



# A Sustainable Production and Consumption Model for Sri Lanka

Developing Country Perspective in relation to Global Change



**Leela Padmini Batuwitage**



**A Sustainable Production and Consumption Model  
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in Relation to Global Change**

Een model voor duurzame productie en consumptie in Sri Lanka  
Het perspectief van een ontwikkelingsland in relatie tot mondiale  
verandering

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## Summary

### **A Sustainable Production and Consumption Model for Sri Lanka – Developing Country Perspective in Relation to Global Change**

Scientific and technological innovations have provided valuable inputs to improve human development over the past 200 years. However, uneven development stemming from the effects of the resource intensive, linear economic growth model and the related changing lifestyles continuously aggravate human pressures on the limited environmental/ecological space available for the survival of all living beings on the planet earth. On the one hand, the earth is under tremendous pressure due to the resource intensive infrastructure developed especially during the period since the industrial revolution by the industrialised countries for their development and the related changing lifestyles. On the other hand the current and emerging demands from the developing countries to improve their standard of living create unprecedented challenges to the limited resource base available for all living beings for their existence. In light of globalisation, no country will be able to address the present multiple global challenges in isolation. The application of Cleaner production (CP)/Sustainable Production and Consumption (SPC) strategies at the local, regional and global level has become imperative to guide and help societies to achieve sustainable human development. Achieving such development needs collaboration between and among developed and developing countries and timely action together.

The challenge for the developing countries is to meet the needs of the people without using the model used by the developed countries, which was based on the principles of ‘pollute first and remedy second’, ‘dilution is a solution for pollution’ etc. Under the developing country perspective, sustainable development also needs economic development along with environmental conservation and wise use of environmental goods and services in a different form than that of developed country perspectives. The author used the developing country perspective, in general, contrasted with the perspective of the developed countries. The author then focused on Sri Lanka for the development of a SPC model.

The author used a ‘mixed method research methodology’ to examine the existing major frameworks, policies, systems and processes for promoting SPC globally and locally, their strengths and weaknesses and linkages in promoting SPC in Sri Lanka, and how Sri Lanka can meet the challenges and effectively guide the development and implementation of a new National SPC programme. The use of the ‘mixed method research methodology’ provided this author extensive literature on global and local perspectives of SPC, case studies and information from the extensive experiences of the author on environmental management and sustainable development for the past 19 years.

Analyses of the theoretical perspective on the evolution of production and consumption patterns and the global and local trends of SPC were used with two case studies including surveys to examine the gaps in the existing system and identify strategies to promote SPC in Sri Lanka, taking into consideration of both global and local perspectives. Considering the multiple inter-linkages and their dynamics operating in the global and local systems, case study methodology was used for the analysis as a major component as it helps researchers to assess the effectiveness of the programmes and initiatives where quantitative techniques tend to obscure some of the important information need to be discovered.

The two case studies include: a. evaluation of the potential of the global network of NCPCs to promote SPC and b. evaluation of the views and responses of a leading environmental policy advocacy group in promoting SPC globally and locally. The findings of the surveys were extensively elaborated upon and supplemented with personal observations of the author at several leading multinational environmental conferences, which the author attended representing Sri Lanka. The author's opportunities to gather information and data in the real life context from such valuable multiple sources is a rare opportunity, which contributed substantially to the author's information and insights. The responses of the global leaders at these fora provided a wealth of information to analyse the potential of the global community to adequately address the multiple global challenges in today's context.

The existing CP/SCP networks and roundtables, which promote CP/SCP nationally, regionally and globally provide opportunities for CP/SCP promoters to network on views/tools/policies on CP/SCP; consequently helping them to become more effective in catalysing national and international actions. In addition, they can strengthen these networks by generating attractive, low cost knowledge management programmes via publications in professional journals and other means. Furthermore, there are increasing numbers of university programmes globally, which are building human capital skills in promoting SPC. It has become urgent, however, to rapidly scale-up and deepen these programmes for application of CP/SCP worldwide base upon a sound environmental governance system. While NCPCs and their global networks can play leading roles to stimulate and promote application of CP/SCP nationally and globally, services of many other institutions and programmes are necessary to implement a SPC model in Sri Lanka or to implement relevant SPC approaches in other countries. Contributions of present Multilateral Environmental Agreements (MEAs) are not sufficient to secure global environmental governance due to intense local pressures based on 'think locally and act globally' advocacy due to their internal conditions and conflicting interests.

The present UN system needs radical reforms in order to secure global good governance, integrating economic development and environmental protection without which sustainable human development will not be possible. The present system should be reformed/strengthened to get the global community committed to take common but differentiated responsibilities based on their capabilities to reverse the trends of unsustainable production and consumption practices considering the accumulated human cost if timely action is not taken.

The SPC model, developed for Sri Lanka from the findings of this dissertation, is presented based upon a vision, mission, goals, and with an operating system that are essential to address the key external and internal forces that impact on application of SPC. The Model's integrated implementation strategies and performance indicators are based upon a sectoral coordination with linkages to existing governmental mechanisms to help to ensure its effective and sustainable implementation. It is anticipated that the model may be replicated in some other countries with appropriate modifications. Further research is necessary to test the Model in few other countries to test its applicability with appropriate modifications based on specific country situations.

The power of the community was evident to act as catalytic agents to promote SPC at national and global levels by supporting political leaders, business community members and other policy makers, to

become empowered with sufficient knowledge and skills. New and innovative knowledge management models are necessary to stimulate target groups to enhance and improve mutual understanding of the problems faced by different countries, and to agree upon a shared vision on how to take shared responsibility for implementing SPC.

Today's challenge for the industrialised countries is to reverse their unsustainable production and consumption patterns that were designed to reinforce the linear, 'bigger-is-better,' more-is-better,' 'richer-is-better' paradigm rather than the ecologically sound system's perspectives of appropriate scale, limits-to-growth' and equity for all. At the same time, non-industrialised countries that contain nearly 80% of the world's population are facing unprecedented challenges to ensure the well being of their people within the shrinking environmental space. The challenges are being increased due to the addition of 70,000,000/yr of people to the planet.

Until now the international community's efforts have failed to respect universally accepted decorum at international fora by using intimidation and undemocratic means of persuasion to advance biased formulations of conditions to be imposed upon others. The theories used to interpret development failed to offer an adequate explanation to the current crises. Therefore, new formulations are needed to guide human efforts to help to guarantee survival of humankind based on sustainable human development with equity, a healthy environment and economic development, equitable sharing of environmental/ecological space, and sustainable lifestyles along a 'middle path', based upon moving away from extreme affluence and abject poverty.

A new theory of collaboration through a cyclic dynamic process ingrained to the phenomenon "Think Globally – Act locally and again Think Globally" is needed to direct the behavior of human agencies for sustainable management of production and consumption locally and globally. A generally accepted theory and practice to ensure application of SPC is necessary to help to manage the ecosystem at global, regional and local levels. At present such a theory to guide the global community does not exist. In that context, the author has made a contribution to the discourse by proposing a theoretical framework with a minimum set of required conditions that are essential for effective collaboration of stakeholders in theory development as well as in practice. The conditions for implementing collaboration are generalisable and will have to be dynamically responsive to findings of future research based on the international environmental negotiation trends and conditions.

In this context, 'Sustainable Human Development' indicators are essential to serve as the framework for monitoring the results of the multi-stakeholder collaboration. In this dissertation, the author proposed a modification to the 'Sustainable Human Development' index developed by the Ministry of Environment of Sri Lanka in 2008. The author added the human population dimension because population growth aggravates human pressure on the limited resources available. The author also integrated the concept of the "Middle Path" that means moving away from extreme affluence and abject poverty by comparing the socio-economic data of Sri Lanka with selected countries as a strategy to equitably share and sustainably manage the common but shrinking environmental space available for all living beings.

## **Samenvatting**

### **Een Model van Duurzame Productie en Consumptie voor Sri Lanka – Perspectief van een Ontwikkelingsland in relatie tot Mondiale Verandering**

Wetenschappelijke en technologische innovaties hebben een belangrijke invloed gehad op de ontwikkeling van mensen in de afgelopen 200 jaar. Daar staat echter tegenover dat de effecten van de industrie op milieu en natuurlijke hulpbronnen, het model van economische groei en de daarmee samenhangende veranderende leefstijlen leiden tot een continu toenemende beslag op de beperkte milieugebruiksruimte waarover alle levende wezens op aarde kunnen beschikken.

Enerzijds staat de aarde onder geweldige druk door industrie en de daarbij behorende infrastructuur die sedert de industriële revolutie ontwikkeld is door de industrielanden voor hun ontwikkeling en hun veranderende leefstijlen. Anderzijds leidt de huidige, toenemende vraag in ontwikkelingslanden om hun levensstandaard te ontwikkelen tot ongeëvenaarde uitdagingen voor de hulpbronnen die alle levende wezens gezamenlijk tot hun beschikking hebben. Tegen de achtergrond van globalisering zal geen land alleen de huidige mondiale uitdagingen aan kunnen. De toepassing van strategieën voor Cleaner Production (CP) en Duurzame Productie en Consumptie (SPC) – lokaal, regionaal en wereldwijd – is een absolute noodzaak geworden om samenlevingen in staat te stellen om een duurzame menselijke ontwikkeling te bereiken. Zo'n ontwikkeling vraagt om samenwerking en tijdige, gezamenlijke actie, in en tussen landen, ontwikkelde landen én ontwikkelingslanden.

Voor ontwikkelingslanden gaat het erom de behoeften van mensen te bevredigen zonder het model te hanteren dat ontwikkelde landen gebruikt hebben. Dat was gebaseerd op het principe 'eerst vervuilen, dan opruimen', en 'verdunding als oplossing voor vervuiling'. In het perspectief van ontwikkelingslanden vraagt een duurzame ontwikkeling om een andere economische ontwikkeling dan in de ontwikkelde landen het geval was. Daarbij gaat het om economische ontwikkeling in combinatie met milieubehoud en het verstandig gebruik van de goederen en diensten van ecosystemen. Dit proefschrift gaat uit van het perspectief van een ontwikkelingsland, in contrast met dat van ontwikkelde landen, en werkt tegen die achtergrond het model uit van een duurzame productie en consumptie (SPC) voor Sri Lanka.

Een methodologie met gemengde methoden wordt gebruikt om onderzoek te doen naar de belangrijkste bestaande raamwerken, beleidslijnen, systemen en processen voor het

bevorderen van SPC, mondiaal en lokaal. Het onderzoek richt zich op sterkten en zwakten, en verbanden die van belang zijn bij het bevorderen van SPC in Sri Lanka, evenals de manier waarop Sri Lanka een succesvol SPC programma kan opzetten. Met deze methodologie konden de uitgebreide wereldwijde literatuur over SPC, case studies en de eigen ervaringen van de onderzoeker gedurende de afgelopen 19 jaar benut worden.

Het theoretisch perspectief van de ontwikkeling van productie- en consumptiepatronen en de mondiale en lokale trends op het gebied van SPC werd gebruikt in twee case studies. In deze studies werden ondermeer surveys gebruikt om de kloof te onderzoeken tussen het bestaande productie- en consumptiepatroon en SPC. Daarnaast werden strategieën geïdentificeerd om SPC in Sri Lanka te bevorderen. Kwalitatieve onderzoeksmethoden werden gebruikt naast kwantitatieve omdat kwantitatieve technieken de onderzoeker vaak minder goed in staat stellen om de effectiviteit van programma's en initiatieven te analyseren. De twee case studies zijn: a. Het mondiale netwerk van National Cleaner Production Centers (NCPC's) en b. Een vooraanstaande internationale adviesgroep voor SPC op mondiale en lokale schaal. De bevindingen van de surveys werden uitgewerkt, en aangevuld met de directe waarnemingen van de onderzoeker tijdens internationale milieuconferenties waar zij Sri Lanka vertegenwoordigde. De unieke gelegenheid die de onderzoeker tijdens deze conferenties had om informatie en data te verzamelen, uit verscheidene bronnen, droeg in belangrijke mate bij tot het succes. De antwoorden van mondiale leiders op deze fora gaven een rijkdom aan informatie waarmee zij kon analyseren in hoeverre de mondiale gemeenschap in staat is om de meervoudige mondiale uitdagingen op te pakken.

Zowel mondiaal als regionaal en lokaal bieden de netwerken voor CP en SPC hun deelnemers de kans om kennis en ervaring uit te wisselen over instrumenten, beleid en opvattingen over cleaner production en duurzame productie en consumptie. Deze netwerken stellen hen zo in staat om effectiever te worden in nationale en internationale initiatieven. De deelnemers kunnen deze netwerken versterken door tegen lage kosten kennisprogramma's op te zetten, publicaties in vaktijdschriften te verzorgen en waar nodig andere middelen in te zetten. Zo ontstaan er steeds meer universitaire programma's die kennis en vaardigheden overdragen ter bevordering van SCP. Deze programma's moeten echter snel verdiept en opgeschaald worden. De NCPC's en hun mondiale netwerken kunnen vooroplopen in het bevorderen van CP en SPC, maar de inzet van vele andere instituties en programma's zal nodig zijn om een SPC model in Sri Lanka en andere landen tot stand te brengen. Bij de huidige belangentegenstellingen zijn de multilaterale Milieuoovereenkomsten (MEA's) ontoereikend om tot een effectieve vorm van mondiale milieugovernance te komen.

Het huidige VN-systeem heeft een grondige herziening nodig om tot mondiale ‘good governance’ te komen. Daarbij moeten economische ontwikkeling en milieubescherming geïntegreerd worden zonder welke een duurzame menselijke ontwikkeling niet mogelijk zal zijn. Het huidige systeem moet herzien en versterkt worden om de wereldgemeenschap te committeren te krijgen aan gezamenlijke, maar onderscheiden verantwoordelijkheden en actie. Die moeten gebaseerd zijn op hun vermogen om onduurzame productie- en consumptiepraktijken te herzien, in het licht van de menselijke kosten die geaccumuleerd worden als niet tijdig actie ondernomen wordt.

Het SPC model dat in dit onderzoek is ontwikkeld voor Sri Lanka wordt gepresenteerd op basis van een visie, missie en doelstellingen en met een uitvoeringssysteem dat essentieel is in het adresseren van interne en externe sleutelfactoren. De geïntegreerde uitvoeringsstrategieën en prestatie-indicatoren zijn gebaseerd op een vorm van sectorale coördinatie en geborgd in bestaande overheidsregelingen. De verwachting is dat het model gerepliceerd kan worden in andere landen, maar wel met de nodige aanpassingen. Nader onderzoek daartoe is vereist.

De internationale gemeenschap bleek effectief in het bevorderen van SPC op nationaal en mondiaal niveau door de ondersteuning die ze leverde aan politieke leiders, leiders in het bedrijfsleven en beleidsmakers. Innovatieve modellen van kennismanagement zijn nodig om doelgroepen te helpen de problemen in verschillende landen te begrijpen, en tot overeenkomst te komen over een gedeelde visie en een manier om gezamenlijk verantwoordelijkheid te nemen voor het implementeren van SCP.

Het is de uitdaging voor de industrielanden om hun onduurzame productie- en consumptiepatronen ingrijpend te herzien. Die werden ontworpen voor het lineaire, ‘groter, meer, rijker is beter’ paradigma, en niet voor een ecologisch verstandig systeemperspectief van ‘passende schaal, grenzen-aan-de-groei en gelijkheid voor allen’. Tegelijkertijd is er de uitdaging voor de ontwikkelingslanden om het welzijn van hun bevolking – bijna 80% van de wereldbevolking - veilig te stellen binnen een kleiner wordende milieugebruiksruimte. Die uitdaging wordt groter omdat er jaarlijks 70 miljoen mensen bij komen op aarde.

De inspanningen van de internationale gemeenschap zijn er tot nu toe onvoldoende geweest om een algemeen aanvaard decorum te handhaven. Dat komt door intimidatie en ondemocratische overredingstechnieken die tot doel hebben om eenzijdig geformuleerde voorwaarden op te leggen aan anderen. Ontwikkelingstheorie is niet in staat een adequate verklaring te bieden voor de huidige crises. Daarom zijn er nieuwe benaderingen nodig voor

menselijke inspanningen die de overleving van de mensheid helpen garanderen; gebaseerd op duurzame menselijke ontwikkeling, met gelijkheid, een gezonde leefomgeving en economische ontwikkeling; eerlijk delen van de milieugebruiksruimte, en duurzame leefstijlen op een middenweg tussen extreme rijkdom en verwerpelijke armoede.

Er is een nieuwe theorie van samenwerking nodig, in een cyclisch dynamisch proces dat nog het best beschreven wordt met een variatie op een bekend motto: ‘Think Globally, Act Locally and again Think Globally’. Daarmee kan het gedrag gestuurd worden van menselijke instellingen voor duurzaam management van productie en consumptie. Een algemeen geaccepteerde theorie en praktijk om SPC toe te passen is nodig om het ecosysteem te beheren, op mondiale, regionale en lokale schaal. Zo’n theorie, die leidend is voor de internationale gemeenschap, ontbreekt momenteel. Dit onderzoek beoogt een bijdrage te leveren aan de discussie daarover met een theoretisch raamwerk dat een set minimum voorwaarden omvat die essentieel zijn voor effectieve samenwerking van belanghebbende actoren. Deze minimumvoorwaarden zijn generaliseerbaar, en de voorwaarden zullen aangepast moeten worden aan de bevindingen van toekomstig onderzoek naar internationale milieuonderhandelingen.

In deze context zijn indicatoren voor ‘Sustainable Human Development’ essentieel. Ze kunnen dienen als een raamwerk voor het observeren van de resultaten van multi-stakeholder samenwerking. In dit proefschrift wordt een wijziging voorgesteld in de index voor ‘Sustainable Human Development’ die in 2008 ontwikkeld werd door het Ministerie van Milieu in Sri Lanka. De variable ‘bevolkingsomvang’ is toegevoegd omdat bevolkingsgroei de menselijke druk op beperkte hulpbronnen vergroot. Ook is het concept van de middenweg, ‘the Middle Path’, geïntegreerd in de index, door sociaal-economische gegevens over Sri Lanka te vergelijken met bepaalde andere landen. Dit alles draagt bij tot een strategie voor het eerlijk delen en duurzaam beheren van de gemeenschappelijke doch krimpende milieugebruiksruimte die beschikbaar is voor alle levende wezens.





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## Acronyms and Abbreviations

10YFP	Ten-year framework of programs
ACME	Applying Cleaner Production to Multilateral Environmental Agreements
APO	Asian Productivity Organisation
APRSCP	Asia-Pacific Roundtable for Sustainable Consumption and Production
AWG-KP	Ad-hoc Working Group of the Kyoto Protocol
AWG-LCA	Ad-hoc Working Group of the long term cooperative action
BCE	Before Common Era
BCRC	Basel Convention Regional Centre
CBOs	Community Based Organisations
CCC	Ceylon Chamber of Commerce
CBDR	Common but Differentiated Responsibility
CEA	Central Environmental Authority
CDM	Clean development Mechanism
CENIA	Czech Environmental Information Agency
CEPOM	Committee on Environmental Policy and Management
CFCs	Chlorofluorocarbons
CFE	Caring for Environment
CIEDP	Committee on Integration of Environment and Development Processes
CITES	Convention on International Trade in Endangered Species of wild Fauna and Flora
CMS	Conservation of Migratory Species
COP	Conference of Parties
CP	Cleaner Production
CPC	Cleaner production Centre
CSD	Commission of Sustainable Development
CSR	Corporate Social Responsibility
DELEC	District Environmental Law Enforcement Committees
DEO	Divisional Environmental Officer
DFCC	Development Finance Corporation of Ceylon
DoI theory	Diffusion of Innovation theory
DTIE	Division of Technology Industry and Economics

ECLA	Economic Commission of Latin America
ECOSOC	Economic and Social Council
EEA	European Environmental Agency
EECCA	Eastern Europe, the Caucasus and Central Asia
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
EMT	Ecological Modernisation Theory
EST	Environmentally Sound Technology
EPL	Environmental Protection Licensing
EPR	Extended Producer Responsibility
FAO	The Food and Agriculture Organisation
GCOS	Global Climate Observing system
GDP	Gross Domestic Product
GEO	Global environmental Outlook
GFN	Global Footprint Network's
GLAP	Green Lanka Action Plan
GNP	Gross National Product
CPGS	Cleaner Production Global Status
GTZ	Bilateral Development Cooperation between Sri Lanka and Germany
HDI	Human Development Index
HDR	Human Development Report
HPI	The Happy Planet Index
ICT	Information and Communication Technology
IEG	International Environmental Governance
IPPC	Industrial Pollution Prevention and Control
IPPP	Industrial Pollution Control and Prevention
IPRP	Industrial Pollution Reduction Programme
ISB	Industrial Services Board
ITI	Industrial Technology Institute
IUCN	International Union for Conservation of Nature
JBIC	Japan Bank for International Cooperation
JCLP	Journal of Cleaner Production
LCA	Life Cycle Analysis
Kgoe	Kilogramme of oil equivalent

MBIs	Market Based Instruments
MC	Municipal Councils
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements/Treaties
MENR	Ministry of Environment and Natural resources
MID	Ministry of Industrial Development
MIF	Multilateral Investment Fund
MoE	Ministry of Environment
MoF	Minister of Finance
NCPC	National Cleaner Production Centres
NCPP	National Cleaner Production Programmes
NCS	National Conservation Strategy
NCSD	Nation Council of Sustainable Development
NDB	National Development Bank
NEA	National Environmental Act
NEAP	National Environmental Action Plan
NEF	New Economic Foundation
NELEC	National Environmental Law Enforcement Committee
NEP	National Environmental Policy
NERDC	National Engineering Research and Development Centre
NGOs	Non Governmental Organisations
NPPR	National Pollution Prevention Roundtable
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OTA	Office of Technology Assessment
PCAF	Pollution Control Abatement Fund
PIC	Prior Informed Consent
PLI	Plan of Implementation
POI	Plan of Implementation
PPP	Purchasing Power Parity
PRISMA	Project of Industrial Successes with Pollution Prevention
PRISMA	Preventive Self Management programme
PSs	Pradeshya Sabas (Small Town Councils)
PECP NET	Resource Efficient Cleaner Production Network

SCOPE	Scientific Commission on Problems of the Environment
SCP	Sustainable Consumption and Production
SPC	Sustainable Production and Consumption
SD	Sustainable Development
SEA	Strategic Environmental Assessments
SEE	South East Europe
SME	Small and Medium Enterprises
SIDA	Swedish International Development Cooperation Agency
SPC	Sustainable Production and Consumption
UCs	Urban Councils
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCED	United Nations Conference of Environment and Development
UNEPGC24/GEMF	UNEP Governing Council/Global Environmental Ministers Forum
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nation's General Assembly
UNHDR	United Nations Human Development Report
UNIDO	United nations Industrial development Organisation
USAID	United States Agency for International Development
VET	Vehicle Emission Test
VCs	Village Councils
WBCSD	World Business Council for Sustainable Development
WCPS	World Cleaner Production Society
WEC	World Environment Centre
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature





# **A Sustainable Production and Consumption Model for Sri Lanka**

## Developing Country Perspective in Relation to Global Change

### **CHAPTER 1 - INTRODUCTION**

#### **1.1 Background**

In space, our planet earth is only one object among millions travelling through the solar system. Unknowns are more numerous than the knowns in this system. There have been numerous humans' efforts to determine if there are other planets where similar living beings exist or whether living beings could exist on other planets. Thus far the wonderings have been mainly limited to imaginations and predictions.

On planet earth, changes of production and consumption patterns of humans in different regions, from primitive ages to the present, have created profound imbalances in the functioning of the natural ecosystems, at different levels. It is an accepted fact that the standard of living of some humans has been improved gradually with technological advancement; however the technological changes have also caused grave imbalances within, between and among communities due to uneven development, ecological disruption and social discord.

There are wide global disparities of per-capita consumption of natural resources and emissions of wastes. For example, the world's average per capita consumption of energy is 1,778.0 (kgoe) in 2005 (Earth Trends - 2011) that is more than twenty times the average food energy intake.<sup>1</sup> Meanwhile, nature signals the limits to growth as humans exceed the ecosystem's carrying capacity. The Global Footprint Network (2007) ([www.footprintwrk.org](http://www.footprintwrk.org)) reported that the total global ecological footprint of 2.7 (ha/person) already exceeds the earth's bio-capacity of 1.8 (ha/person). High-income countries account for an ecological footprint of 6.1 (ha/person) as against the bio capacity of 3.1, whereas middle income and low-income countries have ecological footprints of 2.0 and 1.2 (ha/person) compared with their bio-capacities of 1.7 and 1.1 respectively.

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<sup>1</sup> The average per-capita consumption of energy: in developed countries - 4720.0, developing countries - 975.9, High income countries - 5523.6, Low income countries - 491.8, Middle income countries - 1509.3, North America - 7942.9, South America - 1151.2 (kgoe)

Today, we are faced with two different but interconnected problems, which require immediate attention if humankind is to succeed in working within the earth's ecosystem's dynamic capacity. One problem is over-consumption by the richest 20 per cent of the world's population, which is responsible for 86 per cent of total private consumption expenditures. The second problem is extreme poverty where the poorest twenty per cent of the world's human population consume five percent or less for the goods and services (GEO3). While over-consumption by the rich one billion people imposes a tremendous pressure on the natural resource base, the balance of the 6.5 billion humans on earth at this time, also make high demands on natural resources to enhance their living standards. Human Development Report of the (HDR/UNDP 2007/2008) reports that there are still around one billion people living at the margins of survival on less than one US\$ a day, with 2.6 billion – 40 per cent of the world's population living in less than two US\$ a day. Even though the purchasing power parity differs from country to country the figure 40 per cent is significant in terms of the gap between the rich and poor. More than 80 percent of the world's population lives in countries where income differentials are widening. One consequence of is that more growth is required to achieve equivalent poverty reduction outcome. According to one analysis, developing countries have to grow at over three times the pre 1990-rate to achieve the same reduction in poverty incidence. This indicates the necessity of “doing more with less” with the limited resources available in the world.

In the recent past, numerous initiatives have been taken to reverse the trends of present unsustainable production and consumption patterns in various parts of the world. However, these efforts have not been able to adequately achieve the expected results especially, due to powerful external forces embedded in current market systems.

Meanwhile the human population continues to increase at the rate of approximately 70,000,000 per year. This also contributes to higher demands on natural resources and energy. Today's population has increased three times more than it was at the beginning of the 20th century. GEO4 (2007) reports that during the past 20 years, the global population has continued to rise, increasing from 5 billion in 1987 to 6.7 billion in 2007 with an average rate of 1.4 per cent. However there are large differences across regions. Migration is also a significant challenge due to environmental, economic and political reasons (GEO4).

The author reviewed the evolutionary process and concepts of transformation of human civilisations, from the primitive stages to the current stage of production and consumption along with the changes of the ecosystems as a result of these transformations. The objective

was to develop a model for sustainable production and consumption (SCP) for Sri Lanka based upon the developing country perspective in relation to Global Change. The model can be used outside Sri Lanka with suitable modifications. The special feature of this dissertation is that the author did not narrow the focus to the analysis of local perspectives in developing the model. While considering the local perspectives in application of SPC, the author evaluated the linkages of the effectiveness of implementation of the SPC model from the local to the global levels of global environmental issues and related socio-economic perspectives, which are powerful external forces that can create positive or negative impacts on the local efforts (see figure 6.2).

Three research questions were developed to address these problems, which were used to inquire into the existing policies, frameworks, and procedures for promoting SPC globally and locally with regard to their applicability in Sri Lanka. The author explored the reasons why the existing systems prove to be inadequate for promoting SPC (explanatory), and strategies to promote SPC in Sri Lanka (instrumental).

It was found by the author that because current natural resource pricing policies do not reflect the true costs to the ecosystem services, dramatic paradigm changes are necessary to reverse the trends of unsustainable production and consumption systems, especially in the industrialised countries and in the countries with economies in transition.

The author further considered that SPC should not be limited to environmentally friendly production and consumption processes designed to help to conserve natural resources, to minimise pollution and emissions. But, SPC must have a direct link to the changing lifestyles as well as to decreasing human population increases. However, attainment of SPC practices should not constrain the economic growth of developing countries nor should it hinder their efforts to achieve social goals such as poverty alleviation.

Therefore it was necessary to evaluate the roles of government, the roles of other SPC promoting institutions both national and international, the roles of the private sector, and the roles of the global community as stakeholders in promoting and supporting SPC, considering their different stages of development based on which the global community is seeking to respond to the present multiple crises (figs 3.1 and 3.2).

Therefore the author investigated diverse, complex and conflicting dynamic systems within which the issue of SCP could be considered. The research covers a number of issues from a 'system's dynamics,' perspective that include resource consumption, economic growth, human

population growth, social welfare, uneven development, poverty and social equity. These perspectives were evaluated from an integrated perspective within the context of the driving forces such as globalisation, international trade regimes, international environmental treaties, international and local institutions and related economic-environmental-social policies, and fluctuations of and impacts upon the ecosystems due to these complex systems.

This chapter provides an introduction to the research via an overview of the background, the research objectives, research questions, methodology and the dissertation design.

## **1.2 Objectives of the research – an overview**

During this research the financial crisis deeply impacted many parts of the world. The 2008-2010 financial crises in many developed countries provided evidence that their economies are not sustainable. This crisis is the most severe recession since the Great Depression of 1930s. However, the focus upon resilience is mainly on one aspect of sustainability, the economy. As a result of neglecting the consequences of natural resource depletion, too frequently, the social and economic consequences were also given low priority even though they are also part of the wider market failure that triggers additional losses of the natural capital. If the present unsustainable production and consumption patterns continue, these financial crises may become acute economic crises, which could further lead to severe environmental crisis due to the rapidly expanding resource depletion and environmental pollution. Is humanity able to cope with this sustainability crisis or do we continue in the traditional way and is the 2008-2010 just another crisis in the ups and downs of economic cycles?

High human development indices measured in the majority of these countries by the United Nations Development Programme indicates the need to seriously consider ecological sustainability factors within the development processes in order to achieve economic and social sustainability (SHDI 2008). In the future, countries may need to impose restrictions on their exports considering internal energy security, food security and social security. This situation could aggravate trade imbalances and thereby, result in further, negative impacts on social equity. On the other hand, sole or heavy dependence upon the network of international trade systems presents a high risk for the sustainability of the local economy as economic recessions of one country can dramatically affect the economies of depending countries, especially, developing countries.

In the future, the powerful countries in the world may not be the countries with higher GDP, because high GDP is not sustainable (SHDI 2008). The countries with higher bio-capacities may be more sustainable and therefore, may become more powerful if they efficiently and effectively manage their natural and human resources. The future challenge to the developing countries is to achieve a higher economic growth while maintaining the sustainability of their ecosystems and the social-psychological sustainability of their human populations. For the high-income countries a socio-ecological transition is necessary to reduce the per-capita energy and material use, thereby, moving away from the present unsustainable production and consumption practices. The global and local symptoms of environmental impacts of our current patterns are forcing us to think differently at various levels; this must include the paradigm shift from ‘humans having dominion over the entire ecosystem’ to one of ‘humans being an integral part of the ecosystem upon which we are totally interdependent’.

Sri Lanka, as a developing country, is confronted with the common challenges faced by most of the other developing countries at different levels in the path of sustainable development. Even though the cleaner production and sustainable development concepts have been promoted around the world since 1992, economic development oriented, global market and trade regimes, continue to nullify the limited successes achieved through initiatives taken by various countries and regions. However, with the increasing awareness of the negative, global, environmental impacts of the present unsustainable production and consumption patterns, there is an increasing urgency and an improved likelihood that societies will finally make the essential transformations from the present unsustainable trends into more sustainable patterns.

The objective of this dissertation is therefore, to evaluate the strategic approaches for SCP that Sri Lanka is taking in context of the global and local trends and conditions and based upon that assessment, to develop a SPC model for a National Strategic SPC program for Sri Lanka to serve as a guide for their future SCP efforts and sustainable development.

### **1.3 Research Questions**

The author sought to answer three main research questions in order to identify and characterise the strategic approaches for the national SPC model for Sri Lanka considering the developing country perspective in relation to global change.

Before stating the research questions, the author provides some contextual information. Sri Lanka is an island located in the Indian Ocean close to the southern tip of India. It has been identified as a bio-diversity hotspot of the world. The high population density (average 310/km<sup>2</sup>) and poverty (15% of the population lives below the poverty line) demands a high economic growth to seek to reduce that poverty. A significant future challenge for Sri Lanka is to achieve sustainable, high economic growth with greater equity, whilst responding to globalisation to suit the local conditions in an ecologically sustainable manner. Even though the current pollution levels of the country are relatively low (the industry sector's contribution to GDP is 28% - 2009) compared with most other countries, transformation to more ecologically SPC patterns is necessary to ensure long-term sustainability of economic and social development.

Adverse impacts of the production and consumption of each country or region are unique and at the same time they are interlinked with the global community. In this context the high income countries should take the lead to effectively manage the ecological interdependence in sustainable ways in collaboration with other countries so as to ensure their services for present and future generations based on the principle of “common but differentiated responsibilities and respective capabilities”. Identification and evaluation of the existing global and local policies and practices of production and consumption and their related environmental impacts is necessary in order to be in a position to propose paradigm changes in the global and local systems. In this context, the research questions are presented in the following paragraphs.

Under the present globalisation trends and conditions, no single country would be able to address the present global environmental challenges and related national impacts in isolation. Therefore analysis of both international and national perspectives was necessary to identify strategies for a SPC model for Sri Lanka.

**Therefore, the first research question (RQ1) of this dissertation is:**

“What are the main existing frameworks, policies, systems and processes for promoting Sustainable Production and Consumption (SPC) in other countries in general and in Sri Lanka, in particular?”

It was found that a majority of the global community has accepted, in principle, that human induced activities are causing unprecedented environmental calamities such as climate change, depletion of natural resources etc. (eg. Agenda 21 adopted in 1992). In spite of many

activities/initiatives taken by the global community, collectively and individually to address these problems, many problems remain unresolved and new problems are emerging. Therefore, research question two (RQ2) was formulated to evaluate the successes, failures, scopes and limitations of the existing systems to better understand the static and dynamic nature of the current SCP systems.

**The second research question (RQ2) is:**

“Why did the existing frameworks, policies, and systems and procedures prove to be inadequate in promoting Sustainable Production and Consumption (SPC)?”

Sri Lanka faces daunting challenges in her path to sustainable development. There is a high demand on the natural resource base to ensure food security, energy security and social security even though the existing pollution levels are relatively low (CO<sub>2</sub> emission is 0.6t and share of world is negligible (Human Development Report -2006). The strategic location of the country in the world map provides an opportunity to economic growth compared with many other countries. Ecologically sustainable development strategies should be used to ensure economic and social sustainability, and social security of the country.

The main objective of this dissertation was to develop a model for SCP that can be used in Sri Lanka for the benefit of present and future generations. The third research question was formulated to identify the strategic options to develop and implement the SPC model based on the findings for the first and second research questions.

**The third research (RQ3) question is:**

“How can Sri Lanka meet the challenges and effectively guide the development and implementation of a new National Sustainable Production and Consumption (SPC) programme?”

It is assumed that gathering information and addressing these three research questions will provide the framework and content to develop and implement Sri Lanka’s strategic, sustainable SPC program with new paradigms, frameworks, policies, systems and procedures.

## 1.4 An Overview of the Research Methodology

The author used the ‘Mixed method research methodology’ to seek answers to the three research questions considering the complex and dynamic nature of the existing global, regional and local systems and their interdependencies (see figs. 1.5, 3.2 and 6.2 for an overview). Yin (2009) specified that the mixed method research methodology permits investigators to address more complicated research questions and to collect a richer and stronger array of evidence than can be accomplished by a single method. The mixed methods research forces the methods to share the same research questions, to collect complementary data, and to conduct counterpart analysis – in short to follow a mixed methods design. The author used; ‘extensive literature review’, ‘case studies’, ‘data from direct observations as a participant in leading international conferences that were directly related to the subject of SPC’, and based upon the author’s ‘extensive experience gained for the past 19 years in the field of environment and sustainable development as an officer in the public service’.

The key elements of the mixed method research methodology:

- **A literature review on the theoretical perspectives** of the evolution of production and consumption patterns including key theoretical interpretations of economic growth and their linkages to modern and uneven development, the emergence of the idea of ecological modernisation, the failure of these theories to effectively guide practice of sustainable development considering the ecosystem’s limitations at the global and local levels, and the need for collaboration in both domains (in theory and in practice) to guide the global community to change the unsustainable production and consumption patterns by equitable sharing of the limited environmental space available for the sustenance of all living beings and the ecosystems;
- **A literature review of global trends and conditions of SPC** and their linkages to sustainable and equitable human development and to the functioning of ecosystems;
- **A literature review of local trends and conditions related to SPC** and potential and challenges for application of SCP;
- **The use of two case studies**, which were designed to integrate the information gathered from the literature reviews and the professional experiences of the author of the dissertation to understand the potential and challenges to promote SPC in Sri Lanka,

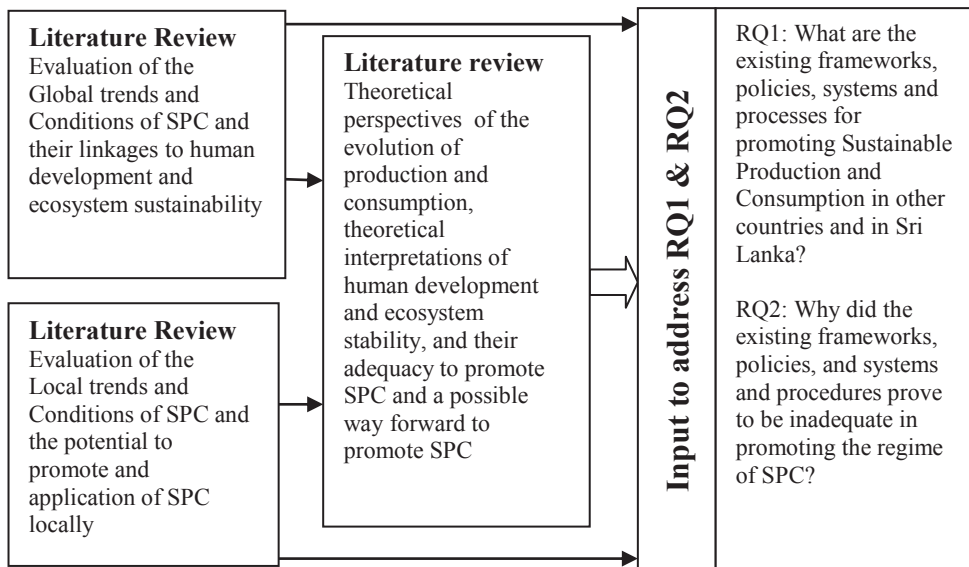


considering the international and local perspectives, both in implementation level (case study one) and on policy level (case study two) in the real life context;

- **Observations and experiences gathered** from leading international environmental conferences as a representative of Sri Lanka; and
- **Use** the observations, information, data, findings and conclusions gathered from the above with the extensive experiences gained by the author for the past 19 years, the author had been directly involved in work on sustainable development, to develop the SPC model for Sri Lanka considering the developing country perspective.

Adverse impacts of the production and consumption of each country or region are unique in one way and also interlinked at the same time with the global community. Therefore, to address the research questions one and two, initially it was necessary to evaluate: the evolution of the production and consumption (historical perspective) from primitive age, current status and the global and local trends and conditions of production and consumption patterns along with the patterns and possible theories adopted from the primitive to the current stage.

Chapters 2, 4 and 5 of the dissertation were based upon extensive literature review, personal observations and experiences of the author. Chapters 4 and 5 present an overview of the global trends and conditions of SPC – a literature review, and theoretical perspectives of the evolution are presented in Chapter 2. Figure 1.1 shows the framework of the methodology used to address the first and the second research questions from these three chapters using the literature review. Two case studies were used subsequently to link the findings of the literature review to the real life situation.



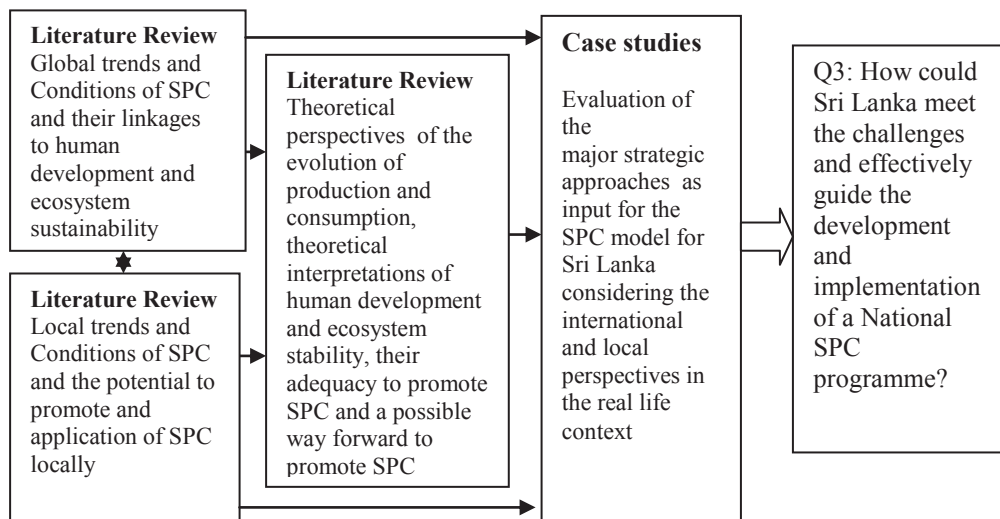
**Figure 1.1: The framework of the methodology to address the RQ1 & RQ2**

Based upon the literature review, it was found that the major theories (Chapter 2) did not adequately predict the present multiple global crises. Nor did they adequately address ecosystem limitations in the context of unlimited growth (both consumption and production). Nevertheless, all those theories (Chapter 2) provide valuable insights and perspectives about factors that influence development, which can help the author to better explain resource scarcities, underdevelopment, uneven development, merits and demerits of dependence, inter-linkages of global economic policies etc.

Theories are of no use if they do not help to guide practice. Therefore, the author sought to develop a theoretical framework, which can be used to integrate the requirements of collaboration, in theory and in practice, to promote SPC. The framework was tested under the global and local contexts (Chapter 9 and Chapter 6).

Two case studies were used to link the findings from the literature review and obtain information about the major strategic approaches required to meet the challenges to promote SPC. These two case studies were major components of the mixed methods research used in this dissertation. The assumption is that in a framework with complex, dynamic and

interconnected social and economic systems: Case studies can provide a practical approach to build upon theory, to dispute or challenge that theory, to explain complex multidisciplinary situations, and to provide a basis to apply practical solutions to such situations. The figure 1.2 shows the framework of the methodology used to address research question 3.



**Figure 1.2: Framework of the methodology used to address the RQ3**

It is important to note the following abstract/overview of the case study method specified by Yin (2009) compared to other research methods.

*“The case study is but one of several ways of doing social science research. Other ways include but are not limited to experiments, surveys, histories, and economic and epidemiologic research.*

*Each method has peculiar advantages and disadvantages, depending upon three conditions: the type of research question, the control an investigator has over actual behavioral events and the focus on contemporary as opposed to historical phenomena. In general case studies are the preferred method when: (a) “how” and “why” questions are being posed, (b) the investigator has little control over events, and (c) the focus is on contemporary phenomena within a real life context. This situation distinguishes case study research from other type of social science research. Nevertheless, the methods overlap in many ways, not marked by sharp boundaries.*

*In case studies, the richness of the phenomena and the extensiveness of the real life context require case study investigators to cope with technically distinctive situations. There will be many more variables of interest than data points. In response, an essential tactic is to use multiple sources of evidence, with data needing to converge in a triangulation fashion. This challenge is but one of the ways that makes case study research “hard” although it has classically been considered to be a “soft” form of research”.*

The two case studies were used to obtain information about the global and local perspectives of SPC systems and to then evaluate the strengths and weaknesses of the current communication systems. Multiple and diverse sources of data and information used in these case studies characterised the local and global perspectives of the problem domain and their linkages and co-existence as these sources were heavily interlinked and mutually supportive.

The two case studies built upon the information gathered from the literature review presented in chapters 2, 4 and 5 into the real life context and facilitated to identify strategic interventions necessary for a SPC model for Sri Lanka.

The theoretical perspectives were assessed based upon the outcomes of the case studies and personal observations of the author in international conferences. Insights gained were used to help the author to develop strategic options that can be considered for a SPC program for Sri Lanka. The objective is to develop a theoretical framework to be used as a foundation considered in the development and implementation of a SPC model for Sri Lanka.

### **1.4.1 Case studies**

This section presents an overview of the methodology used to identify strategic approaches to promote SPC globally and nationally. As stated in the previous section, two case studies were used for this purpose together with the findings of the literature survey on global and local trends and conditions. The findings were used to validate the theoretical framework on collaboration, developed to promote SPC locally and globally.

#### **1.4.1.1 Case Study One**

The overarching objective of Case study one was to evaluate the potential of the global community to effectively guide the local efforts of application of SPC and identify the strategies to promote SPC in Sri Lanka considering both, the local and global perspectives.

The information gathering protocol used in the development of Case study one included a combination of sources to obtain information and data, which are extensively interlinked and hence were essential for application of the insights in the real life context of the problem domain and for identifying strategies to promote SPC locally.

Yin (2009) specified that “in case studies, the richness of the phenomenon and the extensiveness of the real life context, require case study investigators to cope with a technically distinctive situation: There will be many more variables of interest than data points. In response, an essential tactic is to use multiple sources of evidence, with data needing to converge in a triangulating fashion”.

Case study one, basically includes an evaluation of the potential of UNIDO/UNEP international network of the National Cleaner Production Centres to promote CP locally and globally. The UNIDO/UNEP NCPC programme has been established with the objective of assisting developing countries and countries in economies of transition in application of CP for industrial development. There is a NCPC functioning in Sri Lanka. Therefore, by evaluating the potential of this network to promote SPC locally through local NCPCs and by exploring the potential of the NCPC of Sri Lanka to promote SPC locally, the author expected to identify strategies for the SPC model for Sri Lanka.

In addition to the UNIDO/UNEP NCPC Network, Case study one includes observations and experiences made by the author at three leading international conferences which included: the 25<sup>th</sup> Session of the UNEP Governing Council/Global Environmental Ministers Forum (2009); 17<sup>th</sup> Session of Commission of Sustainable development (2009), and the 15<sup>th</sup> Conference of Parties to the Climate Change, famously known as COP15 (2009), to validate the conclusions made by the evaluation of the UNIDO/UNEP NCPC network. Integration of those broader approaches within the framework of Case study one was necessary in order to obtain clearer insights of the global trends and conditions and their potential role(s) in promoting application of SPC at local and global levels and also to evaluate the capacity of the local NCPC as a single organisation to promote SPC in the country (fig. 6.2).

Therefore, Case study one covered a wider range of major stakeholders of SPC who were involved in sustainable development issues in the real life context at the global and local levels and facilitated the author’s evaluation of global perspectives and local level reflections/perspectives/responses to the issues of SPC.

In Case study one, initially, a questionnaire was sent to the 35 countries NCPCs in the UNIDO/UNEP CP network requesting responses on the following categories<sup>2</sup>:

- a) General information pertaining to the objectives and strengths of the NCPCs;
- b) Geographical distribution of CP networks and linkages of the NCPCs;
- c) Contributions of the NCPCs to meet the national goals of their countries;
- d) Governmental policies and opportunities for NCPCs to assist in incorporation of CP activities in to the government policies;
- e) Implementation of UNIDO's strategies;
- f) Sources of financing of NCPCs and the ways and means for ongoing self-support and their sustainability.

Yin (2009) also specified that mixed methods research can permit investigators to address more complicated research questions that will enable them to collect a richer and stronger array of evidence than can be accomplished by any single method alone.

In addition to this questionnaire, the author used data and information gathered from the following sources to arrive at better results for developing strategies for the SPC model for Sri Lanka:

1. Literature review including a report (2008) of an independent evaluation conducted by UNIDO on the UNDO-UNEP Cleaner Production Programme;
2. Results of a structured interview with the major stakeholders of the CP in Sri Lanka;
3. Observations and information gathered at the 9<sup>th</sup> Annual Meeting of UNIDO/UNEP National Cleaner Production Centres and Programme jointly organised by UNIDO and UNEP that was in September 2007 in Semmering, Austria; and,
4. Observations and interviews with participants at three high-level international conferences<sup>3</sup> related to environmental and sustainable development.

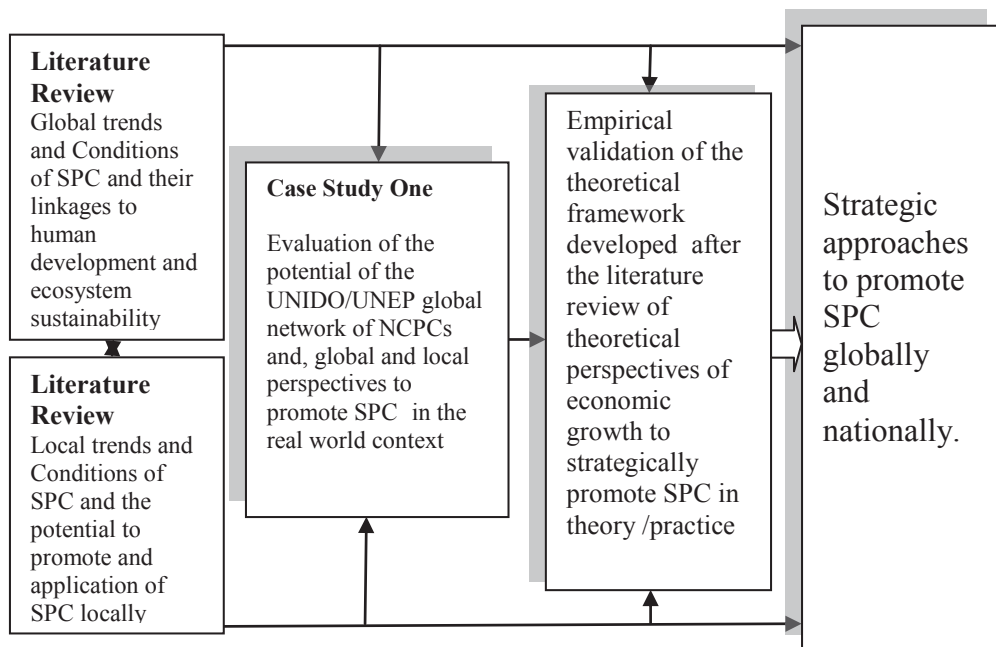
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<sup>2</sup> Nineteen NCPC centres committed to provide information requested in the questionnaire; fourteen provided completed responses.

<sup>3</sup> UNEP Governing Council/Global Ministerial Environment Forum held in February in 2009 in Kenya, 17<sup>th</sup> Session of UN Commission of Sustainable Development held in May 2009 in New York, 15<sup>th</sup> Meeting of the Conference of the Parties to UNFCCC and 5<sup>th</sup> Meeting of the Kyoto Protocol held in Copenhagen in December 2009, famously known as COP15.

The author attended the three international fora referred in four above, while representing Sri Lanka and the 9th Annual Meeting of UNIDO/UNEP as an observer. The data were also used to empirically validate the Theoretical framework developed by the author (Chapter 2) with a minimum set of criteria necessary for collaboration of different stakeholders for implementation of the SPC model.

Figure 1.3 shows the framework of the methodology used to obtain information and to evaluate the strategic approaches to promote SPC in Sri Lanka based upon considerations of global and national perspectives.



**Figure 1.3: Methodology to identify and to evaluate the strategic approaches to promote SPC in Sri Lanka based on case study one**

#### 1.4.1.2 Case Study Two

Case study two was designed to investigate the dynamics of the international and local policy aspects in relation to SPC. In the case study methodology, Yin (2009) specified that multiple case designs may be preferred over single case designs when there is a choice and

(resources). The chances of gaining new insights when using multiple case studies are better than when one uses a single case study.

Therefore, Case study one and Case study two are complementary because Case study one extensively focused on implementation aspects while Case Study Two focused on policy aspects. When the two case studies are taken together, they provide a richer and stronger array of information and evidence of the behaviour and responses of local and global community. Consequently, they provided valuable inputs for answering the three research questions of this dissertation.

Case study two examines the strengths, challenges and opportunities for application of SPC practices through personal responses of a group of leading environmental policy makers at an international forum. These policy makers were senior environmental officials of selected countries who were nominated to represent the five UN regions<sup>4</sup> in the work on implementing three leading multilateral environmental conventions<sup>5</sup> and their personal views have a heavy linkage to and impact upon the real life context at international level. These members were nominated among the parties (countries) to the convention (the larger group) by the parties to represent them under the five UN regions to identify synergies among the three Multilateral Environmental Conventions which have linkages to SPC.

The author, as one of the members of this group, was able to use this forum to perform an independent survey to examine the strengths and opportunities of application of CPC practices globally, based upon personal responses of these environmental leader's to a questionnaire.

Yin (2009) specified that multiple methods can be used in any given study (for example, a survey within a case study or a case study within a survey). But one should be able to identify some situations in which a specific method has a distinct advantage.

The members of the policy group have the potential to develop appropriate SPC policies both at the global and local levels. However, policies alone are not sufficient to ensure implementation of SPC practices. These issues were examined within Case study two, the findings of which support the observations and recommendations of Case study one

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<sup>4</sup>Africa, Asia and the Pacific, Central and Eastern Europe, Latin America and the Caribbean, Western Europe and others.

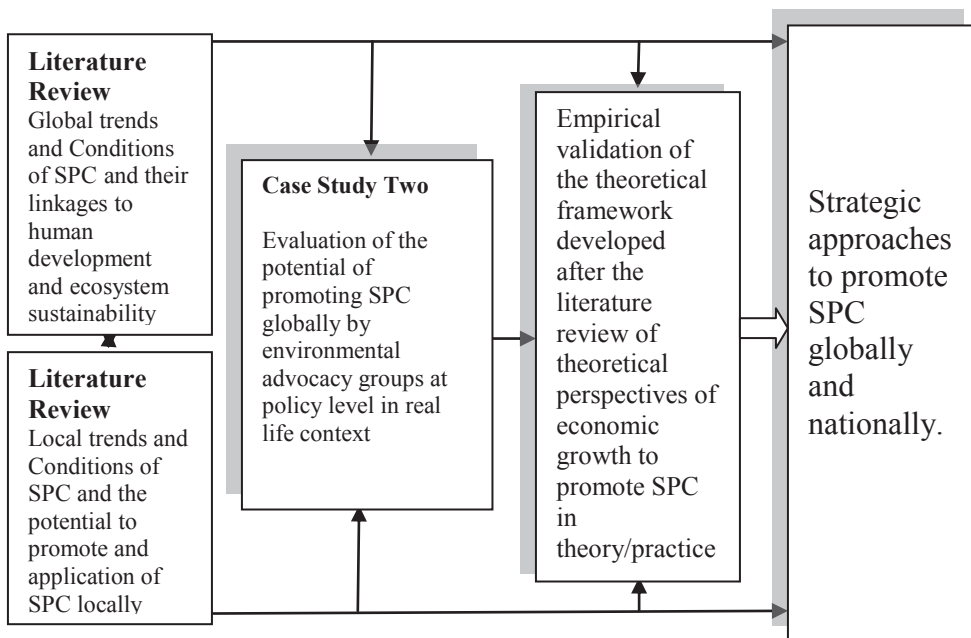
<sup>5</sup>The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), The Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention on POPs) and The Rotterdam Convention on Prior Informed Consent (Rotterdam Convention on PIC).



and the validity of the revised theoretical framework. Both Case studies, together with the information presented in Chapters 4 (global perspectives) and Chapter 5 (local perspectives) provided inputs for development of the SPC model for Sri Lanka as it covered both the global perspectives and local level reflections/perspectives/responses related to SPC.

Fourteen commonly used statements at different fora related to SPC were developed to obtain responses of the members of the forum. The questionnaire was distributed among 39 members of the group and 22 responses were received.

Figure 1.4 shows the framework of the methodology used to analyse the strategic approaches to evaluate the potential of external driving forces to promote SCP globally and locally.



**Figure 1.4: Methodology to evaluate strategic approaches to use external driving forces to promote SPC globally and locally based on case study two**

The findings of the survey (case study two) were analysed on the basis of the theoretical framework developed and presented in Chapter 2 to help the author to identify strategic approaches to use external driving forces to promote SPC globally and locally.

## 1.5 Dissertation design

The dissertation outline presents the sequential development of the research in ten chapters.

**Chapter 1** provides an overview of: the background of the research, the research objectives, the research questions, the methodology adopted and the dissertation design in brief.

**Chapter 2** provides the theoretical perspective of the evolution of production and consumption patterns across the globe from the primitive to the modern era, based upon insights gained from the literature review. Different theories and schools of thoughts developed by the research community analysing, interpreting and explaining the patterns of economic growth and presented in the literature reflects: *the strengths & weaknesses of the economic development systems/models followed by the global community at various stages from primitive to modern development; resulting changes of the standards of living of the societies and related environmental impacts.*

The modernisation and dependency theories were used as two different perspectives commonly used by social scientists, which led the economic development in the past. The Marxist theory was used in explaining the issue of uneven development.

Ecological modernisation and its applicability and the principles of diffusion of innovation were used to help the author to identify strategies of diffusion of ecologically friendly technologies and more sustainable lifestyles.

Based on the theoretical analysis and upon the results from interviews and the experiences gained at various international conventions, the author developed a Theoretical framework with a minimum set of criteria leading to promote collaboration in development of theory and practice in the real life context in application of SPC.

**Chapter 3** provides information about the research methodology along with an outline of the research steps used. It explains the research goals, questions and methodology taking into consideration the major stakeholders in the present dynamic system and related issues of SPC at different levels. It provides the key elements of the mixed methods research methodology used in this dissertation and their linkages to theoretical perspectives derived from the case studies including surveys, based upon the methodology adopted to conduct the surveys and case studies. Justification to use case studies in the research is also explained in this chapter.

**Chapter 4** provides an overview of global trends and conditions of SPC based upon literature review.

The following key areas are discussed, in detail, to evaluate strategies to promote SPC globally and develop strategies to promote SPC in Sri Lanka.

- a) Improvements of the standard of living of the global community;
- b) Social development;
- c) Issues related to uneven development;
- d) Production and consumption trends in different parts of the world and related ecological footprints and bio-capacity;
- e) An overview of the major events related to SPC globally;
- f) Modern environmentalism;
- g) Indicators used to measure human development and the need to integrate ecological sustainability within these indicators.

**Chapter 5** provides an overview of local trends and conditions of SPC by literature review. The geography, population, economy, social development, equity issues, environmental management systems, present policies related to SPC and institutional, legal and coordination mechanisms are discussed. The theoretical perspective of the development with positive and negative outcomes is discussed with the objective to analyse the framework developed and to develop the basic criteria, which can be used to develop & implement the SPC program for Sri Lanka.

**Chapter 6** provides results of the analysis of data and information obtained from Case Study One along with the methodologies adopted. The outcome of the case study and the linkages with the theoretical framework are discussed in this chapter with a view to develop a set of criteria to promote SPC practices in Sri Lanka. The draft SPC model was developed considering all the practical aspects of the observations, analysis and conclusions of this case study to make the model practically implementable.

**Chapter 7** provides the results and the analysis of data and information from Case Study Two along with the methodology adopted. It also compares the validity of the recommendations of Case Study One and of the validity of the theoretical framework proposed in Chapter 2.

**Chapter 8** presents the proposed SCP Model for Sri Lanka, the ultimate goal of this dissertation, which was developed based on the analysis of the literature, the research data and personal observations. The model contains the following components:

- A Vision, Mission, and Goals;
- An operating system model with key external forces from both the production and consumption sides that were transformed into the major implementation strategies of the model;
- Key performance indicators;
- Implementation mechanism of the model with a sectoral coordination structure;
- A coordination mechanism for the implementation of the model with linkages to the existing mechanisms to ensure sustainability of implementation of the model.

A desirable system for behavioural changes of the society is also proposed to highlight the need for the development and implementation of an effective system to monitor the progress of implementation of the model.

**Chapter 9** presents detailed verification of the conditions of the theoretical framework developed and presented in Chapter two on collaboration of stakeholders to ensure effective implementation of the SPC model in Sri Lanka and elsewhere, nationally and internationally with suitable modifications. The importance of revitalising the global environmental governance systems in light of the present, multiple global crises and the related conflicts of interest within, between and among countries in the world is highlighted in this chapter compared with the real world scenarios. This is the theoretical contribution of the dissertation to both the scientific and social community.

**Chapter 10** provides the results and conclusions of the dissertation and a set of criteria to promote SPC programs in Sri Lanka. Procedures and rules to ensure continuous improvements of sustainability of a SPC network and proposals and recommendations for future research are also included.

The Figure 1.5 shows the outline of the dissertation's ten Chapters.

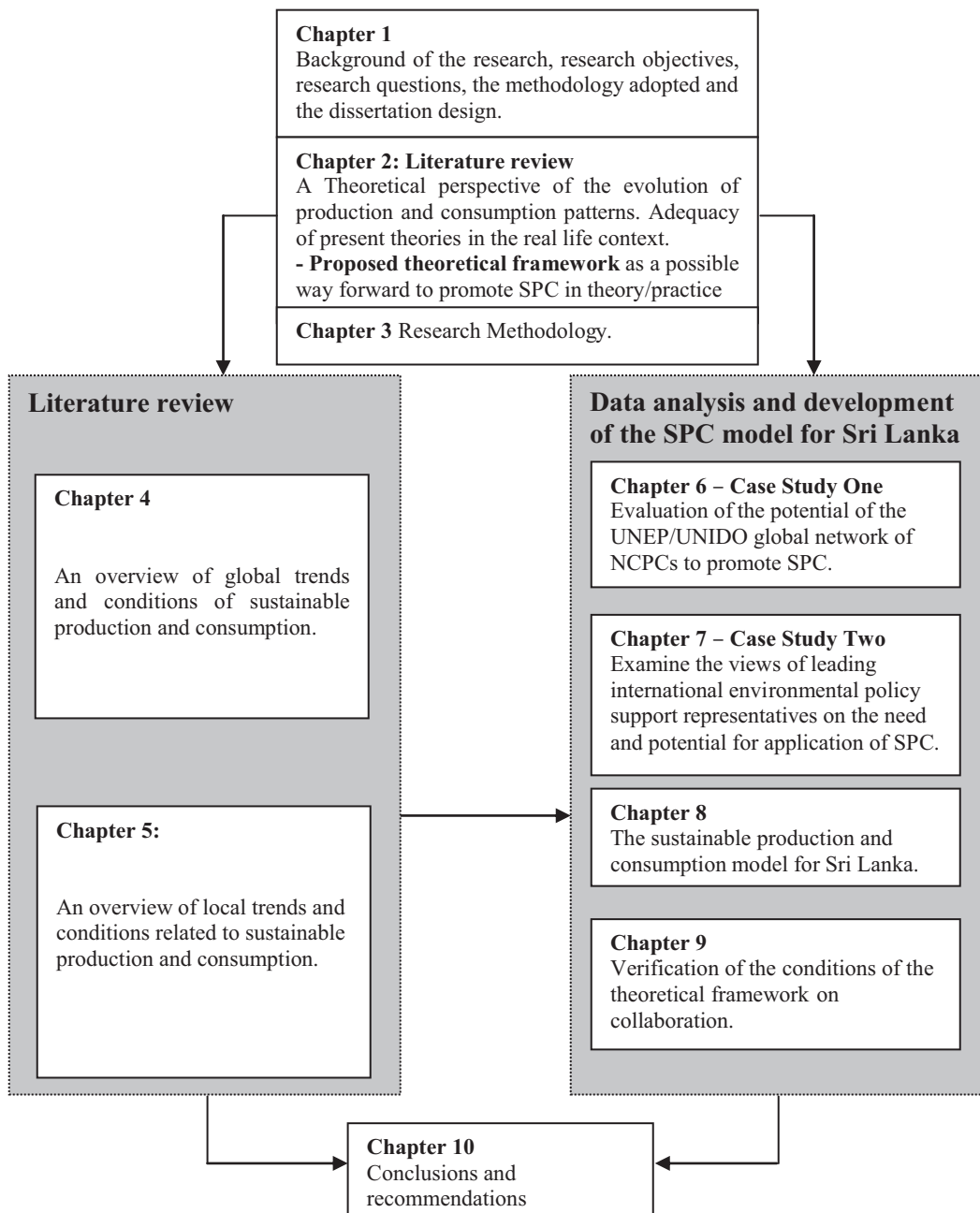


Figure 1.5: Outline of the Dissertation



## CHAPTER 2

# A THEORETICAL PERSPECTIVE OF THE EVOLUTION OF PRODUCTION AND CONSUMPTION PATTERNS

### 2.1 Introduction

The present production and consumption patterns and rates of natural resource depletion, coupled with the economic development are incompatible with a sustainable life cycle approach because of their serious threats to the long term sustainability of the local, regional and global ecosystems. Current consumption patterns pose a problem because of two seemingly contradictory traits, over-consumption and under-consumption (Clark, 2006).

In aggregate, worldwide consumption has increased dramatically. At the same time, increasingly, millions of people do not consume enough to meet their basic needs. Both trends are placing enormous stress on the global ecosystem (ibid). Human impact on the earth has been accelerating over the past three centuries; we are now such a dominant force that our era has been called the Anthropocene era – a human dominated geological epoch (Zaelke et.al 2005).

In this chapter, the author examines the evolution of global production and consumption patterns (Section 2.2), which reflect the trends of growth and development. Then, in sections 2.3 and 2.4, the Modernisation theory and the Dependency theory that can be used to better understand and explain the pattern of economic growth and uneven development in the world in different perspectives are presented. In section 2.5, a comparison is made of Marxist theory with the Modernisation and Dependency theories for explaining issues of development. Section 2.6 is devoted to a review of the applicability of, Ecological modernisation to SCP; this is followed by section 2.7 on the principles of Diffusion of Innovation that helped the author to identify effective strategies of diffusion of technologies and life-styles to promote SCP practices at the national, regional and global levels.

The reason for examining these theories was to better understand their potential value to guide practice in today's context. All the theories considered, helped the author to obtain valuable insights and perspectives of development within a narrow focus.

The Modernisation theory promotes linear economic growth and claims that underdeveloped countries are traditional and therefore, they should follow the modernised countries for their development. The Dependency Theory proponents claim that modernisation is limited to

western economies. This perspective has contributed to uneven and inequitable development between the centre (north) and the periphery (south). Such proponents are concerned with the exploitation of resources of the periphery for the development of the centre.

The Marxists focussed upon social class relationships, exploitation and on the value of labour with a perspective on capital to address the issue of uneven development. The Ecological Modernisation theory has been used as a possible guide for industrialised nations to solve their environmental problems.

None of these theories has a framework to adequately help policy makers to predict the present multiple global crises that we are facing today or to consider ecosystem limitations to fulfil unlimited needs of the expanding global human population. Exploitation of the natural resources of the environment, in today's context, is a serious issue to be considered with a shared vision based upon which life on earth depends. All living beings have to equitably share the limited environmental space available globally regionally and locally.

Take a magnet and one can see that the magnet has the polar opposites like the globe. If the magnet is broken into several pieces each piece has its polar opposites. Likewise both, between and within countries, there are communities whose lifestyles are highly resource intensive and they follow luxurious lifestyles enjoying global/local resources disproportionately while the less privileged societies are claiming their rights to enjoy similar development.

The environmental space available for all living beings is shrinking. The environmental problem in today's context is different from the past and is now dynamically global in nature and is driven by a political economy. All stakeholders should understand these issues with consciousness to the fact that life on earth depends upon global human action. This requires approaches of joint decision-making, joint deliberations on agreed actions and sharing responsibility of the joint decisions made.

Theory is of no value if it does not help to guide decision-makers to improve their practices in the real world. The theories should help to guide practice to address the issues related to needs for development and ecosystem limitations. Therefore, in this dissertation, an attempt was made to develop a theoretical framework, which can be used to synergistically integrate approaches to solving conflicting issues through collaboration in theory and in practice to promote SPC.



Based on the theoretical analysis presented in section 2.8, the author proposes a theoretical framework with a minimum set of criteria that can lead to collaboration of different stakeholders in diverse situations with many drivers and competing interests in order to help to ensure a more effective implementation of SCP practices.

In this context it is important to emphasise that the intention of the author in this dissertation is not to develop a new theory of collaboration nor did the author intended to develop a new theory of development either. Such an effort would require another extensive research study, which needs to be considered by researchers in future.

Due to the absence of appropriate theories to adequately guide practice in today's real world context, in this dissertation, an attempt was made to develop a theoretical framework that can help to guide stakeholders to ensure collaboration in the real world context because the author assumes that collaboration is one of the key missing components in the path of sustainable development in theory and in practice. Such an effort by the author was necessary to develop strategies for a SPC model for Sri Lanka, which is the primary objective of this dissertation. The author anticipated validating the framework based on the findings of the literature reviews and case studies proposed to be performed at subsequent stages of the research as outlined in the methodology.

The proposed set of minimum conditions of the framework is applicable in today's context globally, regionally and locally at different perspectives and levels and can be further improved upon based on the outcome of the global, regional and local responsiveness to the current environmental and socio-economic problems and availability of theories to adequately guide practice to address the issues of sustainable and equitable human development within the ecosystem's limitations. This framework, with its logic, is the theoretical/practical contribution of the author.

## **2.2 Evolution of Global Production and Consumption Patterns**

Evolution of global production and consumption patterns are reflected in various development theories and related paradigm changes. It is useful to analyse the sequence of this evolution to better understand the causes and effects of the current production and consumption patterns.

In ancient times, humans survived by hunting and gathering. Discovery of agriculture and fire as new technologies, improved their living conditions dramatically. Traditional practices to hunt and gather resources could not cope with rapid increases of population combined with

changing lifestyles. Human beings as sacred entities without which life on earth could not exist spiritually respected natural resources such as wind, water, mountains and trees, and sources of energy such as the sun and fire. In the occidental tradition, the four basic elements were considered to be earth, water, air and fire (energy). The oriental tradition included a fifth element, ether/space.

Phenomena affecting the living environment, such as floods, droughts, climate variations, uncontrollable diseases etc., which could not be understood, were interpreted spiritually as reactions of the Gods or other supernatural beings who acted either to protect the community or to destroy it if the life supporting systems were misused. These interpretations are reflected in various myths developed within communities with a sense of understanding of the power vested with these driving forces.

It can be seen that most of the underlying principles of these beliefs are in line with the principles of SCP and with life cycle thinking. Ellen Simple's (1911) assertion that man was a product of the earth's surface complemented the understanding that the environment controlled human behaviour (Batuwitige (1996).

The spiritual interpretation of power and the potential of nature to either keep the human beings alive or to destroy them based on human activities is currently being replaced by scientific evidences. The issue of SPC is addressed within a mix of spiritual and mostly knowledge based interpretations. In the past the religious institutions played an important role to promote behavioural changes of the communities stimulating spiritual aspects and beliefs to practice good governance.

However the present trends of unsustainable production and consumption and relating environmental changes call for a new global governance structure to maintain the ecosystem stability conducive for the existence of all living beings including humankind. The new governance structure should be able to stimulate and support ethical responsibilities of communities backed both by science and maybe also by religious interpretations<sup>6</sup> to promote the global community to keep human activities within the carrying capacities of the ecosystems based on shared visions. In this context, the author proposed a minimum set of criteria that can be considered at the national, regional and global levels to help to foster collaboration of different stakeholders to reverse the present trends of unsustainable production and consumption patterns.

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<sup>6</sup> Both strategies are important to address the current multiple global crises.

Various strategies that were adopted by community leaders to maintain their consumption and production patterns within the carrying capacities of the ecosystem, in ancient times, are worthwhile to be considered to provide insights for the development of strategies to reverse the trends of present unsustainable practices. In fact the importance of indigenous technological knowledge in sustainable development was recognised in the Agenda 21 that was adopted at the Conference on Environment and Development commonly known as the “Earth Summit” held in Rio de Janeiro in 1992. John Isbister (1991), in his book, “Promises not Kept,” claims that “before the arrival of imperialists, the majority of the people of the Third World were involved in producing food for their own needs as hunters and gathers, in some regions, but for the most part, they were cultivators of the soil. They typically produced some surplus food, over and above their own needs, which was used to support a ruling group, but this was usually a small portion of their production. Usually, they produced what they needed to survive, but imperialism changed the picture.”

The initial practices of hunting and gathering for living have progressively changed to ‘production,’ especially through cultivation. Patterns of development strategies have changed dramatically, especially in the latter half of the 21st century, when they were increasingly focused upon economic development with the objective of improving the standard of living of the people. The early attempts at constructing development theories maintained that the concepts of development and economic growth were considered to be synonymous with economics playing a dominant role in development (Blomstrom and Hettne 1988). Limits of the carrying capacities of the ecosystems to absorb pollution and natural resources depletion were either not considered or were ignored in the development process. Technologies were developed to support economic growth exclusively, without considering the long-term impacts to the environment and to the ecosystems.

Recently, climate change has been recognised as a scientifically established fact; the UNDP Human Development Report (HDR/UNDP 2007/2008) claims that “we are recklessly mismanaging our ecological interdependence and our generation is running up an unsustainable ecological debt that the future generation will inherit.” Climate change will be one of the driving forces shaping human development during the 21st century (HDR/UNDP 2007/2008). When a new technology with radically different and improved capabilities of communication is introduced into society, it may profoundly change the culture and indeed mark the beginning of a new civilisation. Qualities inherent in the technology help to shape the new culture (Predicting the Future 2005).

Around 8000 BCE (Before Common Era), humans developed agriculture, formed larger groups, settled in urban communities and eventually built huge empires, created religious institutions and explored their planet (Jones 2007). “Predicting the future (2005)” introduced five types of civilisations in the evolutionary process out of which four civilisations have already come and developed to a mature stage and the fifth one (computer based civilisation) has recently appeared in the cultural horizon and remains in an embryonic form. Civilisation, in a broad sense, transcends the life cycles of individual societies, passing its culture along to peoples in many parts of the earth. But they too, have come, one after another, to comprise successive historical epochs (ibid).

It is useful to analyse the evolutionary patterns of these five civilisations, which overlap in time and space, to understand the trends of the behavioural changes related to production and consumption practices in the world.

The five civilisations were:

Civilisation I which was recognised as the earliest form of civilised society beginning in the 4th millennium B.C. and culminating in the 2nd and early 3rd centuries of A.D., during which time the technology of writing (originally, in ideographic form) supported the cultures.

In Civilisation II, after the philosophical and spiritual awakening of the 6th and 5th centuries B.C., societies in turn, related to the invention of alphabetic writing.

Civilisation III began in the 14th and 15<sup>th</sup> centuries A.D. and continued through the first two decades of the 20<sup>th</sup> century. A.D. This civilisation was predominately commercial although secular education also played an important role. The technology of printing supported culture during this era.

Civilisation IV is the culture of news and entertainment that we have come to know in the 20th century. Advertising drives commerce, and the media in which advertising takes place (especially television) have become powerful institutions within societies. Various electronic technologies such as the telephone, sound recordings, cinema, radio, and the television supported this culture, which emphasised the sensuous aspects of human personality.

Civilisation V has been recognised as the computer based civilisation. Computers, which support two-way communication between man and machine, are quite unlike the technologies of mass communications. However, computer-based systems and applications are developing so rapidly that it is hard to predict what will come next.

In Civilisation III, the dominant institutions were commercial and educational institutions. With respect to Civilisation V, computer-based societies have led business activities to become strongly influenced by E-commerce. The Internet makes it possible for merchants to succeed without much capital investment. Internet-related companies have created instant billionaires and numerous poor people at the same time.

This evolutionary process explains the gradual changes in human capabilities that have been instrumental for changing production and consumption patterns for humankind from ancient to present times. However, despite numerous radical, technological improvements, human poverty has increased, widening the gap between the rich and poor globally and locally, although the standard of living, in certain classes, improved remarkably, in some regions of the world, dramatic increases in abject poverty have occurred as a result of uneven development.

Globally 20% of world's people in the highest income countries account for 86% of total private consumption expenditures – the poorest 20% a minuscule 1.3%. More specifically, the richest fifth:

- Consume 45% of all meat and fish, the poorest fifth 5%;
- Consume 58% of total energy, the poorest fifth less than 4%;
- Have 74% of all telephone lines, the poorest fifth 1.5%;
- Consume 84% of all paper, the poorest fifth 1.1%;
- Own 87% of the world's vehicle fleet, the poorest fifth less than 1%

(HDR/UNDP 1998 – Overview).

The HDR 1998 claims that “the new human poverty index (HPI-2) shows that 7-17% of the population in industrial countries is poor”. It can be seen that the disparities of the consumption-poverty-inequality-environment nexus are widening. The HDR 1998 suggests that “consumption must be shared, strengthening, socially responsible and sustainable (shared implies - ensuring meeting basic needs for all; strengthening implies - building human capabilities; socially responsible implies - the consumption of some does not compromise the well being of others; sustainable implies – without mortgaging the choices of future generations).”

The digital divide (the gap between those who have access to digital and information technology and those who do not), as well as imbalances in resources and skills needed, push

the developing countries to participate in the global and local market systems that create a situation in which the rich become richer and the poor become poorer. The definition of what constitutes a “necessity” is changing and the distinctions between luxuries and necessities are blurring (UNDP/HDR 1998 – Overview).

It is evident that societies are developing new ideas and better ways of making life more comfortable, easier and enjoyable, with the resultant rapid increases of consumption worldwide. On the other hand, new problems have emerged due to different types of waste generation both hazardous and non-hazardous, in the absence of environmentally sound waste management practices and of life cycle thinking in the product design and production phases of the production-consumption cycles. This situation, while polluting the environment, also leads to depletion of natural resources, thereby, undermining the carrying capacities of global regional and local ecosystems. Therefore, it has become necessary to develop and implement innovative strategies to reverse the trends of environmentally harmful production and consumption practices.

Until recently, the agreed-upon criterion of economic development was aggregate economic growth. This criterion was reflected in the concern among development economists with macro-economic phenomena: Industrialisation strategy, the process of capital formation, the workings of financial institutions, and the impact of trade policies are examples (Fields 1980). Blomstrom and Hettne (1988) specified that “the classical economic theory was replaced by the neo-classical one and the attention is now focused on static, microeconomic relations”. They raised the question of how the market mechanism can optimally distribute the resources in society as the main issue.

Different theories were developed by the research community to analyse, interpret and explain the patterns of economic growth and the uneven development in the world. In this dissertation, the principles of Modernisation theory, Dependency theory, and Marxism were considered as these theories are related to social science and reflected the development process followed in the past.

These theories and applications are basically based on economic development designed to improve the standard of living of the people. Environmental aspects were not considered as a component of sustainable economic development. Even though there are variations among these theories, the variations reflect insights of different viewpoints of the research community; these different viewpoints, when put together, provide useful frameworks based on which new

theories could be developed. Certain components of each of these theories and models can be considered for further research to understand the causes for uneven development and over consumption and to develop theories and applications to modify the present consumption and production patterns in order to help to ensure long term societal sustainability.

### **2.3 Modernisation Theory**

Modernisation theory is used to characterise modern transformations of social life. It analyses basically how countries and societies develop from primitive to modern by passing through certain stages through economic development, political stability, and social and cultural change. The first wave of modernisation theory has evolved in 1950s and 1960s (University of Twenty 2010). Modernisation means the appearance of “modes of social life or organisation which emerged in Europe from about seventeenth century onwards and which subsequently became more or less worldwide in their influence (ibid)

Isbister (1991) described modernisation theory as the dominant philosophy of social scientists in the developed countries; it is the worldview that most of them adopted in their attempt to understand the origins of poverty and underdevelopment. It includes very few suggestions that the rich are responsible for the plight of the poor. Rather, modernisation theorist’s focus upon deficiencies in the poor countries, such as the absence of democratic institutions, the lack of capital, outdated technology and lack of initiative. And then they speculate upon ways of repairing those deficiencies.

Zhang et.al. (1994) describe modernisation as a broad concept that refers to major social changes which occur when a pre industrial society develops economically and the workplace shifts from the home to the factory (industrialisation), people move from farms into cities where jobs are available (urbanisation), and large-scale formal organisations emerge (bureaucratisation). These three components of modernisation cause dramatic changes in such major social institutions as the family, religion, and education. These changes in turn affect power relations among people in a society.

The “BookRags”<sup>7</sup> defines ‘modernisation theory’ as a description and explanation of the process of transformation from traditional or underdeveloped societies to modern societies. “Historically, modernisation theory is the process of change towards those types of social,

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<sup>7</sup> “BookRags” ([www.bookings.com/research/modernisation-theories03/\(2009\)](http://www.bookings.com/research/modernisation-theories03/(2009))) is an educational website that provides summaries and study guides for literary works.

economic, and political systems that have developed in Western Europe and North America from the seventeenth century to nineteenth century and have then spread to other European countries and in the nineteenth and twentieth centuries to the South American Asian and African continents (Eisenstadt 1966.)”. Batuwitage (1996) explained the differential status of development of places, highlighted that modernisation theory postulates that modern ideas are generated at certain locations before they diffuse to the periphery, thereby, transforming traditional societies into modern societies.

Even though there are disputes among modernisationists’ analyses on development, Isbister (1991), described common elements that can be usefully drawn together. He highlighted the concept of the “traditional” society as interpreted by modernisationists. These interpretations illustrate that “today’s Third World societies as being largely traditional and think of Western Europe as having been traditional in the long period before the era of modern economic growth and cultural change. According to this view, the essence of traditional society is that it is stagnant and unchanging. Its values are spiritual values and, not the values of individual self-betterment. Its rhythms of life are circular, not linear and progressive; one returns always to the same place. The traditional world is emotionally comfortable, a world in which each person has a place that is secure, a place in the family among the pantheon of ancestors. The traditional person identifies with his or her ancestors, and emulates them. Daily work is performed as it has always been, not to secure a profit but to perform one’s duty, to maintain one’s place in the society. Nothing is innovative” (Isbister 1991).

It is important to consider the above description together with further comments of Isbister on this issue, which specified that “The picture of traditional life painted by modernisationists is not a negative one. It is an integrated life, in which the spirit, the family, the larger group and the work tasks all combine to form a seamless whole, a life in which there is no estrangement, no alienation. From an economic point of view, however, it is a poor, subsistence life, and a life that has no hope of accumulation of wealth. There is no sense of progress. When time is circular, when the most honourable task is to imitate one’s ancestors, there cannot be breakthroughs, no fundamental changes, no development.”

Some important principles can be extracted from the above comment with appropriate modifications. Today, the global community, especially in the environment sector, is promoting circular economies in line with the life cycle thinking as an appropriate strategy to achieve sustainable development. It does not mean that “there is no sense of progress” with the traditional societies as interpreted by the modernisation theorists. The author considers



that the desirable system is “*refraining from both affluence and poverty and following the ‘middle path’.*”

Zhang et.al. (1994) wrote that “Modernisation Theorists” in social psychology have established a relationship between economic advancement and the power structure. They emphasised that the findings of many previous studies, including those of Inkeles (1972) and Thomas and his associates (1971, 1972, 1974) that modernisation results in a decrease in traditional face-to-face social relations and an increase in secondary social relations as industrialisation and urbanisation increase. The leaders of the family, religion, and community have less power because they control fewer resources, while those in education, employment, and the media control more resources and have greater power”. However, Zhang et.al highlighted the need to include the cultural variable within the study of the effect of modernisation on power relations.

These insights are useful to be considered for further research on the various driving forces that create changes of production and consumption practices in different cultures and the responses needed to reverse unsustainable practices.

Isbister (1991) made the argument of modernisationists that “the poverty and backwardness of the Third World can be understood simply as the failure of those societies to kindle the same sparks of creativity.” According to them, “the task before the underdeveloped countries is to transform themselves from tradition to modernity, that is to say, to follow in the footsteps of the newly developed countries.”

However at present the linear economic model focussed upon unlimited growth has failed on one hand to achieve sustainable and equitable development and on the other hand this system has created grave imbalances of ecosystem stability. The present multiple global crises are a result of the linear economic growth. The central importance of circular economic systems is strongly promoted by UNEP to address the present multiple global crises.

OECD in its policy brief (2009) stated that attribution of the current economic crisis to a failure due to market and free trade is premature and as a result, this situation led to an anti-market backlash and calls for protectionism. It claimed that times of crisis are also times of opportunities according to history. Efforts to resist protectionism and pursue timely appropriate policy reforms may help non-OECD emerging economies, and the world economy, to emerge from crisis with stronger trade options and more robust performance that would otherwise have been possible.

However it is evident that the magnitude of the present crises over the past remarkable crises situations is unprecedentedly high as it extended all over the world through many other countries, irrespective of their responsibility for the crisis. Ritholtz (2009) claimed that the magnitude of the present crisis (bailout) of 8 trillion US\$ compared with the magnitude of World War II (1941-45) i.e. 3.6 trillion (adjusted for inflation).

Nallari (2010) specified that the recent global crisis (2008) is not only about financial market failures but also government failures in several countries as reflected in failure to contain the housing bubbles and credit booms, bad regulations, and lack of supervision and enforcement. Nallari further stated that trade and financial protection is on the increase as countries that have been less reliant on exports and foreign capital are weathering the storm better.

The Publication, '21st Century Africa (1992)', '*a compilation of scholarly research that sought to test alternative theoretical explanations for Africa's poverty and powerlessness, and to assess the probable consequences of the resulting, often conflicting policy proposals*', pointed out that colonially-shaped national boundaries and institutions thwarted African nations' efforts to coordinate regional trade and payments. National currencies, tariff and tax policies, ministries and planning institutions only marginally altered from those imposed by the colonial scramble for Africa- still thwart efforts to expand regional productive activities to enable African industries to take advantage of modern economy of scale. 21st century Africa claimed that investments, shaped by short-run profit maximising criteria, cannot foster the kinds of domestically oriented industry and agriculture required to spread productive employment opportunities and rising living standards. Both state and major domestic and foreign investors have, instead invested preliminary in the production and sale of crude materials and trade geared to external markets. It also stated that since the capitalists' class dominates the mode of production in that system, their ideas and their laws dominate the culture and the legal order.

Isbister specified the arguments of the modernisation school that "there is every chance that the world's poor countries can succeed in this transformation from traditional to modern, because they have an advantage the Europeans lacked; that is the poor countries can avoid some of the false starts and the dead ends that delayed the progress of the pioneers." Furthermore, the rich countries can lend a helping hand to the poor, by offering them technology, markets, capital and encouragement."

This concept can be interpreted in different ways, which may cause positive or negative impacts depending on its interpretation. One negative impact has been highlighted by Isbister

predicting that transformation from traditional to modern with a helping hand of rich could also be an obstacle. In this context, Isbister specified that “Developed countries may wish to perpetuate their dominance in this process either without understanding or purposely to promote business ventures not appropriate to the local conditions, which may further lead to unsustainable local economic conditions. Also, it is important to note that the freedom of utilisation and the availability of natural resources within which the development can proceed in developing countries are limited; this situation is likely to worsen in future generations.”

21<sup>st</sup> Century Africa (1992), while reviewing Africa’s ecological crisis stated that Africa is currently experiencing major interlinked economic and ecological problems. The association states that “while agricultural output has declined in most countries in recent decades, industrial output has only marginally contributed to the economic growth”. It is important to note the data quoted by the association to reflect the economic growth and standard of living. 21st Century Africa claimed that “twenty years ago, Africa was self sufficient in food production. Now the continent imports 20 percent of its serial requirements. Over the 1970-1980 period, cereal imports increased 300 percent while the cost of these imports increased 600 percent. Overall since 1970s, Africa’s annual agricultural output has grown at an average rate of less than 1.3 percent, less than half of the 3.0 per cent of population growth. Africa is the only region in the world where nutrition levels have declined over the last two decades”. The research further stated that modernisation strategies have aggravated many aspects of the African continent’s environmental deterioration, especially in urban areas.

Therefore, innovative approaches are necessary to address the uneven development by focusing, more holistically and proactively upon local, regional and global ecosystem stability. The most appropriate approach would be a mixture of opportunities: transfer of scientific knowledge to enable developing countries to blend it with traditional knowledge, transfer of appropriate technology and facilitate regional collaboration based research and development without transformation from traditional to the so-called modern society, which failed to achieve sustainable and equitable development and maintain ecosystem stability.

BookRags in its article on modernisation theory emphasised “in general, modernisation theorists are concerned with economic growth within societies, and measures of gross national product and mechanisation or industrialisation are ingredients in the process of economic growth. The same article views the modernisation theories as a study the social, political, and cultural consequences of economic growth and the conditions that are important for industrialisation and economic growth to occur”.

Robinson Rojas (2007) characterised the modernisation theory as, ‘In traditional societies, social relationships tend to have an affective component – personal, emotional, and face-to-face, which is a constraint in the process of developing efficient relations of production via market. In modern societies, societal relationships are impersonal, detached and indirect, which makes it possible for efficient market relationships etc.’

Nallari (2010) pointed out that ‘when an economy is experiencing a positive or negative shock, people do not respond in a completely rational way to the shock. Moreover, the people’s responses to events are asymmetric – people hate to lose money more than they love to win money’.

It is important to note that that the modernisation theorists have not considered the sustainability of linear economic growth and its linkages to human development. It is a fact that the GDP itself has failed to reflect the human development as an indicator. Traditionally GDP has been considered as the measure of development of a country. GDP only measures the value of goods and services in the economy and does not capture the equity issue and social well being such as quality of life as a measure of development. On the other hand, modernisation theorists failed to capture the limitations of the carrying capacities of ecosystems and their inability to provide unlimited ecosystem services.

Robinson Rojas (1996) described modernisation theory in his notes on “Modernisation Theory and the Laws of Social Change,” as an historical product of three main events in the post - World War II era:

- 1) The rise of the United States as a superpower to contain the growth of the international communist movement. For this, the United States financed the industrialisation of Western Europe (Through The Marshall Plan), the industrialisation of the South Korea and Taiwan, and the reconstruction of Japan.
- 2) The growth of a united worldwide communist movement led from Moscow and later also from Beijing (with the Soviet Union, the People’s Republic of China, Vietnam and Cuba as hot points).
- 3) The process of de-colonisation in Africa and Asia as an outcome of the disintegration of the former European colonial empires.

“By and large, including Latin American states, which decolonised themselves between 1804 and 1844, the new nation states were in search for a new model of development” (Robinson Rojas 1996)

The development pattern described above shows some insights into marginalisation of Africa and Asia in the modern development process and of the external forces that created uneven development in these regions for the prosperity of a handful of powerful countries. The traditional values and knowledge available in these regions have either been neglected or have been forced to be neglected without empowering the communities with appropriate skills for the development of these regions; in the process unlimited resource extraction continued for the wellbeing of the western communities.

Rostow W.W. (1960) described five stages<sup>9</sup> of evolution of economic growth by focusing on social welfare that deals with mass production and consumption without focusing on the limits of growth in line with the carrying capacities of the ecosystems. These stages were described by Isbister (1991) as one of the more powerful, although more complex, stage theories of modernisation using the metaphor of the take-off of an airplane, depicting the five stages corresponding to the take off process.

The first stage: **The Traditional Society**. Output is limited because of inaccessibility to science and technology. Values are generally “fatalistic” and political power is non-centralised.

The second stage: **The Preconditions for Take-off**. Clusters of new ideas favouring economic progress are arising; these lead to and are supported by new levels of education, entrepreneurship, and institutions capable of mobilising capital. Investment is increased, especially in transport, communications and raw materials extraction/utilisation, with a general direction towards commercial expansion. But, in accordance with Rostow, traditional social structures and production techniques remain. There is a “dual society”.

The Third stage: **The Take Off**. Agriculture is commercialised, there is a growth in productivity, because that is necessary if the demand emanating from expanding urban centres is to be met. New political groups representing new economic groups push the industrial economy to new heights.

The fourth stage: **The Drive to Maturity**. Rostow stated that between 10 to 20 percent of GDP is invested and the economy “takes its place in the international order. Technology becomes more complex and there is a move away from heavy industry.” Now production

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<sup>9</sup> The Traditional Society, The Preconditions for take-off, The Take off, The Drive to maturity and Mass Consumption.

is not the outcome of social necessity but of the need of maximising profits to survive in a competitive capitalist market.

The fifth stage: **Mass Consumption**. The leading economic sectors specialise in durable consumer goods and services. At this stage, economic growth ensures that the basic needs of most people are satisfied, because the social focus increasingly changes to address social welfare and security

(Robinson Rojas (1996).

Gow (2005) noted that ‘Rostow treated modernity as equivalent to the model of western capitalistic society. This approach has a unilateral interpretation of traditional societies as ‘non-modern’ because of their misinterpretation of ‘lower’ or ‘other’ forms of development. Gow claimed that Rostow’s model does not consider exogenous factors of underdevelopment while it favors a top-down approach over a bottom-up approach thus, arrogantly, rendering indigenous means to development as irrelevant or useless’.

According to Rostow, international relations did, in fact, speed up the processes of development, but had little to do with underdevelopment. Rostow differed from early development theorists, by his much broader approach (he saw his ‘theory’ as an alternative to the Marxist theory), but the key element in this thinking was, nevertheless, the process of capital formation. According to Marx, the origins of all historical changes may be found in the conflict between the forces and relations of production. When the latter do not correspond to the former, development in a society is slowed down, and the obsolete social relations must be replaced by new and more advanced ones (Blomstrom and Hettne 1988).

Rojas suggested that a review of Rostow’s assumptions is necessary at this stage and proposed;

- a) Since the United States is MODERN and ADVANCED and the Third World is TRADITIONAL and BACKWARD, the latter should take the former as a model, and, of course they should ask for guidance and advice from the people leading the model;
- b) Because of this approach, Third World societies should consider their common enemies to be communist ideology and socialist economic theory;
- c) Modernisation theory helps to legitimate as progressive and necessary the United States’ ruling class “foreign Aid policy”, “trade policy”, and “international relations policy” and

the U S expansionism (imperialism) since the XIX century, especially in Latin America and the Pacific, as a “modernising” drive helpful for the world human species.

Rojas quoted four processes of the societal transition from traditional to modern as distinguished by Semlser in his “Mechanisms of and Adjustments to Change,” in T Burns (1969) viz.

- 1) There was a move from simple to complex technology;
- 2) There was a change from subsistence farming to cash crops;
- 3) There was a move from animal and human power to machine power;
- 4) There was a move from rural settlements to urban settlements.

Smelser stated that “those processes would not occur simultaneously, and importantly, changes would differ from one society to another”. He emphasised that “there was a variety of pre-modern starting points; the impetus to change varied because it was crucially affected by tradition, consequently different paths towards modernisation are taken”. National differences are always important, even in the most advanced stages of modernisation; this was underscored by him by the statement that “wars and natural disasters can crucially affect the pattern of development.”

Todaro and Smith (2003) pointed out that the mechanisms of development embodied in theory of stages of growth did not always work because even though more saving and investment is a necessary condition for accelerated growth, it is not a sufficient condition. Todaro and Smith clarify this argument stating that “the Marshall Plan” worked for Europe because the European countries receiving aid possessed the necessary structural, institutional and attitudinal conditions (e.g., well-integrated commodity and monetary markets, highly developed transport policies, a well trained and educated workforce, the motivation to succeed, an efficient government bureaucracy) to convert new capital efficiency into higher levels of output”. The conditions are not the same in underdeveloped countries. Todaro and Smith further specify that “even more fundamental level, the stages theory failed to take into account the crucial fact that contemporary developing nations are part of a highly integrated and complex international system in which even the best and most intelligent development strategies can be nullified by external forces beyond the countries control”.

Rostow, in his preface of the third edition (1990) of ‘The Stages of Economic Growth’ specified that ‘From its 18th century origins, a recurrent theme asserts itself in a political

economy, fades away, and once again appears; that is the notion that diminishing returns to non-renewable natural resources will, in the end, set limits to population expansion and economic growth. This proposition was at the root of the classical judgement that the prices of food, energy, and raw materials relative to manufacturers would rise with the passage of time'. Rostow further stated that over the span of the last two centuries, this did not happen as a clear-cut, linear, or even persistent trend; but it did happen periodically during the intervals.

Rostow (1990) mentioned that even though there is no decree for all societies to follow modernisation, in a world of modern weapons, communications, and technology it is difficult for traditional societies to sustain withdrawing from modernisation.

There are many criticisms against the modernisation theory due to failure of sustainable and equitable development and also due to widespread poverty throughout the world. The misleading perceptions of modernisationists' concept of "Traditional" societies and the nature of their non-linearity as being the reason for poverty can be well understood in the light of the present multiple global crises fuelled by the financial crisis that emerged in the western world in 2007/8. The crises situation has spread across the world due to economic and trade linkages. Today, the international community is recognising the ill effects of linear growth and are responding with an awareness of the need to follow a circular economic growth.

Knorringa (2007) in his paper on 'Asian Drivers and the Future of Responsible Production and Consumption- Exploring A Research Question and Hypotheses For Future Research', raised the following basic questions in order to begin assessing the development relevance of responsible production:

1. *How likely is it that responsible production becomes increasingly mainstreamed?*
2. *To what extent can we expect the 'tool' of responsible production to enhance development outcomes?*

Knorringa emphasised that the need for take into account the 'rise of China and India, not only as workshops of the world, but increasingly also as 'spiders-in-the-web' of global value chains'. Knorringa further specified that 'a significant number of new middle-income consumers from 'production' countries are entering the global consumption market. Thus far, attention on the consumer side has focused on the roughly 800 million middle-income consumers in OECD countries'. Knorringa emphasised that 'another 600 million to one-and-



a-half billion middle-income consumers from the Global South, most visible in countries like China, India, South Africa, Brazil, are likely to significantly influence global consumption patterns’.

Chee (2010) in its paper on ‘UN and the Shaping of the Post-Crisis World: Opportunities for Change’ specifies that “the Countries in Asia, especially China, India and South Korea have not only weathered the recent economic recession but also now lead the process of global recovery”. Chee claimed that the current economic recovery remains shaky and fraught with uncertainties<sup>10</sup> and specified that in the midst of all the challenges, America has pressured the main trading partners in Asia, in particular China, to revalue upwards their currencies, poses a problem for internal development planning for developing states and is understandably seen as “interference” in the internal affairs of another country. Chee further specified that the developed economies such as Japan and Germany as well as the developing economies of Brazil, India and Russia (the BRIC developing economies of Brazil, India, Russia and China) are also crucial to the overall effort to achieve full recovery.

These elaborations show the rigid inter-linkages of the present economic systems, which lead the world into a political economy. Resource intensive economic models further complicate these inter-linkages by adding environmental calamities into the system.

Chee analysed a variety of proposals and counter-proposals that were proposed at the COP15 Climate Change Conference held in Copenhagen, Denmark in December 2009, to reduce emissions of greenhouse gases. He emphasised that the disagreements revolved broadly around “(a) whether agreements on carbon reduction be made legally binding (as is the case of the Kyoto Protocol) or should they be made voluntary as advocated by the US and (b) whether agreements reached on carbon reduction be subject to monitoring and verification as advocated by the US or should they be based on self-accounting and self-regulatory mechanisms as advocated by China and India”. Furthermore, he referred to the vexing question of applying per capita income as a basis for determining responsibility for reducing greenhouse gases – a proposition that would place the developed and industrialised countries at a disadvantage.

The demand of developing countries in this process is that addressing the climate change problem should be based on the principle of ‘Common but differentiated responsibility’ as

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<sup>10</sup> The main reasons given by Chee being (a) the absence of new ideas on how to move the process of economic recovery forward in the industrialised West (b) the apparent slow take-up rate of cheap bank credit to start or expand businesses (c) the threat of heightened inflation (d)

specified and agreed upon in the UN Climate Change Convention. The convention specifies that the developed (Annex 1) countries should bear not only more of the burden of reducing carbon emissions but they should also make financial aid and green technology available to developing countries to help them to mitigate the threats of climate change. The idea is to acknowledge the right to achieve sustainable development considering all three pillars of development (economic, social and environmental). Within this context, again domestic politics were and will be a factor in deciding the outcomes of climate change negotiations, which have a strong link to global and local economic development.

## 2.4 Dependency theory

Dependency theory claims that the economic development pattern reflected by modernisation theory was limited to the economic growth of western economies. Mostly resources of the other countries were used for stabilising the development pattern of the western economies. This situation resulted in uneven development between the centre (north) and the periphery (south).

Dependency theory became a major intellectual movement among Latin American social scientists, through the concept of ‘dependencia,’ as they called it (Isbister 1996). The most important author of the dependency school was Raul Prebisch, an Argentinean economist who was secretary of the United Nation’s Economic Commission for Latin America (ECLA) in 1950’s and of its Conference on Trade and Development (UNCTAD) in the 1960’s (Isbister 1996, Ferrow 1966). Dependency theory became popular in the 1960s and early 1970s as a criticism of modernisation theory that seemed to be failing due to the continued widespread poverty of large parts of the world. While this theory, to a larger extent, went out of favour during the 1980s and into the 1990s, versions of it have enjoyed a resurgence in the early years of the twenty first century, as some of its views have been adopted, albeit in modified form, by theorists and leaders of the anti-globalisation movement (Todaro and Smith 2003).

(Isbister 1996) pointed out that dependency theorists offered a critique of the modernisation school and a completely different way of understanding the problems of the Third World. According to Isbister, “Dependency theory is an outgrowth of Marxism; and in fact, many of the central ideas of this theory find their original expression in a 1957 book by Paul Baran,

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the recourse to trade protectionism as a means to safeguard employment and corporate survival and last but not least (e) the deep-set structural problems faced by the US in particular.

the leading American Marxist economist of his generation, titled “The Political Economy of Growth”.

Prebisch and his colleagues viewed that economic growth in the advanced industrialised countries did not necessarily lead to growth in the poor countries. Their studies suggested that economic activity in the richer countries often led to serious economic problems in the poorer countries (Ferraro 1996).

This finding provided evidence of continuous resources extraction by the western countries from the countries conquered by them during the colonial period. This external force pushed transformation of traditional practices of peripheral countries to suit modernisation of the centre to focus upon further development of the centre while neglecting the socio-cultural values of peripheral countries, which were more sustainable. The general idea was that developing countries should follow the economic development model of the centre.

External forces are of singular importance to the economic activities within the dependent states. These external forces include multinational corporations, international commodity markets, foreign assistance, communications, and any other means of by which advanced industrialised countries can represent their economic interests abroad (ibid).

Absence of a focus upon environmental aspects in the economic development process supported continuation of resource extraction and transportation from the periphery to the centre as major environmental disasters did not surface during that time.<sup>11</sup> Such resource extractions without paying attention on the social welfare of the local communities widened the gap between the rich and poor and created uneven development.

The ideas of dependency were later developed by many social scientists in Latin America and outside Latin America. Isbister (1996) further specified that, “to a major extent, dependency theory is a product of the Third World itself. This is one important way in which it differs from the modernisation perspective, which was developed almost exclusively in the major universities of the developed countries.”

It is useful to analyse the following general concepts, premises and practices of the Dependency theory<sup>12</sup> and to compare them with the modernisation theory to obtain a better

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<sup>11</sup> However the incidents such as the Bhopal accident in India, Mining in Papua New Guinea are recent examples of the exploitation of resources of the developing countries with least attention on the wellbeing of their communities.

<sup>12</sup> [http://en.wikipedia.org/wiki/ Dependency theory](http://en.wikipedia.org/wiki/Dependency_theory)

understanding of the trends of economic developments and the principles behind these trends:

### **Concepts:**

1. Resources are extracted from the periphery and flow towards the states at the centre in order to sustain their economic growth and wealth.

Comment: it is important to note the diverse schools of thoughts of dependency theory on this issue. Some researches have adapted it to Marxism. Isbister,(1996) emphasised that the “Standard” dependency theory differs sharply from Marxism, however, he argued against internationalism and any hope of progress in less developed nations towards industrialisation and liberating revolution.

Isibister (1996) disagreed with the arguments of dependency theorists against the concepts of modernisationists that “the Third World societies are in a primitive, unchanged state” by claiming that it is the opposite. That is, the Third World has been formed, even created, by their interactions with the world’s rich (and not incidentally, capitalist) countries);

2. It makes sense to think that prior to the sixteenth century, before the era of modern economic growth, that the world’s major regions were essentially unconnected to another and the societies of today’s Third World, had been traditional, however, from the sixteenth century onward, capitalist markets dominated the world; consequently these capitalist markets fundamentally changed the social structures of the Third World. The process continued for over four centuries and continues today. The Third World is not traditional and is not accidental. It is the necessary companion to the richness of the developed countries.

Comment: This trend of economic development reflects the present structure of globalisation which directly and indirectly promotes the rich becoming richer and the poor becoming poorer. The dependency theory has not captured this characteristic of the globalisation process. The gap between rich and poor are increasing between and within countries (see Chapter four global trends).

3. The most popular criticism of modernisation theory revolves around the idea of Ethnocentrism, or the assumption that the way economic and social progress worked in certain countries will work equally well, elsewhere. This criticism is underscored

by the statement, that “In the post World War II, both capitalist and communist views agreed that the Third World nations should eventually seek modernisation and that these nations’ underdevelopment was a direct result of internal characteristics. It was said that they should be “modernised” or “westernised” and that their traditional values should be replaced with more modern values. Their economic ideals led those lesser nations to become more dependent on wealthier nations for social change and thus led to their inevitable exploitation.

Comment: The negative impacts of modernisation theory are experienced by the present generation. The ecological modernisation (see section 2.6) requires developing countries to reverse the trends of the economic development pattern used by the modernised or westernised countries while developing countries claim the right to develop to improve the standard of living of their communities with a minimum cost. Limitations of the global environmental space have profoundly changed the perceptions of the development pattern reflected by the modernisation theory. It also reflects on the deficiencies of the dependency theory to capture the limitations of the carrying capacities of the ecosystems in the development process.

4. Dependency theory came into play due to failure of the modernisation theory towards the end of the 20th century in the 1970’s and 1980’s to reflect widespread poverty throughout the world. The developed nations were essentially taking advantage of underdeveloped nations in the process of economic exchange to their own benefit; thus making these Third World nations become powerless and more dependent. It continues by stating that foreign investors dominated these industries and gained more control. The same article quoted the argument of the sociology scholar, Immanuel Wallerstein, that dependent nations should remove themselves from the global market in order to increase their economic development. These nations have certain class positions and uneven trade relationships where the core exploits the periphery. Wallerstein argued that there is only “one world” connected by economic exchanges and social relationships.

Comment: This concept is valid even today to a considerable extent and continues in light of the current multiple global crises. To address this problem, an innovative global good governance system is necessary through mutual understanding and building on trust among and between all the countries in the world.

The following premises reflect more insights of the external forces that obstruct to address uneven development.

### Premises:

1. Poor nations provide a destination for obsolete technology, and markets to the wealthy nations, without which the later could not have the standard of living they enjoy.

Comment: this premise reflects the mistrust on the issue of technology transfer. More over there are many other complications on the issue of the intellectual property rights, which will be discussed in Chapter 6 of this dissertation.

2. First World Nations actively, but not necessarily consciously, perpetuate a state of dependence through various policies and initiatives. This is multifaceted, involving economics, media control, politics, banking and finance, education, culture, sport, and all aspects of human resource development.

Comment: This situation is somewhat changing in today's context as there are many emerging economies such as China, India, Brazil and South Africa. However the future situation of most of the other countries is still uncertain as the influence of the external forces on these countries are still critical (see Chapter 6).

3. Attempts by the dependent nations to resist the influences of dependency often result in economic sanctions and/or military invasion and control. Many dependency theorists advocate social revolution to effect change in economic disparity.

Comment: This reflects the need for collaboration of the global community with mutual understanding to address the present global multiple crises for the benefit of all the countries developed and developing alike.

The following practices have been adopted by protectionist/nationalistic nations, at one time or another, in order to help to alleviate the negative effects of the world system:

- **Promotion of domestic industry and manufactured goods.** By subsidising and protecting industries within the periphery nations, these third-world countries can produce their own products rather than simply export raw materials.
- **Import Limitations.** By limiting the importation of both luxury goods and manufactured goods that can be produced within the country, supposedly, the country can reduce the amount of its capital and resources that are siphoned off.

- **Forbidding foreign investment.** Some governments took steps to keep foreign companies and individuals from owning or operating property that draws on the resources of the country.
- **Nationalisation.** Some governments have forcibly taken over foreign-owned companies on behalf of the state, in order to keep profits within the country.

Strengths and weaknesses of the different strategies adopted by countries for development can be observed by evaluating the progress and performance achieved in improving the standard of living of the citizens in the light of global economic systems.

Dependency theory is not free from criticism. Free market economists such as Peter Bauer and Martin Wolf claim that dependency theory would lead to corruption and lack of competition while counter arguments claim that the theory of competitive advantage breaks down when capital – including both physical capital like machines and financial capital are highly mobile, as under conditions of globalisation. This is countered, however, by the argument that the conditions of globalisation make competitive advantage all the more sound.

Isbister (1996) elaborated on the analysis in the dependency school on “unequal exchange”, and states that in international trading markets, Third World countries are seen as giving up much more than they get. Isbister described another stand within the dependency school that does not focus on unequal exchange; which is even willing to admit that the international economic system may lead to the creation of new wealth in the Third World rather than simply to its expropriation. These theorists believe that “the heart of underdevelopment lies in the creation of rigid, unproductive social structures in the Third world. That means it is a social structure dominated by the puppets of the rich countries and a relatively small group of local people controls the agriculture and the industrial development of the Third world. These people become very rich, due to their relationships with foreign companies and foreign investors, but they keep their gains to themselves. Connected as they are to the foreigners, they are unable to expand the development effort in ways that would improve the living conditions of their people, as a whole.” Isbister further emphasised that “most members of the dependency school claim that economic subservience very often leads to political subservience. Groups in power in the Third World, serve essentially at the convenience of the political and business power centres in the core of the international capitalist system. The core states support clients in the periphery which can be counted upon to serve their interests, in broad outline, if not in every particular ways.”

Blomsrom and Hettne (1988) described the following ideas that were developed based upon the different positions of the Dependency School, which are common to most of the proponents:

- Underdevelopment is intimately connected with the expansion of the industrialised capitalist countries;
- Development and underdevelopment are different aspects of the same universal process;
- Underdevelopment cannot be considered as the original condition in an evolutionary process;
- Dependency is, however, not only an external phenomenon but is also manifested in different ways in the internal (social, ideological and political) structure.

In the analysis of the spread of the Dependency theory, Blomsrom and Hettne (1988) found that in the case of Asia there was a negative reaction whereas, it was accepted in Africa.

Todaro and Smith pointed out that if Dependency theory is considered at its face value, one would conclude that countries pursue a policy of autarky or inwardly directed development, or at most they trade only with other developing countries. They emphasise that large countries that embarked on autarkic policies, such as China and to a significant extent India, experienced stagnant growth and ultimately decided to substantially open their economies. China began this process after 1978 and India after 1990.

Ferraro 1996 presented important insights of policy implications of dependency analysis on how poor economies develop are quite different from the traditional perspectives concerning competitive advantage, capital accumulation, and import/export strategies. Ferraro claimed that success of the advanced industrialised countries is not a good model for the currently developing economies.

It is valuable to note the following impotent new issues highlighted by Ferraro in this regard:

- Paradigmatic consensus emerged during 1950s and 1960s, ‘that growth strategies were universally applicable,’ was challenged by the dependency theory. Dependency theory suggests that the success of richer countries was a highly contingent and specific episode in the global economic history, one dominated by the highly exploitative colonial



relationships of the European powers. A repeat of those relationships is not now likely for the poor countries of the world;

- The neoclassical model of economic growth pays relatively little attention to the question of distribution of wealth;
- Dependency theorists emphasis social indicators far more than economic indicators;
- Dependant states should therefore, attempt to pursue policies of self-reliance by endorsing a policy of controlled interactions with the world economy on terms that promise to improve the social and economic welfare of their citizenry.

## **2.5 Marxism – comparison with Modernisation and Dependency Theories**

It is useful to compare the views of Marxists with the modernisation and dependency perspectives on the issue of development. Many of the dependency theorists consider themselves to be Marxists while some are not. According to Isbister, “Dependency theory has been attacked by orthodox Marxists who argue that it has abandoned the central tenets of Marxism, and that in consequence, it deals only with surface phenomena, not with the true underlying causes of development and social change, hence the label “neo-Marxist” that is now sometimes used to refer to the Dependency school” (Isbister 1996).

Marx often considered the less developed countries to be “primitive” and incapable of starting a process of development by themselves and that colonialism was therefore, necessary despite the fact that colonialism was both cruel and ruthless, for the elimination of the pre-capitalist modes of production and the introduction of capitalism, according to Blomstrom and Hettne (1988).

Isbister (1996) demonstrated some different thinking of Marxists. He highlighted a resurgence of Marxist thinking that is antagonistic to both modernisation and dependency theories. At the base of this thinking is the analysis of the class structures of the Third World societies, rather than the growth of resources and technology, as in the modernisation theory or in foreign domination, as in the dependency theory.

Also, Isbister (1996) specified three principal conclusions, which distinguish the Marxists from the neo-Marxist dependency theories. “Firstly, Marxists argue that the fundamental forces for social change lie internal to the Third World societies, not external to them. Secondly, they argue that capitalism is capable of producing growth in the economies of the Third World. And

thirdly, they argue that imperialism, both in its historical form and its neo-colonial form, is often an agent of progress, that it may operate in such a way to propel Third World societies on the path to capitalist growth.”

With these conclusions, Isbister (1996) concluded, “Marxists lie closer to modernisationists than they do to the dependency theorists, but it must quickly be added that the Marxists look at the Third World very differently from the way modernisationists do.” Isbister, further specified that “Modern Marxists fully understand that the Third World countries are intimately involved in international networks of trade, investment and finance, but they argue nevertheless, that there is internal autonomy, that the local capitalists classes may have their own power and not simply be subservient to the international system”.

Blomstrom and Hettne (1988) emphasised the different views between Marxism and Neo-Marxism on ecology in their book ‘Development Theory in Transition.’ They underscored that “many Marxists consider the concept of scarcity to be a bourgeois invention for the purpose of legitimising economic inequality and some Neo-Marxists now integrate the growing ecological consciousness and the demands of environmental movements into their theory of development.”

It is important to consider these varieties of theories and their principles together to understand the strategic options for policy development and implementation to transform the present unsustainable production and consumption patterns into sustainable patterns, locally, regionally and globally. Some principles of all these theories when mixed together, reflect the present context. However, it should be noted that these theories have basically focused on economic and social development without paying much attention to the integration of environmental considerations.

## **2.6 Ecological Modernisation**

During the later half of the 20th century, “economic-social and environment” dimensions have been considered as basic prerequisites for sustainable development. In line with this thinking, the idea of ecological modernisation has emerged. Ecological modernisation originated in Western Europe in the 1980’s and gained attention around the world by the late 1990’s (Mol and Sonnenfeld 2000). The core of this social scientific and policy-oriented approach is the view that contemporary societies have the capability of dealing with their environmental crises.

York, Rosa, and Dietz (2003) stated that there is growing evidence, which demonstrates that threats to the sustainability of ecosystems that are essential to support human societies, have given rise to various sociological theories of human-environment interactions. These authors provide three general perspectives of these environmental impact theories that include: Human ecology, Modernisation and Political economy.

In their analysis, a framework that relies on ecological principles has been partially adopted and modified. The overall findings of their study support the claims of human ecologists, partially support the claims of political economists and contradict the claims of modernisation theorists. They argue that factors from neo-liberal modernisation theory, such as political freedom, civil liberties, and state environmentalism have no effect on environmental impacts and taken together, they suggest that societies cannot be sanguine about achieving sustainability via a continuation of current trends in economic growth and institutional change (York et al (2003).

Mol (2000) stated that ecological modernisation theory is a valuable starting point for analysing the contemporary reflexive reorganisation and transformation of production along ecological criteria. York and Rosa in their article, “Key challenges to ecological modernisation theory” (<http://oae.sagepub.com/cgi/content/16/3/273>) raise four challenges to the claim of ecological modernisation theory (EMT) that continued modernisation is necessary for ecological sustainability:

- a. “EMT needs to go beyond merely demonstrating that societies modify their institutions in reaction to environmental problems and show that such modifications lead to ecological improvements.
- b. EMT must show that late stages of modernisation processes lead to the ecological transformation of production and consumption at relatively high frequency.
- c. EMT must demonstrate that industries or firms that are reducing their direct impact to the environment are not contributing to the expansion of negative impacts by other industries or firms.
- d. EMT must show not only that economies are becoming more resource efficient but also that the pace of increase in efficiency exceeds the pace of increase in overall production.” York and Rosa, after reviewing the existing evidence, concluded that EMT has insufficiently addressed these four issues.

Murphy and Gouldson (2000) stated, “Ecological Modernisation theory has been offered as a possible solution to the environmental problems currently facing industrial countries. It suggests that governmental regulations can help to solve environmental problems whilst at the same time making industry more competitive and in theory, this can be achieved if regulations encourage the development and application of innovative technologies and production techniques.” However, they concluded that whilst encouraging technological and organising changes, integrated pollution control measures fail to establish the environment as a strategic concern of industry and as a result, it is unlikely to promote the radical innovations that are associated with ecological modernisation, in the long run.

## 2.7 Diffusion of Innovation

Diffusion is the process by which innovation is communicated through certain channels over time among the members of the social system (Rogers (1962). Some principles of ‘*Diffusion of Innovation*,’ could be useful to identify strategies of diffusion of technologies and lifestyles that can promote paradigm changes to move forward to SCP patterns. Rogers (1962) and his subsequent editions provide most significant and compelling theories of diffusion. Rogers’ definition contains four elements that are present in the process of diffusion of innovation process: a. Innovation, b. Communication channels, c. Time and d. The Social system, into which the innovation is being introduced.

Diffusion of Innovation (DoI) theory describes the pattern adoption, its mechanisms and provides insight into how to predict whether and how a new invention will be successful. DoI theory specifies five stages<sup>13</sup> through which a technological innovation passes: 1. **Knowledge:** exposure of its existence and understanding of its functions; 2. **Persuasion:**, forming a favourable attitude to it; 3. **Decision:** commitment to its adoption; 4. **Implementation:**(putting it into use; and 5. **Confirmation:** reinforcement based on positive outcomes from it (Clarke 1999).

DoI theory recognises three important roles in the innovation process: 1. Opinion leaders, who have relatively frequent informal influence over the behaviour of others, 2. Change agents, who positively influence innovation decisions, by mediating between the change agency and the relevant social system, 3. Change aids, who complement the change agent, by having more intensive contact with the clients, and who have less competence credibility but more safety or trustworthiness credibility.

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<sup>13</sup> Rogers has changed his terminology in to these five stages later.

In relation to SPC, change agents can play an important role to change the behavioural patterns towards sustainability. DoI theory organises the functions of the change agents, the principles of which could be considered in promotion of SPC. Their functions, according to Clarke (1999) include: a. develop a need for change on the part of the client, b. establish an information-exchange relationship, c. diagnose the client's problems, d. create the intent to change in the client, e. translate this intent to action, f. stabilise adoption and g. prevent discontinuance and h. shift the client from reliance on the change agent to self-reliance.

Promotion of SPC needs transfer of information and know-how mostly backed by the scientific evidence and experiences on economic, social and environmental impacts of unsustainable production and consumption practices. Promotion of SPC practices involves:

- a. Understanding the problems associated with the unsustainable production and consumption and their impacts to the economic, social and environmental development;
- b. Forming an attitude to reverse the present trends towards un-sustainability;
- c. Commitment to develop strategies and methodologies to reverse the trends;
- d. Implementation of the strategies and methodologies developed;
- e. Improve the effectiveness of implementation based on the results achieved.

The DoI theory is, at its best, as a descriptive tool, less strong in its explanatory power, and less useful still in predicting outcomes, and providing guidance as to how to accelerate the rate of adoption (Clarke 1999).

It is evident that based on the strength and powers vested with the stakeholders for its interpretation within the market forces, unsustainable production and consumption patterns are widely spread at present at a higher rate than that of sustainable practices. DoI research identified that in a competitive diffusion process, diffusion of some innovations stimulates an opposing innovation that also diffuses in competition with the first. In this context, it is obvious that in environmental management, especially in the promotion of SCP, collaborative learning and decision-making are necessary to avoid rebound effects in the diffusion process.

However, the author proposes that the study of various approaches of diffusion of innovation principles can also be useful for promotion and dissemination of SCP practices in different cultures, locally, regionally and globally with horizontal and vertical communication, especially in the events that pervasive innovations are promoted by the global marketing strategies with powerful market mechanisms. Improving mutual understanding based on facts

and evidences are necessary conditions to promote SPC and thereby, to promote ecosystem stability. Facilitation of joint problem solving in the sustainable development process is a key element considered in this research. Considering the theoretical approaches discussed in the process of development in this Chapter and the progress achieved by the counties in the world in the process of sustainable development, it is observed that more innovative approaches are necessary to challenge and reverse the trends of present unsustainable production and consumption patterns.

## **2.8 Collaboration as a strategy to promote SPC**

The theories of development offer different explanations to uneven development of the world economy and the global environment. The local and global ecosystem consists of innumerable number of consumers and producers of ecosystem resources, whose behaviour in production and consumption determines the survival and stability of the ecosystem. The evolution of the behaviour of these consumers and producers and their various forms of organisation and institutions from gathering and hunting to the present day production and consumption and the causality to the present day eco- system crises is only partially explained from the theories of development. There is a need for building new perspectives to provide guidance on the way forward for the countries to continue to be consumers and producers while maintaining ecosystem stability, which has been threatened and has produced a problem domain to everyone to act upon.

Theories offering explanations to uneven development indicate desired human behaviour in production and social systems with a kind of homogeneity in the way factors of production is treated and used. Stakeholder interests are more heterogeneous today and such heterogeneity is accepted and respected with respect to rights and obligations of the members of the society. Competing interests are a factor of the day and mechanisms are needed to resolve conflicts and to ensure gains to all.

Theory is of no use if it does not guide practice. The present day environmental crises caused by competing, short-term interests in resource use are resulting in ecosystem instability that threatens the common future of all. Additionally, the policy making within international fora often result in the stakeholders being deadlocked with regard to the need for new perspectives for recognition and adoption.

Development theories define ‘development’ and ‘under-development’ and interpret the processes, their linkages and propose solutions in different ways. However it is seen that the

gaps between ‘rich’ and ‘poor’ are increasing between and within countries. The economists have failed to predict the risks and instability involved in the present economic development systems. The financial crises that erupted in 2008 are an example of such risks.

Meanwhile, unsustainable production and consumption continue to cause increasing demands on natural resources, worldwide, thereby, threatening ecosystem stability and life on earth globally and locally. Various initiatives have been taken by diverse interest groups, communities, international and national institutions over the last 30 to 40 years to integrate sustainability measures into the production and consumption processes. Even though there are success stories in certain areas of production and consumption, it is evident that these efforts are not adequate to achieve the needed improvements. This may be due to failure of dissemination and adoption of best practices by the majority and also due to rebound effects.

Baas (2005) in his PhD Dissertation specified that “The correlation between the volume of documents on corporate environmental policy and the results achieved through environment-integration is negative”. Baas continued by stating that because in general, “Human beings seek comfort, managers seek the line of least resistance, taking end-of-pipe solutions for granted and thereby they failed to be open to the possibility that preventive approaches are economic opportunities within a framework of continuous improvement and innovation.”

The kind of innovation required at the macro level to address the present multiple global crises is not limited to a particular technology. The innovations should be able to promote behavioural changes of the world community locally (nationally), regionally and globally to resort to more sustainable production and consumption patterns to safeguard our common future.

The first international conference held in Stockholm on Human Environment in 1972 connected environmental dimensions into this framework by recognising the limitations of the carrying capacities of the ecosystem to absorb increasing pollution levels and natural resource depletion. This concept was further strengthened by the Brundtland Commission’s publication of *Our Common Future* (1987) and subsequent International Conference (Earth Summit) held in Rio de Janeiro in 1992. A key result of the Rio conference was Agenda 21, comprised of 40 chapters that outlined the key areas and approaches that societies must take to make progress toward sustainable development. Chapter 4 of Agenda 21 focuses on unsustainable production and consumption patterns prevailing in the world and upon the need to take measures at international and national levels to reverse the those trends by taking into account the imbalances in the global patterns of consumption and production.

Almost all the subsequently developed multinational environmental treaties include provisions to take action to promote SPC directly and indirectly. However, so far the international community has failed to achieve the needed results despite the number of international policies taken through these Conventions.

The development theories should be able to analyse socio-economic phenomena of ‘development’ and ‘under-development’ based on the problems related to present and emerging economic, social and environmental issues within diverse and heterogeneous political and cultural systems.

Modernisation, Dependency, Marxist, and Ecological Modernisation theories of development anticipate a kind of homogeneity within which human behaviour could be changed. ‘Development Theme’ is still mostly viewed as economic development nationally and internationally while few countries recognise ‘Happiness’ as a guiding principle of development.

Due to the political economy, the famous phrase, ‘*Think Globally and Act Locally*’ is being replaced by ‘*Think Locally and Act Globally*’. Individual countries have rights to take their own decisions on national development policies and implement those. Of course there are international rules and procedures governing these behaviours when the policies impact on international trade and environment. However, these policies have failed to deliver the expected results. While most of the current problems remain, new problems are emerging. The multiple global crises that we are facing today are classic examples.

Both, overconsumption and under-consumption (unsustainable production and consumption) pose daunting challenges to human development and ecosystem stability. Theories are of no use if they do not adequately guide practice. The author proposes that the ‘*Will to Effectively Collaborate*’ for sustainable human development is one of the significant missing components in securing global environmental governance, throughout which to achieve sustainable human development.

Among the existing conventions, The Montreal Protocol has been recognised as a successful Convention in terms of achieving the expected results. To a considerable extent this was due to the high level of collaboration among all stakeholders with significant financial and technical assistance provided by developed countries, which were particularly interested in achieving the objectives of this Convention.



However, it should be noted that the ozone layer is not yet recovering or at least not very fast. Phasing out use of CFCs and other ozone-layer depleting substances will be not sufficient even though it was necessary. There is a very long time lag between the time of stopping their usage and release of CFCs and the recovery of the ozone layer. Therefore continued collaboration of the global community focusing on this problem domain is imperative to ensure the long-term sustainability of the implementation of environmental policies based on scientific evidence.

In September 2000, the United Nation's General Assembly (UNGA), adopted the Millennium Development Goals through which the Member States asserted, "*The current unsustainable patterns of production and consumption must be changed in the interest of our future welfare and that of our descendants.*" The eight millennium development goals (MDGs) with a target date of 2015, adopted at that assembly form a blueprint agreed upon by the Member States and by the world's leading development institutions. The MDG include: *Eradicate extreme poverty, Achieve universal primary education, Promote gender equity and empower women, Reduce child mortality, Improve maternal health, Combat HIV/AIDs malaria and other diseases, Ensure environmental sustainability, and develop a global partnership for development.*

In September 2002, at the World Summit on Sustainable Development (WSSD) held in Johannesburg, the delegates adopted a plan of implementation (POI) which specified the concrete actions and measures to be taken by the international community to realise the MDGs. In the POI it was recognised that in order to make real progress in fulfilling those goals, fundamental changes are essential in the ways societies promote and implement SPC patterns.

In his address in September 2007, in the launching of MDGs the UN Secretary General Ban Ki-Moon, emphasised the need: to break the business as usual practices overtime and the need to train the teachers, nurses, and engineers; *to build the roads, schools, and hospitals; and to grow the small and large businesses able to create the jobs and income needed.* He further reiterated the need to more than double the global development assistance over the next few years, because, in his opinion, nothing less will help to achieve the goals.<sup>14</sup>

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<sup>14</sup> (<http://www.un.org/millenniumgoals/2009>)

All significant initiatives need effective collaboration in order to achieve the objectives.

Rostow, in his preface to the third edition of *'Stages of Economic Growth'* emphasised the need for regional organisations. He noted that in a world where heightened interdependence has progressively reduced the capacity of the nation state to solve, by itself, the problems of its people. He claimed that the United Nations in New York is too big to do detailed serious housekeeping business required to meet the various needs of specific countries in each of the regions. It is evident that collaboration at all levels is necessary to address the present multiple global challenges.

It is necessary to consolidate the relevant aspects of the development theories and their schools of thought, and to go beyond them by developing new theories that can more adequately serve to guide the global and local communities to address the present global multiple crises situation considering the ecosystem limitations and its inability to provide services to meet the unlimited demands for human development globally and locally. Such consolidation needs collaboration without which fragmented approaches will be continue to be implemented that further push the global and local communities to move in different and opposite directions as is happening at the present time. It will be valuable if theories can be designed and applied that can be used to guide the promotion of collaboration in theory and in practice in the real world context.

Collaboration is defined as joint decision making of a problem domain or of the future of the problem domain and sharing of responsibility in implementation by different stakeholders (Grey 1989). The emphasis is on both decision making and sharing responsibility of information. The rule of the engagement is that stakeholders cannot withdraw, at will, during the implementation stage, once they have agreed to joint decisions. One international example of collaboration in the field of environment is the Montreal Protocol in which production companies and environmentalists worked together, debated and finally found a way to solve the ozone layer depletion problems caused by the production and use of CFC's.

It is also evident that both over consumption and under consumption can be addressed by integrating sustainability criteria within decision-making processes, at all levels. Collaboration at local (national), regional and global levels is essential in order to adequately address these urgent challenges. Collaboration, at all levels, is mutually supportive.

### 2.8.1 Collaboration at local, regional and global levels

We need to create a framework<sup>15</sup> within which collaboration will be possible in a complex, diverse and heterogeneous socio-economic conditions prevailing at present in the world which controlled by a political economy. Such a framework can guide leaders to better understand the conditions, procedures, and rules, of practice that can bring about the desirable changes required to balance economic growth with ecosystem limitations in a sustainable and equitable manner in the real world context.

Full stakeholder involvement is necessary in joint decision-making on defining the problem domain and for facilitating the action to address problem domain in theory and in practice. Merely, participating in decision-making is not sufficient, even though it is a necessary condition. One can argue that integration of sustainability criteria into the development process is an inevitable process and therefore, changes will occur over time. In this context, it is important to include the time dimensions into this mode of thinking. It may be too late for us to prevent irreversible damages to the ecosystem, which supports the life on earth if we fail to take corrective measures now on behalf of present and future generations. Relevant theory should also help users to integrate the time dimension in order to more effectively guide practice for making the needed transformations for the short and long-term future.

Collaboration, the joint decision-making and sharing responsibility of implementation of the joint decisions is the key to results. Stakeholders who took part in making decisions should continue to be empowered and engaged during the implementation journey. In reality the main obstacle to achieve the desired changes is lack of directions to sustained collaboration at local and international levels in order to reverse the unsustainable consumption and production practices.

The American Association of School Librarians (2005) included the following principles of collaboration:

- Collaboration is a promising mode of human engagement but in order to become more than a passing fad, a theoretical structure and framework are needed to guide individuals and groups toward successful collaboration.—*Vera John-Steiner*

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<sup>15</sup> The framework of collaboration should extend beyond the borders of stakeholder theory and network theory while taking in to account of the basic principles of those, as behavioural changes required for SPC is a broader cross cutting issue that need a broader perspective of collaboration with minimum set of conditions that can be scaled up at local regional and global levels based on the dynamic conditions and trends of interactions.

- The principles in a true collaboration represent complementary domains of expertise. As collaborators, not only do they plan, decide, and act jointly; they also *think together*, combining independent conceptual schemes to create original frameworks. Also, in a true collaboration, there is a commitment to shared resources, power, and talent; no individual's point of view dominates, authority for decisions and actions resides in the group, and work products reflect a blending of all participants' contributions... (Minnis, John-Steiner, and Weber 1994, C-2 cited in John-Steiner, Weber, and Minnis 1998, 776).

Batuwitage explained the difference between participation and collaboration in his dissertation on 'Managing overlapping interests,' specified, "Participation works well in homogeneous situations. It offers tools to help identify common interests of all the members of groups and formulates action to realise them. In the path of realisation of the goals, however, they have to compete with others who have different interests. This is the domain of collaboration."

Batuwitage quoted Toffler 1984:243 and Gray 1989 to clarify that "Collaboration starts with heterogeneous situations, and proceeds with the assumption that we live in an increasingly interdependent world with diverse and competing interests. It takes over when groups are unable to break deadlocks. Collaboration offers a set of tools to break the impasse for problem solving by finding common ground to multi-party problems."

"Collaboration is a process in which those parties with a stake in a problem actively seek a mutually determined solution. It includes the other parties, and all have the common role of "being stakeholders" while carrying differing interests. "It is a processes through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible, they join forces, pool information, knock heads, construct alternative solutions, and forge an agreement (ibid)"

The present multiple global crises provide an opportunity to examine the capacity of the governance structures at the local (national), regional and global level and to assess the adequacy of the existing structures to meet the unprecedented multiple environmental and development challenges within the limited carrying capacities of the ecosystems.

It is evident that in order to maintain ecosystem stability at local (national), regional and international levels, there has to be at least a minimum level of collaboration among all the stakeholders. A single country or an institution/organisation is able to address the environmental

and development challenges in isolation. High-level collaboration among the stakeholders can help to create win-win situations for the stakeholders even though some asymmetries may occur.

When the stakeholders fail to collaborate to maintain the ecosystem stability, sooner or later there will be serious threats to human existence due to inadequate capacity of the ecosystem to sustain human life. In this process it is necessary to bear in mind that the focus should be to achieve the expected outcome and impact of collaboration to ensure ecosystem stability.

Similarly, at regional level, collaboration of all the countries is required to maintain the regional ecosystems. In this case there is freedom for individual countries to act on their own. However, such action should not contravene the joint decisions made to meet multiple environmental and development challenges and ensure regional ecosystem stability.

It is evident that the functioning of ecosystems at the local, regional and global levels is inextricably interlinked and therefore, regional and global level collaboration is also equally important at appropriate levels to maintain the ecosystem stability and life on earth.

The present multiple, global environmental calamities and existing trade and economic inter-linkages provide ample evidences of the dire need for collaboration at the global, regional and local levels to address the challenges. Based upon the theories of modernisation and dependency, and upon the urgent sociological, ecological and economic needs, at all levels, the author developed a theoretical framework that can be used to help achieve the essential collaboration among stakeholders to make progress toward achieving ecosystem stability and SCP in theory and in practice.

### **2.8.2 The Proposed theoretical framework with a minimum set of criteria to facilitate collaboration of different stakeholders**

After considering the theoretical perspectives of the evolution of production and consumption patterns globally and locally, it is evident that the decisions taken at various stages of development by different communities on changing production levels & patterns and, utilisation or conservation of natural resources depend on various ecological, political, sociological and economic factors, conditions and related driving forces, which vary over time and space. Considering the theoretical perspectives and the experiences of the author in the field of environment, she proposed that, ‘Mutual Understanding’ and ‘Trust’ among the drivers & actors coupled with ‘Incentives’ and ‘Facilitation,’ both technical and financial, are

necessary minimum preconditions to facilitate common decision-making by the stakeholders and to secure commitment for the implementation of the decisions taken in a collaborative manner. If one or more of the elements are not present at the right time and in sufficient strength, it will not be possible to move forward to achieve the expected outcomes; such deficiencies will eventually break the collaboration.

The author tested the validity of the criteria by using case studies and other international forums, which the author attended during the study. Chapter nine presents evidence of the validity of the framework. Chapters six and seven (case studies) provide additional information, that supports its validity.

The theoretical framework for this thesis was developed from the understanding that resulted from the literature review and from the review of the status of global efforts designed to achieve consensus in managing global change. As stated in the foregoing paragraphs, the framework is built upon a minimum set of conditions that can build or diffuse collaboration in the implementation of SPC practices. Chapters 6 & 7 present the results of the case studies. Chapter 9 presents additional supportive validation of the framework, based upon real life examples such as climate change international negotiations.

**Table 2.1 : Theoretical Framework to guide collaboration for effective SPC practices**

Minimum Conditions leading to collaboration of all stakeholders				Different Scenarios
Mutual Understanding	Trust	Incentives	Facilitation (Financial and technical support)	Win-Win outcome with all parties gaining significant benefits
<i>Inadequate Mutual Understanding</i>	Trust	Incentives	Facilitation (Financial and technical)	Uneven results, possibly leading to breakdown of trust
Mutual Understanding	<i>Lack of Trust</i>	Incentives	Facilitation (Financial and technical)	Distorted results due to lack of participation and withdrawal at will by some of the parties
Mutual Understanding	Trust	<i>Lack of Incentives</i>	Facilitation (Financial and technical)	Inadequate results due to shortfalls of inputs
Mutual Understanding	Trust	Incentives	<i>Lack of Facilitation (Financial and technical)</i>	Unsatisfactory results due to uneven technical capacity

Two important points have been observed in the efforts to achieve collaboration in international fora. First, the conditions of this framework are dynamic. The presence or absence of these conditions creates the dynamics that either results in stakeholder frustration or creates the willingness to look for options to overcome the inertia to continue business as usual, thereby arriving at consensus decisions. Acceptance of the accepted rules of the engagement can help to defuse the conditions that move stakeholders away from each other so that they can seriously search for alternative mechanisms for dealing with global and national issues under different scenarios.

When there is a deadlock, the framework can serve as a guide to explain why collaboration failed because it can be used to map the problem as well as it can be used to get the process going ahead, again. Abundant experience has documented examples of events that saved negotiations from collapsing due to the adherence to the rules of the engagement that forced the stakeholders to restart their efforts to reach agreement. The author verified the validity of these conditions through case studies and other information gathered. The results are presented in Chapter 9.

A function of the framework is to manipulate scenarios to juxtapose the different types of forces and factors to arrive at a shared vision and help to motivate people to commit to working to achieve shared visions and consequent responsibilities to address a particular problem and to identify what forces/actions are to be promoted/accelerated and what forces are to be slowed, diffused or discontinued.

Depending on the outcome of the dialogue, new questions can be posed; new responses can be discussed until consensus is reached. The discussions should be continued until participants are in agreement with the proposed way(s) forward. Countries cannot afford to shut down the dialogue. The lack of required depth of knowledge and openness and the abundance of ego and greed are stakeholder traits in a heterogeneous world among people with diverse and competing goals, objectives, skills, and motivations accepted as natural at the process of negotiation toward collaboration. The resultant time taken for consensus is again a reflection of perceived space, thresholds or tolerance levels of some parties which generate dynamics for other parties to react by regrouping, south-south dialogue, boycotting, non compliance, and many such reactions until adequate depth of understanding is forced to return.

The framework will show where, what and how different forces are operating under different problem domains; thereby pointing to accountability issues that are the driving force(s) for returning to or blocking collaboration.

In order to make effective collaboration possible, it is necessary for all stakeholders to thoroughly understand the extent to which the natural ecosystem can be utilised for human use and the strategic approaches needed to achieve optimum results to keep the consumption and production patterns within the limits of the carrying capacity of the ecosystem.

Many international environmental conventions have established targets to slow down and to reverse the trends of present consumption and production levels. Common decisions have been taken at various conferences of Parties to those Conventions. However, it is apparent that the international community has, thus far, failed to get the desired outcome of many of those decisions due to lack of collaboration for the implementation of the decisions taken.

Local efforts for changing behaviour also reflect very limited successes although ambitious SCP programs have been initiated in many parts of the world. Pollution levels and degradation of natural resources vary within and between regions of the world. It is therefore, necessary to understand the driving forces that could keep the stakeholders together as well as the forces that could block progress. This must be done in order to identify, develop and implement strategies and frameworks for local strategic SPC programs. These conditions were tested and validated in the two case studies presented in Chapter 5 and 7 and subsequently in Chapter 9.



## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Introduction to the Research Goal and Research Questions

The Sri Lankan people have the vision of becoming a more prosperous nation, with a stable and internationally competitive economy. They are working to achieve this goal by combining growth with equity in the context of a liberalised economic system, while retaining people-friendly democratic values and institutions, and simultaneously protecting Sri Lanka's ancient cultural and ecological heritage. This vision is to be accomplished through promotion of ecologically sound SPC while maintaining the viability of our ecosystem from generation to generation (National Policy and Strategy of Cleaner Production – Sri Lanka - 2005).

Over the past 60 years, Sri Lanka's economy has evolved from a predominantly agricultural economy to a diversified economy. With the increasing trends of globalisation and related business influences designed to achieve profit-making without much consideration of ecological impacts, Sri Lanka has to confront and overcome many daunting challenges to promote ecologically sound SPC patterns in the country. Some of these challenges are common to many developing countries; some of the challenges are, however, specific to Sri Lanka.

In light of the present, multiple global crises embedded within the socio-economic and environmental problems, the need to transform countries' economies to be greener and cleaner is more urgently needed than ever. Climate change has become a centre of focus of the global community with impacts that Sri Lanka is experiencing today and even more so when one considers future challenges based upon climate changes predicted by the scientific community. All countries have to take common but differentiated responsibility considering the limited environmental & economic resources available for most countries to develop their economies to fulfil the needs of their present and future populations. Integrating SPC policies into the national development planning processes is considered to be the only way forward to ensure long-term sustainability of socio-economic development and to ensure sustainable and dynamic functioning of the ecosystem. In this context it is necessary to make a paradigm shift from the way that the industrialised countries used to develop their economies as a result of which the present crises have evolved.

With this background, the goal of this dissertation research was designed to develop a model for Sri Lanka's National Strategic SPC programme. For this purpose it is necessary to develop strategic approaches equipped with both policies and institutional mechanisms for long-

term sustainability of the production and consumption programme in Sri Lanka. The vision statement of this is, “*Sustaining our Common Future by Caring for Nature and its Capacity to Care for All.*”

This goal should be accomplished in light of the following:

- That the adverse impacts of the production and consumption patterns of each country are spreading worldwide;
- Even though the concepts of CP and SCP have been promoted around the world since 1992, implementation is far less rapid than was expected and that is urgently needed.

It is necessary therefore, to find answers to the following questions in order to achieve the research goal:

1. What are the main existing frameworks, policies, systems and procedures for promoting SPC in other countries in general and in Sri Lanka, in particular?

Objective: to analyse the strengths, weaknesses, opportunities and threats of the present systems.

2. Why did the existing frameworks, policies, systems and procedures prove to be inadequate in promoting SPC?

Objective: to identify the strengths, weaknesses, challenges and threats in the present system to make social, economic, and environmental progress toward SPC in Sri Lanka.

3. How can Sri Lanka meet the challenges and effectively guide the development and implementation of its National Strategic SPC programme?

Objective: to identify strategic approaches necessary for a National Strategic SPC programme in Sri Lanka.

### **3.2 Research methodology**

SPC issues continuously change over time in response to co-evolving social, economic and ecological systems; it is therefore, necessary to analyse the evolution of SPC practices over time to identify the successes and failures in the process of economic, social and environmental development. By building upon theories of modernisation and dependency and, upon experiences of strengths and weaknesses of both approaches, it will be possible to

develop information of appropriate kinds and levels of interventions and integration necessary to move toward sustainability at the local, regional and global levels.

It is equally important to develop a series of indicators, at the beginning, that Sri Lanka can use at the national, regional and local levels to monitor the ‘success’ or ‘failure’ of the implementation of its National Strategic SPC programme based on which short, medium and long term strategic interventions can be made to fine-tune the programme as appropriate to ensure its effective implementation. In this dissertation an array of short, medium and long-term indicators are proposed for use in monitoring the performance of the model, and thereby, to monitor the progress in implementing its SPC programme and to achieve the expected improvements in economic, environmental and societal sustainability.

The research methodology includes a mixed methods research with the following key components:

- An extensive literature review to:
  - 1.1 Gain insights into the evolution of SPC patterns and related theoretical perspectives, throughout the world;
  - 1.2 Identify and evaluate the global and local trends and conditions of SPC, and identify and evaluate the diverse roles of the stakeholders in global, regional and local systems.
- Literature review to:
  - 1.3 Understand the theoretical perspectives of development at various stages from the primitive era to the present era;
  - 1.4 Evaluation of the adequacy of the development theories to address the present global multiple environmental problems and related socio-economic issues;
  - 1.5 Propose a possible way forward to promote SPC globally and locally in theory and in practice.
- Two Case Studies (one on implementation and the other on policy) to:
  - 1.6 Link the information gathered from the literature review to existing systems in real life contexts;
  - 1.7 Identify strategic approaches to promote SPC in Sri Lanka considering the developing country perspective in relation to global change; and

- Use the information, data, conclusions and recommendations gathered from these sources along with the experiences gained by the author at local and international levels in the field of environment and sustainable development in the past 19 years to:

#### 1.8 Develop a National Strategic SPC Programme for Sri Lanka.

The special feature of this dissertation is, the development of the SPC model for Sri Lanka, without limiting it to a narrow focus by considering only local conditions. Global perspectives and their linkages to local conditions and, local conditions and their linkages to global perspectives were co-evaluated in the literature review as well as in the process of designing the case studies to develop strategies to promote and application of SPC practices. The mixed methods research methodology was used in the dissertation which provided an excellent opportunity for the author to use extensive literature on global and local perspectives of SPC, case studies and information from the extensive experiences of the author on environmental management and sustainable development for the past 19 years.

Multiple sources were used to collect data and information in the case studies that are heavily correlated and mutually supportive in application of SPC globally and locally. Case studies were major components of the research methodology.

Yin (2009) specified four types of case studies: type 1-single case holistic design, type 2-single case embedded design, type 3- multiple case (holistic) design and type 4- multiple case embedded design. Case study one of this dissertation's case studies used the type 2 design where two units of analysis were considered.

In designing case studies one and two, many interesting opportunities were considered as a whole to identify strategies to promote and application of SPC at the local level considering the developing country perspectives in relation to global change. Case study one considered implementation strategies while case study two focused on policies. Both case studies are inter-related and mutually supportive. As the issue of SPC is global in nature such an approach was necessary to link the local and global perspectives in a globalising world. Integration of data and information from multiple sources in case study one facilitated to link local and global perspectives and identify strategies for the SPC model. At the same time the two case studies, data and information gathered from the literature review, and from the extensive experiences gained by the author in the field of environment and sustainable development for the past 19 years at local and global levels, once they are taken together, they effectively facilitated the author's work to link global and local perspectives and to develop strategies for the SPC model that links policy and implementation perspectives.

The author used the case study method that was designed:

1. To understand and to apply the facilitation roles that can be played by the international community to strengthen and enhance the national and local efforts in the processes of application of SPC practices;
2. To learn how collaboration at the international and national levels can facilitate the horizontal and vertical implementation of SPC practices into the development processes.

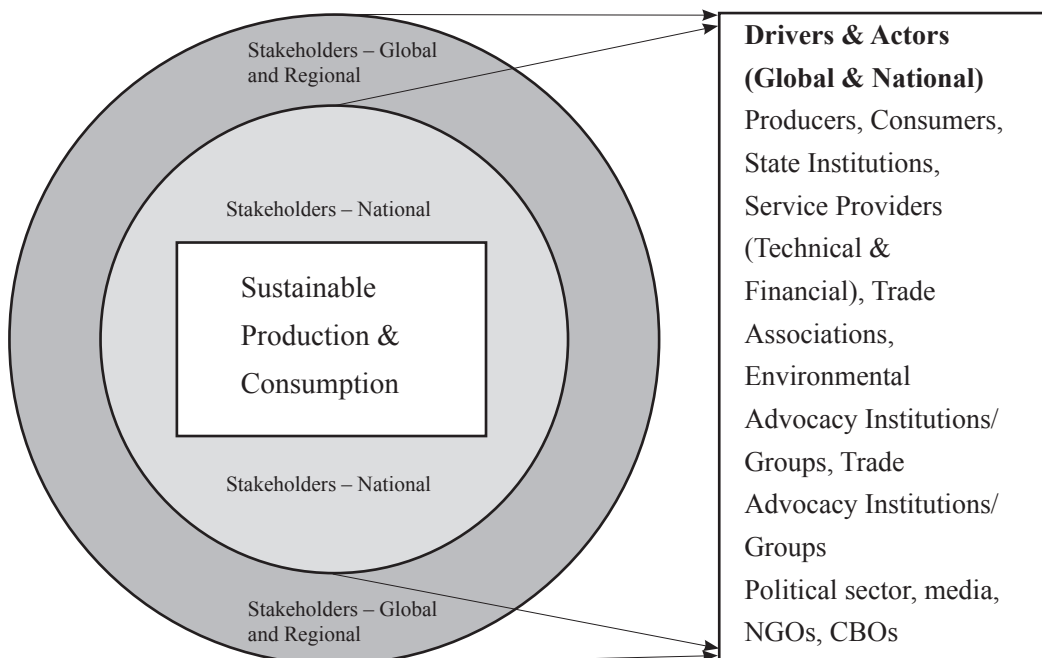
This dissertation considers collaboration of stakeholders as a prerequisite to promote and implement SPC practices at the local, regional and international level. SPC issues are generally characterised by conflicting social perspectives embedded within multiple and diversified driving forces.

In a competitive global market system, the ability to change behavioural patterns towards sustainability depends on the capacity and will of the stakeholders, drivers and actors, for collaborative decision-making. It is also then dependent upon a high degree of commitment to implement the decisions to overcome the barriers and challenges. In this context it is essential to understand how collaboration supports the concept of SPC and how it facilitates its implementation in complex geo-socioeconomic and political environments. Better understanding of the inextricable inter-linkages of the drivers and actors in the current global, regional and local SPC systems can help governmental leaders to design and implement the policies, procedures, and rules that are required for ensuring that the desirable changes occur in order to achieve the vision, goal and objectives of this dissertation as stated in section 3.1.

### **3.2.1 Drivers and Actors**

Initially it was necessary to identify the major drivers and actors in the system whose collaborative involvement is necessary, at all levels, for the development and implementation of the strategic SPC programme for Sri Lanka. Illustrative stakeholders that must be involved include but are not limited to: Producers, Consumers, Service Providers (Technical & Financial), State Institutions, Universities and other educational institutions, Private sector organisations, Trade Associations, Environmental Advocacy Institutions/Groups, Trade Advocacy Institutions/Groups, the Political sector, the Media, Non Governmental Organisations (NGOs) and Community Based Organisations (CBOs).

Secondly, it was essential to develop a thorough understanding of the diverse roles of the drivers and actors of the current system at the local, regional, national and global levels and to develop insights into their potential for promoting SCP. Analyses of the strengths and weaknesses of the diverse strategies used for economic and social development helped the author to identify opportunities and challenges in the existing system, and thereby to clarify the new conditions, procedures and rules that are required to promote SPC in Sri Lanka.



**Figure 3.1: Major drivers and actors in the promotion of SPC**

### 3.2.2 Introduction to Case Study Research Methodology

Case study research methodology was used as a key component of this research to obtain answers to the three research questions and to identify the strategic approaches for the National SPC model for Sri Lanka, the goal of the research.

Case study research methodology has been widely used by researchers when there are limitations in applying quantitative methods. It helps the researcher to assess the effectiveness of programmes and initiatives where quantitative techniques tend to obscure some of the important information that they need to uncover. Analyses of dynamic systems in the field of

sociology make case study methodology more appropriate. Case studies can be designed to bring out the viewpoints of the participants by using multiple sources of data. Some researchers use case study methods combined with action research approaches based on the nature and the time span of the case to be analysed. The case study method enables investigators to retain the holistic and meaningful characteristics of real life events – such as individual life cycles, small group behaviour, organisational and managerial processes, neighbourhood changes, school performance, international relations and the maturation of industries (Yin 2009).

The earliest use of case study research has been traced to Europe, predominately to France, where its usage was marked by the periods of intense use and disuse (Tellis Winston 1997). Tellis, in his “Introduction to Case Study,” stated that the field of sociology was associated more strongly with case study research, during the period from 1900 to 1935. Thereafter, there was a tendency of declining usage by some researchers due to their perceptions of its limitations to provide quantitative measurements in comparison with other more directly quantitative methods; this was important for some researchers as they sought to make sociology more quantitatively scientific.

However, due to some of the limitations of quantitative methodologies, in the 1960s, there was a renewed interest in usage of case study methodology. The application of “Grounded Theory” in some highly regarded studies accelerated the renewed use of the case study methodology. Chris Voss et al. (2002) emphasised that unconstrained by the rigid limits of questionnaires and models, case studies can lead to new and creative insights, development of new theory, and have high validity with practitioners, the ultimate users of the findings of research.

One of the strong criticisms of case study research is its “microscopic” nature due to lack of a sufficient number of cases. This claim has been strongly denied by Hamel (Hamel et al 1993) and Yin (1984, 1989a, 1989b, 1993, 1994) who counter argued that the relative number of case studies does not transform multiple cases into macroscopic nature. The goal of the study should establish the parameters, and should then be applied to all research and in this way, even a single case can be considered acceptable, provided it met the established objectives (Tellis 1997). Chris Voss et. al, (2002) presented several challenges in conducting case study research such as its time consuming nature, the need for skilled interviewers, and the care needed in drawing generalisable conclusions from a limited number of cases and in ensuring rigorous research; all of these parameters must be carefully addressed by researchers using case study methods.

Yin (2009) emphasised that case studies need not take a long time to complete; he claimed that case studies are a form of inquiry that does not depend solely on ethnographic or participant – observer data. One could, according to Yin, even do a valid and high quality case study without leaving the telephone or internet, depending upon the topic being studied.

With regard to generalisation, Yin (2009) specified that case studies, like experiments are generalisable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment, does not represent a “sample” and in doing case studies, the goal is to expand and generalise theories (analytical generalisations) and not to enumerate frequencies (statistical generalisations). Quoting (Lipset et. al (1956) Yin (2009) further elaborated that the goal of the case study is to do “generalising” and not “particularising”.

The critical features of the logic of the design of the case studies were restated by Yin (2009), as part of a twofold, technical definition of case studies.

The first part begins with the scope of the case study.

1. A case study is an empirical inquiry that,
  - Investigates a contemporary phenomenon in depth and within its real-life context, especially when,
  - The boundaries between the phenomenon and context are not clearly evident.

The second part includes the case study inquiry.

2. The case study inquiry,
  - Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result it,
  - Relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result it,
  - Benefits from the prior development of theoretical propositions to guide data collection and analysis

By this definition, Yin (2009) clarified that case study research is an all- encompassing method – covering the logic of the design, data collection techniques, and specific approaches to data analysis.



### 3.2.3 Justification of the use of the Case Study research method in this dissertation

Considering the goal and the nature of the research questions raised in this dissertation, the author concluded that case study research is an appropriate methodology to analyse the issues related to the research questions in the real life context. The complex nature and the dynamics of the governing variables of the systems and their inter-linkages, make the case study methodology a viable and appropriate methodology to link and to transform the findings from the literature review into the real life context, together with the experiences gained by the author at the local and international levels, in an integrated manner. Another benefit of the case study approach is that makes it possible to integrate results from action research cycles and to thereby, gain an understanding of the dynamism of the conditional processes that required different strategies to create an environment conducive to collaboration of stakeholders and to facilitate stakeholders to act positively within a flexible framework to achieve the common goal, namely sustainable development, through SPC. Yin (2009) proposed three tactics to increase construct validity: (a) To use multiple sources of evidence, (b) To establish a chain of events and (c) To have the draft case study report reviewed by key informants.

In case study research, Yin (2009) specified five components of the research design that are especially important:

1. A study question(s);
2. Its propositions;
3. Its unit of analysis;
4. The logic linking the data to propositions;
5. The criteria for interpreting the findings.

There are five types of research questions categorised in the social science research: “*Who, What, Where, How and Why*” and the case study method is most likely to be appropriate for *How* and *Why* questions Yin (2009). The three research questions considered in this dissertation relate to *What, How* and *Why* questions.

These research propositions include:

**Proposition 1:** In the light of globalisation and related market mechanisms, no single country would be able to address the global environmental challenges and related national impacts in isolation.

**Proposition 2:** Even though the concepts of CP and SCP have been formally accepted at the UNCED in 1992, implementation is far less rapid than was expected and that is urgently needed.

In the case study research, the researcher has an option to select single or multiple cases. The use of multiple cases must follow a replication rather than sampling logic. When no other cases are available for replication, the researcher is limited to single case design (Tellis (1997). Yin (1994) stated that generalisation of the results, from either a single or multiple cases, could be transformed to theory and not to populations.

Multiple cases strengthen the results by replicating the pattern matching, thus increasing confidence in the robustness of the theory. Yin (2009) advised that researchers should use multiple–case designs as a preferred option over single case designs when there is choice and resources; although, all designs can lead to successful case studies. Yin specified that case studies can cover multiple cases and then the researcher can draw a single set of “cross-case” conclusions.

In this dissertation, two case studies were prepared. These two case studies were not designed as direct replications but as a multiple case design. An attempt was made to consider two single cases that are interrelated, mutually supportive and which represent global and national perspectives of SPC and their linkages that can be used to fulfil the goal of the research.

This also satisfies the three tenets of qualitative method: describing, understanding and explaining (Tellis 1997). The two case studies were used exclusively to address research question 3 (*Question on How?*) while addressed the first (*Question on What?*), and the second research question addressed the (*Question on Why?*).

The units of analysis used for logical linking of the data to the propositions and to the criteria for interpreting the findings of the two case studies were specific to each case study while the research questions and their propositions were common to both.

The two case studies were also used to validate the proposed theoretical framework developed in Chapter 2 as a complementary process that helped the author to test internal validity of the analysis.

### **3.2.4 The Case Study Methodology**

This section provides a general overview of case study methodology including the type and the design, and an introduction to the two case studies presented in this dissertation.

#### **3.2.4.1 General**

The two case studies were designed to provide insights on the strengths, weaknesses, opportunities and challenges of dynamic systems related to SPC globally and locally. Even though these case studies are based upon two different systems, they are interrelated, mutually supportive, and facilitate the evaluation of the global, national and the local perspectives of SPC and their linkages to their system boundaries. The case studies contain information gathered from and view points of different stakeholders who are driving forces of SCP. Information was also obtained about the governing variables of different systems in the field of SPC. The experiences gained by the author locally and internationally were also used to verify and validate different systems related to the three research questions.

#### **a) The type of case study**

Yin (1993, 2009) has identified three specific types of case studies: Exploratory, Explanatory and Descriptive. Tellis (1997) proposed the addition of another three special types of case studies: Intrinsic, Instrumental, and Collective developed by Stake (1995). Exploratory cases are sometimes considered as a prelude to social research. Explanatory – case studies may be used for doing causal investigations and suitable for doing causal studies where pattern matching techniques are used in very complex and multivariate cases. Descriptive cases require a descriptive theory to be developed before starting the project. The three types of case studies added by Stake (1995) include Intrinsic – (when the researcher has an interest in the case), Instrumental – (when the case is used to understand more than what is obvious to the observer), Collective - (when a group of cases is studied (Tellis 1997).

The methodology used by the author in this dissertation is a combination of the Explanatory and Descriptive types of case studies identified by Yin (1993, 2009) together with the three specific types (Intrinsic, Instrumental and Collective) added by Stake (1995) which feed into the three research questions.

## **b) Design of the case study**

Yin (2009) specifies four types of designs: Holistic (single unit of analysis) – single case design, Holistic-multiple case design, Embedded (multiple units of analysis) – single case design and embedded multiple case design. In this dissertation, the author used embedded-multiple case designs for the case study analyses.

Yin (2009) specified the logic underlying the use of multiple case studies is the same as multiple experiments. Each case must be carefully selected so that it either (a) predicts similar results (a literal replication) or (b) predicts contrasting results but for anticipatable reasons (a theoretical replication). A few cases would be literal replications and a few other cases might be designed to pursue two different patterns of theoretical replications. If these cases evolve as predicted, in the aggregate, they can provide strong support for the initial set of propositions. If the cases are in some way contradictory, the initial propositions must be revised and be applied to the data found for the case studies or new cases may also have to be performed. (Yin 2009).

In this dissertation, the two case studies cannot be considered to be direct replications. The two cases were designed to provide insights of international perspectives combined with local perspectives of SPC and to identify strategic approaches necessary for the development and implementation of a SPC model for Sri Lanka based upon the international perspectives.

Yin (2009) wrote that research studies using mixed methods are more difficult to perform than studies limited to single methods. He further reported that mixed methods research enables the researcher to address broader or more complicated research questions than case study research methods alone.

Both case studies were used to seek to empirically test and build upon the theoretical framework outlined in Chapter 3, as a complementary process and thereafter, to help the author to identify the strategic approaches that could be used to help ensure cooperation and collaboration of global, national and local networks to promote implementation of SPC in Sri Lanka.

The two case studies are:

### **Case Study One:**

The initial purpose was to evaluate the potential of the UNIDO/UNEP National Cleaner Production Centre (NCPC) network to promote cleaner production (CP)/SPC globally and locally.

In addition to the survey, Case study 1 included evaluation of the potential of both global and national perspectives including global and national (horizontal level) collaboration by using data and information from multiple sources (three leading international environmental conferences, 9th annual meeting of UNIDO/UNEP NCPC network and literature review) in order to identify strategic approaches for the implementation of the SPC model. Consolidation of data and information from multiple sources facilitated to link local and global perspectives which are mutually co-related (see section 1.4).

### **Case Study Two:**

Examine the views of leading international environmental policy support regional representatives on the need and the potential for application of SPC locally and globally (see section 1.4).

In proceeding to gather information for the two case studies, the researcher notes, that

Yin (1994, 2009) identified six preliminary sources of evidence in case study research:

- Documents;
- Archival records;
- Interviews;
- Direct observation;
- Participant's observation;
- Physical artefacts.

In addition to these sources of evidence, Yin (2009) highlighted the need to continue addressing the case study design challenges for maintaining the quality of the research, ensuring construct validity, internal validity, external validity and reliability as appropriate.

With regard to the strengths and weaknesses of the information sources, the researcher should

make an attempt to use multiple sources of data to ensure enhanced reliability of the study. This researcher used multiple sources of information; surveys, interviews and documents and literature reviews which facilitated validation of the findings in different approaches. The following paragraph identifies, in more depth, the sources of information that were used in developing the case studies.

**(c) Different sources of data and information used by the author in addition to the literature survey;**

1. A survey-questionnaire sent to the NCPCs in the UNIDO/UNEP CP network;
2. Literature review including a report (2008) of an independent evaluation conducted by UNIDO on the UNDO-UNEP Cleaner Production Programme;
3. Observations and Information gathered at the 9th Annual Meeting of UNIDO/UNEP National Cleaner Production Centres and Programme jointly organised by UNIDO and UNEP that was in September 2007 in Semmering, Austria. The author attended, as a participant of the meeting (participant-observation), and;
4. A structured interview of some of the leading stakeholders related to cleaner production in Sri Lanka.
5. Observations and information gathered from participation in the UNEP Governing Council/Global Ministerial Environment Forum held in February in Kenya in 2009.
6. Observations and information derived from participation in the 17th Session of UN Commission of Sustainable Development held in May 2009 in New York.
7. The UN Climate Summit during 64th Session of UNGA on Climate Change and Environmental Governance; Opportunities and Challenges to the Global Community in September 2009.
8. Observations and information gathered from participation in the 15th Meeting of the Conference of the Parties to UNFCCC and 5th Meeting of the Koto Protocol held in Copenhagen in December 2009, famously known as COP15.
9. Observations and information gathered at the UN Climate talks held in Bonn in 2010 after COP15.

The author represented Sri Lanka in all the international conferences and meetings referred above except the 9th annual meeting of UNIDO/UNEP National Cleaner Production Centres to which the author was an observer.

SPC issues are generally characterised by conflicting social perspectives linked with multiple and diversified driving forces. In view of the above, in this dissertation, the two case studies were considered to analyse the current strategies and approaches used to environmental management with preventive approaches, which can be used as inputs to develop frameworks for application of SPC.

#### **3.2.4.2 Case Study One:**

##### **Evaluation of the potential of the UNIDO/UNEP National Cleaner Production Centre (NCPC) network to promote CP/SPC globally and locally.**

Case study one basically includes an evaluation of the UNIDO/UNEP international network of the National Cleaner Production Centres to promote CP locally and globally. In addition to the UNIDO/UNEP NCPC Network, Case study one includes observations and experiences made by the author at a three leading international conferences which included: the 25<sup>th</sup> Session of the UNEP Governing Council/Global Environmental Ministers Forum (2009); 17<sup>th</sup> Session of Commission of Sustainable development (2009), and the 15th Conference of Parties to the Climate Change, famously known as COP15 (2009) (section 3.2.4.1.C), to validate the conclusions made by the evaluation of the UNIDO/UNEP NCPC network. Consolidation of such broader approaches within the framework of Case study one was necessary to get clearer insights of the global trends and conditions in promoting application of SPC at local and global levels because this dissertation addresses a broader issue of paradigm changes from ‘business-as-usual’ practices to more sustainable practices.

The challenges are global and have a significant bearing on the behaviours of individual countries and visa versa, which requires a meta analysis of assessments and reviews to fulfil the objective of the dissertation (fig.6.2) Under these circumstances multiple cases in the form of assessments and reviews were consolidated and used in the design of case study one considering top down and bottom up approaches to identify strategies for the SPC model.

For the development of this case study, the author initially used a questionnaire that was sent to members of the NCPCs to obtain information from them.

The main objective of this research survey was to assess the capacity of the NCPCs to promote CP locally and internationally.

The research was designed to help the author to gain insights from the vast practical experiences developed by the members of the NCPCs in promoting and implementing CP and CP-related activities in their countries with their existing resource mobilisation capacities.

It was expected that the experiences of NCPCs and their networks, together with the researcher's experience as a senior officer of the Sri Lankan Government would be useful to develop recommendations for interventions and for resource requirements nationally and internationally to help the NCPCs to more effectively achieve the targets of application of CP worldwide.

The research was designed to help the author to identify and characterise the requirements to ensure long-term sustainability of the NCPCs, to take timely actions to help their societies to implement the concepts and approaches of CP as part of their strategy to achieve rapid and effective progress toward SD.

In order to do an in-depth analysis of the strengths and opportunities of NCPCs for these purposes, the questionnaire was developed to address issues within the following seven categories:

1. General information pertaining to the objectives and strengths of NCPCs;
2. Geographical distribution of the CP networks in their countries;
3. Contributions of the NCPC to meet national goals for the last five years, and achievements, success stories, best practices & problems encountered during implementation;
4. Governmental policies and opportunities for their NCPC to facilitate incorporation of CP activities into government policies;
5. Implementation of UNIDO's new strategy and their NCPC's position on the new strategy;
6. Sources of financing and the NCPC's financial and political sustainability
7. Additional views from the leaders of the NCPCs.

In this case study, data and information gathered from the other seven sources referred in section 3.2.4.1 (C) was extensively used in addition to the data and observations used from this survey. Those sources provided valuable information on the current perceptions, trends and practices of the world community on SPC. The author attended the three international forum referred in this section, representing Sri Lanka and therefore, was able to constructively analyse the conflicting positions of different countries on sustainable development and to



identify strategic approaches needed for the development of the SPC model for Sri Lanka. Analyses of the international and national perspectives from these multiple sources were found to be useful for the author to better understand the strengths and weaknesses of the present system and to evaluate the opportunities and challenges/threats for the development of a sustainable framework for the implementation of a SPC system in the country.

### 3.2.4.3 Case Study Two

#### **Examine the views of leading international environmental policy support regional representatives on the need and the potential for application of SPC locally and globally.**

This case study was based upon an information gathering survey used by the author when she attended an international environmental forum in 2008 organised by UNEP to identify synergies among the following three multilateral environmental conventions: The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), The Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention on POPs) and The Rotterdam Convention on Prior Informed Consent (Rotterdam Convention on PIC).<sup>16</sup> The forum met three times to complete its work and the author conducted the survey at the third meeting held in Finland in 2008.

This survey was used to gather the views of international leaders in environmental policy<sup>17</sup> on the need for and the potential of the application of SPC practices globally and locally.

A questionnaire was used for information gathering purposes to obtain the personal views of regional representatives of the five regions of the world at that international forum, based upon different commonly used statements at different levels related to the application of SPC locally and globally. Their responses were compared with the findings of Case Study One and with the set of criteria of the proposed theoretical framework.

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<sup>16</sup> The Basel Convention is the most comprehensive global agreement on hazardous wastes and other wastes. It was adopted in March 1989 and entered into force in May 1992 ([www.basel.int](http://www.basel.int)), Stockholm Convention on POPs was adopted in May 2001 and entered into force in May 2005 ([www.pops.int](http://www.pops.int)). Rotterdam Convention on PIC was adopted in September 1998 and entered into force in February 2004 ([www.pic.int](http://www.pic.int)). The three conventions are heavily interlinked and promote environmental friendly production and consumption with special emphasis on preventive measures.

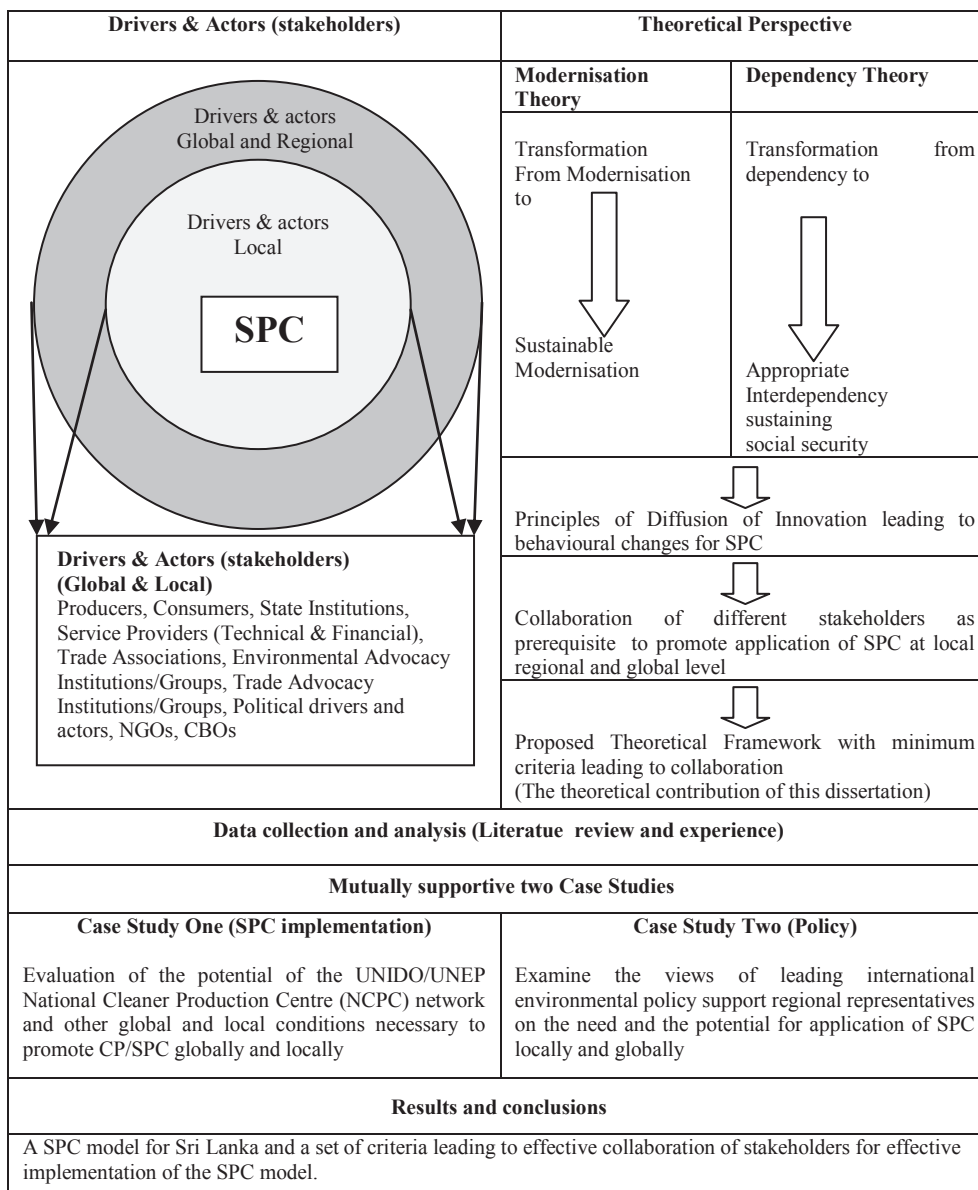
<sup>17</sup> The members of the forum were very senior governmental officials of selected countries who were nominated by the parties to the convention to identify synergies among the three multilateral environmental conventions referred above representing the five UN Regions (Africa, Asia and the Pacific, Central and Eastern Europe, Latin America and the Caribbean, Western Europe and others).

The questions were designed to obtain insights of different country perspectives on an array of statements related to SPC policies and strategies, based on which new strategies can be developed to promote SPC locally and globally.

The survey included nine statements on SCP, and four specific statements specific to the Theoretical framework developed by the author, which is elaborated upon in Chapter 3. Within the survey, five options were given for response. The five options were: ‘fully agree’, ‘agree’, ‘partially agree’, ‘partially disagree’ or ‘disagree’ to each of the statements. Responses of the members were grouped as percentages under each option based on which the outcome was compared with the Theoretical framework developed and presented in Chapter 2 as well as with the findings of Case Study One. Then recommendations were made for the development of SPC model for Sri Lanka.

The Figure.3.2 presents the outline of the research methodology under which the research was conducted. The detailed methodology is presented in each Chapter with relevant linkages.

### 3.2.5 Outline of the research methodology



**Figure 3.2: Outline of the Research Methodology used in the Dissertation**



## **CHAPTER 4**

# **AN OVERVIEW OF GLOBAL TRENDS AND CONDITIONS OF SUSTAINABLE PRODUCTION AND CONSUMPTION – LITERATURE REVIEW**

### **4.1 Introduction**

This Chapter provides an overview of global trends and conditions of SPC and linkages of these trends to the functioning of ecosystems. An attempt was made to highlight the importance of the use of realistic performance indicators, which reflects sustainability criteria to measure sustainable human development considering economic, social and environmental aspects together. The objective was to guide the countries, to improve mutual understanding and build trust among the key players in promoting SCP worldwide.

Insights gained from the literature review on global perspectives were very useful when integrated with the findings of the case studies for identifying strategies for the SPC model for Sri Lanka considering the developing country perspective in relation to global change in real life contexts.

Section 4.1 describes the trends of the income and economic development focusing on the equity issue, which is one of the main barriers to achieve sustainable development worldwide. Section 4.2 provides an overview of evolving consumption trends. Section 4.3 describes the trends of population growth, which is one of the key issues to be addressed in the path toward more sustainable development. Section 4.4 provides an overview of major environmental consequences experienced following the rapid industrial development in the latter half of the twentieth century.

The origin of modern environmentalism emerged as a result of negative environmental consequences experienced due to rapid industrial development, without paying attention to the environmental impacts, is described in section 4.5. Section 4.6 provides an overview of major events that have occurred since the 1960s, related to SCP, which shows the evolution of modern environmentalism and related production and consumption trends. Application of the concept of cleaner production is described in section 4.7, as one of the strategic tools that can be used to help ensure SCP worldwide. Recent initiatives taken to promote changing behaviour towards SCP are given in section 4.8. Sections 4.9 and 4.10 describe some indicators to measure the status of the sustainable development worldwide. Section 4.10 includes the proposed sustainable human development index developed by Sri Lanka, which

will be a useful tool to increase mutual understanding and trust among the key players which in turn will promote collaborative decision-making and implementation of SPC practices at local, regional and global levels. Section 4.11 provides an overview from past experiences of envisioning the future.

## 4.2 Income and Economic Development

During the second half of the last century, after the Second World War, humans have made remarkable achievements in economic development and in the quality of life. People are living longer, more are literate, better educated, and have higher incomes than before. Food, housing, healthcare facilities and other related infrastructure facilities were improved with the technological improvements. Overall, a child born today can expect to live eight years longer than one born thirty years ago (GEO3) at least in some nations. However there are wide disparities between and within regions.

Average annual incomes of people in developing countries have mostly risen: in real terms (constant US\$ 1995) they rose during 1972-99 by 13 percent in Africa, by 72 percent in the Asia-Pacific region and by 35 percent in Latin America and the Caribbean the, in West Asia, they fell by 6 percent (GEO3). During the 20th century, world consumption expanded at an unprecedented pace with private and public consumption expenditures reaching \$24 trillion in 1998, twice the level of 1975 and six times that of 1950 (UNDP/HDR1998). The production and consumption pattern has however, created grave imbalances in productivity and distribution of goods and services in the world threatening the global ecosystem.

GEO 2000 captured this economic development highlighting the income disparities by stating, “Average global per capita income passed US\$5000/ year but more than 1,300 million people still live in less than 1 US\$/day.” Per capita incomes have risen only marginally in most regions, with the exception of Europe and North America. Currently 3.5 billion people in low-income countries earn less than 20 percent of the world income, while the one billion people living in developed countries earn 60 percent (GEO3 2002). The ratio between income earned in countries with the richest 20 percent of the population compared to the world’s poorest 20 percent, has also widened – from 30:1 in 1960, to 60:1 in 1990, to 74:1 in 1997 (GEO3). GEO3 categorises this phenomenon as “Lifestyle Divide” which is partly a result of growing poverty and affluence. It says “One side of the lifestyle divide is characterised by excesses of consumption by the minority one fifth of the world population, which is responsible for close to 90 percent total personal consumption; the other side by extreme poverty where 1.2

billion live on less than US\$1/day, causing a serious threat to sustainable development.” The UNDP/HDR 2007/2008 reported that there are approximately one billion people living on the margin of survival on less than US\$1/day, with 2.6 billion – 40 percent of the world’s population- living on less than US\$2/day. This 40 percent accounts for 5 percent of global income whereas, the richest 20 percent accounts for three-quarters of global income.

It is important to note the rising income inequities within countries too. UNDP/HDR 2007/2008 emphasised that more than 80 percent of the world’s population lives in countries where income differentials are widening; consequently incomes in developing countries will have to grow three times the pre-1990 rate to achieve the same reduction in poverty incidence that was achieved in developed countries.

All these facts signal the legitimate demands in the coming years for more resources to meet the minimum standards of living for nearly 50 percent of the global population and highlight the need for paradigm changes of the patterns of economic growth embedded within the present, system of unsustainable production and consumption.

The eight Millennium Development Goals (MDGs) and eighteen (18) targets set for 2015 in the Millennium declaration signed by 189 countries including 147 heads of States and Governments in September 2000 at the Millennium Development summit, call for; Eradication of extreme poverty and hunger; Achieve universal primary education; Promote gender equality and empower women; Reduce child mortality; Improve maternal health; Combat HIV/AIDS, malaria and other diseases; Ensure environmental sustainability; and Develop global partnerships for development.

The pattern of world poverty has changed from 1970. The Gapminder (2000) in its interactive presentation of some of the information in the UNDP/HDR 2005 predicts that the global goal of halving poverty by 2015 will be met because of the fast progress in Asia. But, at the current rates, Africa and Latin America will not meet the goals.

Table 4.1 presents an overview of the profile of poverty presented by Gapminder (2000) interpreting some of the information presented in the UNDP/HDR 2005 in respect of South Asia, East Asia, East Europe, Latin America and Africa. Please see the website below. The presentation uses UNDP/HDR data to interpret the regional socio-economic development trends, which needs global attention. African region is getting poorer. The conditions of the Latin American Region are also not socially sound. This unequal development creates a tremendous negative impact not only to these two regions but also on the entire world.

Promotion of SPC should be promoted globally under the paradigm of sustainable and equitable development.

**Table 4.1: An Overview of the Profile of the World Poverty by Region**

Region	Percent of world poverty (%) (Income below US\$ 1 per day)		
	1970	2000	2015
South Asia	30	28	13
East Asia	56	32	14
East Europe	0	1	0
Latin America	3	4	5
Africa	11	35	68

Source: *Gapminder 2000* ([www.gapminder.org](http://www.gapminder.org))

In 2003, GDP (US\$) per capita in South Asia - 2740; East Asia – 4820; East Europe – 7500; Latin America – 6990; OECD – 28,500; Africa – 1750; Arab States – 5370 (Gapminder 2000).

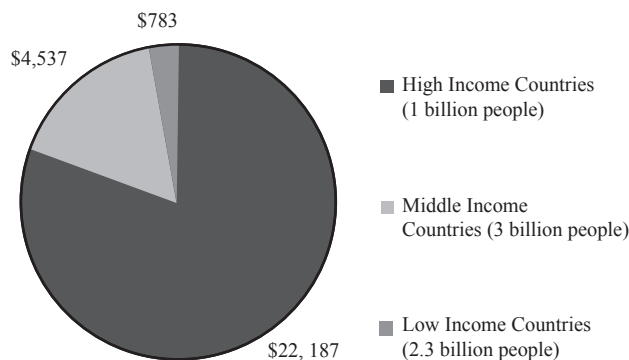
It is evident that unsustainable patterns of economic development and resource consumption without maintaining social equity issues, threaten the social stability locally and globally; in fact we are threatening the stability of the global and local ecosystems as a whole. The modern economies of North America, Europe and parts of the East Asia consume immense quantities of energy and raw materials and produce high volumes of waste and polluting emissions. In the other regions, particularly in many parts of the developing world, poverty combined with rapid population growth is leading to widespread degradation of renewable resources (GEO 2000). The magnitude of these economic activities combined with social issues is causing environmental damage on the global scale and widespread pollution and disruption of ecosystems.

GEO3 captures the value of environmental goods and services which are critical to the life supporting systems, and contribute to human welfare but are outside the market and reports that the World’s gross national product (GNP) more than doubled from approximately US\$14,300 billion in 1970 to an estimated US\$ 29,995 billion in 1999, and an estimate of the economic value of the ecosystem services that are not taken into account is between US\$ 16,000 billion and US\$ 54,000 billion a year, with an average of US\$33,000 billion a year.



The author observed that the public perception about the limits of human development and reasonable standard of living that covers the basic needs for survival is changing rapidly with time with the increase of globalisation and commercially biased modernised marketing strategies. The present market competition leads to low costs of production and in the absence of internalising externalities, the consumption pattern in the world is seriously and rapidly undermining the ecological and environmental resource base; this underscores the urgent need to take steps to share and strengthen the resource base in ecologically sustainable and socially responsible ways.

### 4.3 Consumption trends



**Figure 4.1: Global Consumption, 2004 (in billions of US dollars)**

While indicating economic development, both the energy and transport sectors produce severe negative impacts on the environment. Since 1970s, about 16 million new vehicles were added to the world’s roads annually; passenger cars account for 15 percent of the total global energy consumption. It has been estimated that the richest 20 percent of the world’s population accounts for 86 percent of total private consumption expenditures, it consumes 58 percent of the world’s energy, 45 percent of all meat and fish, 84 percent of paper, and owns 87 percent of cars and 74 percent of the telephones. Conversely, the poorest 20 percent of the world’s population consumes 5 percent or less of each of these goods and services (GEO3, UNDP 1998).

GEO 2000 reports that the world average per capita energy consumption as 60.97 GJ with regional distribution of: 12.15 in Africa, 28.56 in Asia and the Pacific, 131.89 in Europe and Central Asia, 41.76 in Latin America and Caribbean, 342.91 in North America and 99.89 in

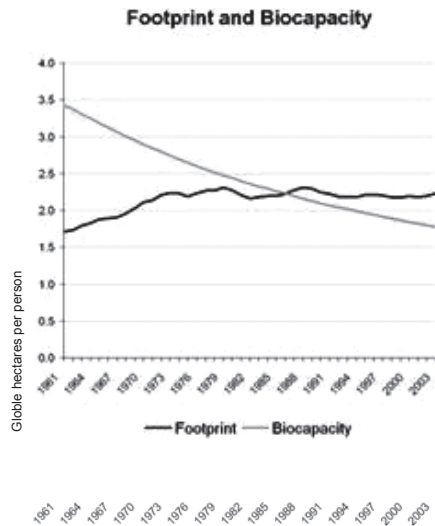
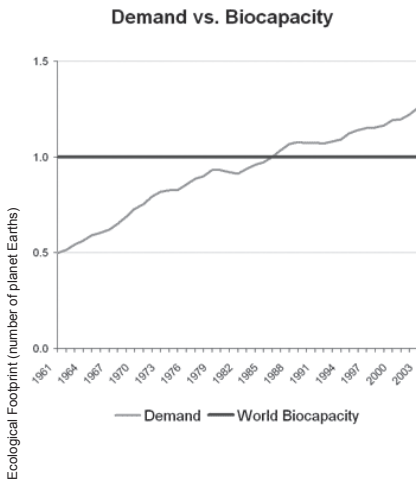
West Asia.

The ecological footprint, an estimate of human pressure on global ecosystems, is a function of population size, average per capita consumption of resources, and the resource intensity of the technology used. During 1970-96, the world’s ecological footprint increased from about 11,000 million area units to more than 16,000 million area units. The world’s average per capita footprint remained fairly constant during 1985- 96 at 2.85 area units. Each unit corresponds to the number of hectares of biologically productive land available per capita to produce the food and fibre that people consume, the infrastructure people use, and the ecologically productive area required to absorb the CO<sub>2</sub> produced from burning of fossil fuels (GEO3).

<p>Figure 4.2.1 shows the ratio between the world’s demand and the world’s bio capacity in each year, and how this ratio has changed over time.</p>	<p>Figure 4.2.2 tracks, in absolute terms, the world’s average per person Ecological Footprint and per person bio-capacity over a 40-year period.</p>
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**Fig 4.2.1**

**Fig4.2.2**

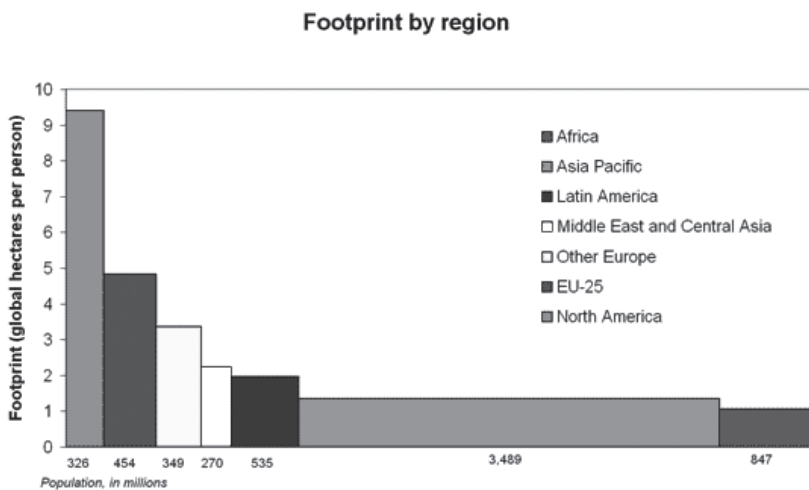


Source: *Global footprint Network (2007)*

**Figure 4.2: Ecological footprint**

The global average ecological footprint is 2.7 global hectares per person as against the bio-capacity of 1.8. The ecological footprint measures humanity’s demand on nature. “High income countries” accounts for an ecological footprint of 6.1 global ha/person as against the bio-capacity of 3.1, whereas the “Middle Income Countries” and ‘Low Income Countries’ account for ecological footprints of 2.0 and 1.2 as against bio-capacities of 1.7 and 1.1 respectively (Source: Global Footprint Network 2010 edition).

*Footprints vary widely by region. Global Footprint Network, with its partner WWF International have published reports for Europe and Asia, and Africa*



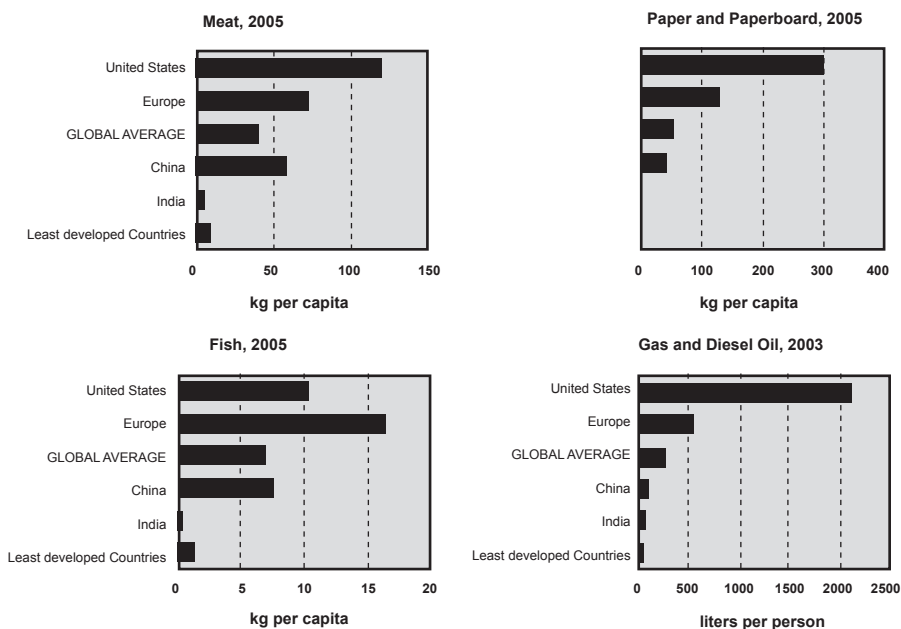
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Last Updated: 10/05/2007

**Figure 4.3: Regional Footprint Analysis**

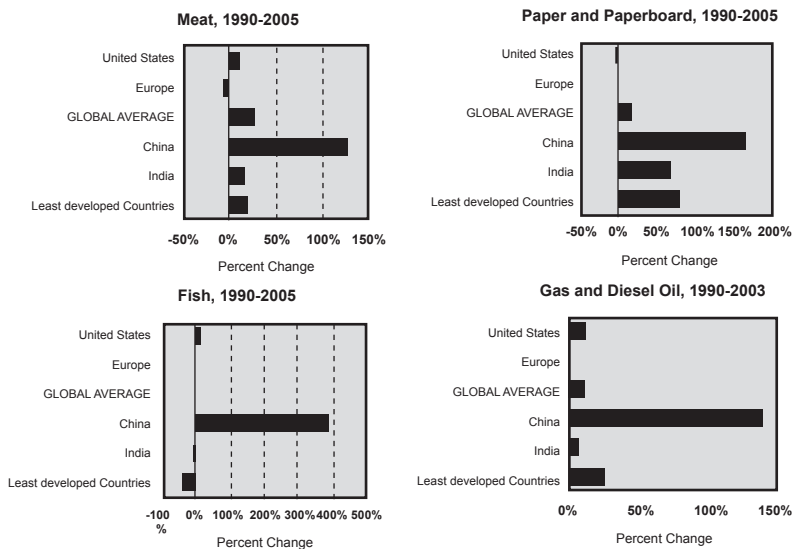
The European Communities (2006) while accepting the EP/BC concept as a tool for increasing awareness as a link to EP/BC account with ecosystem and its over-use specifies that, the concept cannot represent the full range of environmental problems. They claim that resources without a significant regenerative capacity do not fit in the concept of biologically productive area sighting an example that the biocapacity needed to sequester CO<sub>2</sub> emissions is covered but not the regeneration of the “burnt” fuel stocks. Moreover, nature has no significant absorptive capacity for several important environmental problems: pollution by heavy metals, radioactive materials or persistent synthetic compounds. That means that substances without a significant absorption or regenerative capacity cannot be covered by the EF/BC accounts.

Figs. 4.4. and 4.5 present ‘annual consumption of selected commodities in selected countries’ and, ‘categorisation and the trends in consumption of these commodities’. Low consumption of least developed countries, India and China is significant during 2005. However, the trends in consumption indicate the future demand and need to focus on SPC at all levels. Sustainable development requires the balancing of all three pillars: economic, social and environmental. Developed countries need to reduce their per capita consumption while many developing countries may need to accelerate their economic development in ecologically and socially sustainable ways. The important aspect in this process is the choice of the development pattern of the developing countries and the commitment of the developed countries to change their consumption patterns on par with the carrying capacity of the local and global ecosystem.



Source: *EarthTrends*, 2007.

**Figure 4.4: Annual Consumption of Selected Commodities in selected countries (consumption per-capita) presented by Earth Trends, 2007.**



Source: *EarthTrends*, 2007.

**Figure 4.5: Categorisation and the trends in consumption of selected countries and selected commodities**

In 2000, the world population was 6.1 billion out of which 19% were poor, earning less than 1US\$ a day. (GEO2000) However, there are wide regional disparities. Table 4.2 presents the regional disparities of poverty.

**Table 4.2: Regional disparities of income poverty**

Region	Population (millions)	Millions of people with income of less than 1 US\$/day	Percentage (%) of poor population
Africa	630	420	66
OECD	1,130	0	
Latin America	520	40	8
East Europe	410	10	2
East Asia	1,880	480	20
South Asia	1,430	330	23

Source: *Gapminder 2000* ([www.gapminder.org](http://www.gapminder.org))

A long-run, diverging trend in income inequality is beginning to be reversed because of growth in China and India (World Bank 2006). This trend would have created an overall impact of the Asian Region. However, it has been predicted that polarisation effects will create further income disparities in most of these countries. Poverty in the African region will continue to increase with increases in population and expanding environmental degradation.

It is anticipated that the Asian region will continue to be an economic hotspot in the coming years. Its high population growth rate and poverty will be the main driving forces for higher economic development in the region.

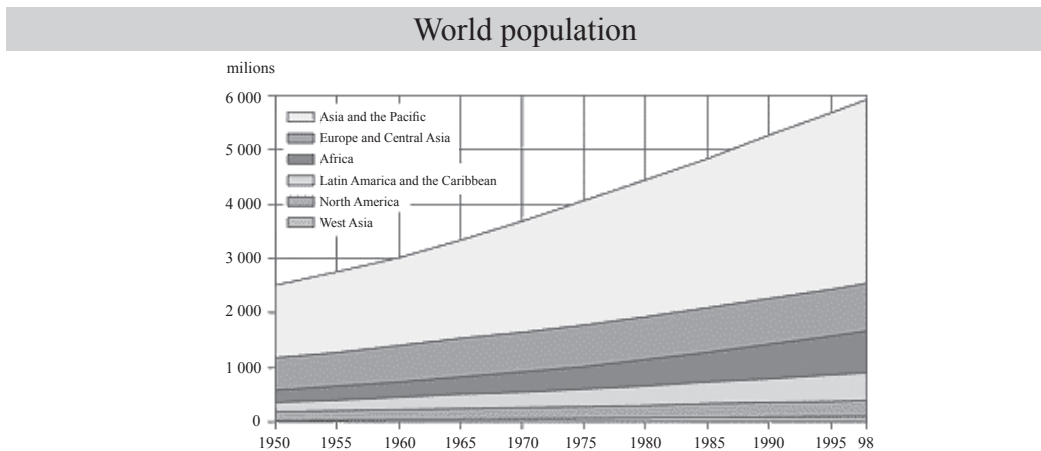
The Asian region needs economic development to help its people to prosper; this is non-negotiable politically and socially. Therefore, timely action of application of SPC strategies is of paramount importance given the limited capacities of the ecosystems available to support higher growth. “Doing more with less,” will not only be an option, it will be a necessity. High population growth also creates a tremendous pressure on the limited resources available (section 4.3).

Promoting simple lifestyles (concept of the middle path) avoiding both affluence and poverty creates a tremendous opportunity for a middle path and moving away from the unsustainable production and consumption patterns followed by the industrialised countries for economic development. Linear growth scenarios have failed to address the sustainability issues globally and locally. The present multiple global crises situations relating to finance, energy, food security and resource scarcity provide ample evidence for the need to move into a circular and green economy as the way forward for sustainable development. However, the external forces, which emerged with globalisation, are more of a threat/challenge than they are an opportunity in this context since international commitments to adhere and support for SPC practices are far from expectations despite various attractive policies that have been developed through several multilateral environmental agreements. Promotion of the concept of SPC should be under the paradigm of sustainable development which needs incentives for production, consumption and resilient economic development, social well-being, protection and sustainable use of environmental resources.

#### **4.4 Population Growth**

The world population increased from 3 billion in 1959 to 6 billion by 1999, doubling that occurred over 40 years (Matt Rosenberg 2005). The latest prediction of the Census Bureau

of USA (2005) predicts that population growth will continue into the 21st century although it will increase more slowly. The world population is projected to grow from 6 billion in 1999 to 9 billion by 2042, an increase of 50 percent in 42 years.



Source: GEO 2000

**Figure 4.6: World Population with regional overview**

GEO3 reported that most of the population growth is concentrated in developing countries with nearly two-thirds in Asia and the Pacific. The difference in growth is mainly due to the levels of fertility. Less developed countries reported fertility of 3.1 children per woman over the period 1995-2000, while developed countries reported fertility at 1.57 over the same period. In the Asia and the Pacific region, the population grew from 2173 million in 1972 to 3514 million in 2000. The growth rates have declined from 2.3 percent in 1972 to 1.3 percent, the same as the world's average by 2000 – although there are significant sub-regional variations. This can be due to the fact that fertility levels have fallen from 5.1 to 2.1 children per woman over the past three decades (GEO3).

It is obvious that increasing human population creates increased demands on the natural resource base and it is necessary to take steps to reverse the trends of the present unsustainable production and consumption and to enhance the carrying capacity of the ecosystem by efficient resource utilisation and technology innovations to do 'more with less' while engaging in individual and collective efforts to reduce and to stabilise the human population.

#### **4.5 An Overview of Major Environmental Consequences**

With the increase of population and inequitable development, there is no doubt that the demand for natural resources will increase, thus adding further negative impacts to the ecosystems due to unsustainable resource consumption and waste generation. Global warming is considered to be the number one environmental problem, which creates climate changes in the world that result in further imbalances in harvests, increasing frequency of storms and droughts, accelerating the extinction of species, spreading infectious diseases, and sea level rises.

Fossil fuel combustion and industrial processes release over six billion metric tons of carbon into the atmosphere each year (Earth trends 2007). Emissions of greenhouse gases move freely across the world without border controls resulting temperature increases, rainfall pattern changes and shifting ecological zones. The GEO 2000 reported that climate change was the most cited issue in their Scientific Commission on Problems of the Environment of the International Council for Science (SCOPE) survey although; taken together, water scarcity and pollution ranked higher. Rich countries dominate the overall emission accounts for seven out of every ten tonnes of CO<sub>2</sub> that have been emitted since the start of the industrial era (HDR 2007/2008).

HDR 2007/2008 highlights an important issue related to the historical emissions. First is the cumulative past emissions that drive today's climate change. The second is the envelop for absorbing future emissions, which is a function of past emissions. Even though climate change is a global problem, a relatively small group of countries are responsible for the bulk of the emissions.

The share of emissions from developing countries is also increasing. In 2004, developing countries accounted for 42 percent of energy related CO<sub>2</sub> emissions, compared to around 20 percent in 1990. By 2030, developing countries are projected to account for just over half of the total emissions. However, it has to be noted that the 19 million people living in New York State have a higher carbon footprint than the 146 Mt CO<sub>2</sub> left by the 766 million people living in the 50 least developed countries. When we consider the total emissions across the world, as a whole, this reflects the large 'carbon debt' accumulated by the rich countries – a debt rooted in the overexploitation of the Earth' (HDR 2007/2008).

The perception of the developing countries in various negotiating tables on their economic development is that "Increasing concerns of developed countries over the future emissions



of developing contrives should be embedded to the limitations under which the developing countries have to improve the standard of living of their people.” Collaboration between developed and developing countries with mutual understanding and trust is therefore, necessary to maintain the optimum levels of SPC within the carrying capacity of the ecosystem.

The consequences of the greenhouse gas emissions are often discussed in terms of rising global temperatures. However, global warming is not the only threat from increased atmospheric concentration of carbon dioxide. Ocean acidification, which occurs when CO<sub>2</sub> in the atmosphere reacts with water to create carbonic acid, which has increased ocean acidity by 30 percent (Earth Trends 2007). The Intergovernmental Panel of Climate Change (2007) predicted that ocean acidity could increase by 150 percent by 2100. Even though a 150 percent increase in ocean acidity would be undetectable to the average human; there is a potential to create negative impacts on marine organisms due to such increased acidification. There is an emerging recognition that there is also a global nitrogen problem, with some areas receiving nitrogen compounds in quantities that lead to unwanted ecosystem changes, such as excessive plant growth. Human activities now contribute more to the global supply of fixed nitrogen than do natural processes (GEO 2000). Deforestation continues to meet the demand for wood and paper, most of which are used by the industrialised countries. Most of the poor people in developing countries depend on renewable natural resources and are living in ecologically fragile areas. Fresh water scarcity, pollution and waste generation rates also tend to exceed the carrying capacity of many local ecosystems and thereby, they threaten the global ecosystem and deprive their people the opportunity for economic development, locally and globally.

It is evident that extraction of the natural resources to fulfil the underdeveloped and the additional population in the coming years with the present rate of production and consumption will create grave imbalances to the stability of the ecosystems if practical solutions to reverse the trends and to change the production and consumption patterns are not taken. The GEO3 specified that the collapse of the environmental pillar is a serious possibility if action – from global to local – is not taken as a matter of urgency to address human impacts, which have left; increased pollutants in the atmosphere, vast areas of land resources degraded, depleted and degraded forests, biodiversity under threat, increasingly inadequate fresh water resources of deteriorating quality, and seriously depleted marine resources. In addition to these, increased severity of natural disasters, species invasion as a result of globalisation, increased environmental pressures caused by urbanisation, new wars which impact on both the immediate environment and neighbouring states and the impacts of refugees on the natural ecosystem have all been identified as new problems for this millennium.

## 4.6 Modern Environmentalism

The trends in locations of national mass production facilities in the world have been changed in the past few years by outsourcing of (mass) production by northern corporations to China, India and Vietnam and by near-sourcing of production from USA to Mexico while Western Europe has outsourced much production to Central Europe (Baas 2006).

In the 1960s, environmental concerns emerged in the industrialised countries especially, in the western world, due to environmental damages and related human health impacts caused by industrial development without environmental safeguards. Publications of books such as ‘Silent Spring’ (Carson 1962) galvanised the concerns of people in these countries on the risks on human health arising from industrial processes and products. This led to development of modern environmentalism that is coordinating international environmental stewardship.

The United Nations Conference on Human Environment held in 1972 in Stockholm, Sweden was the first International Environmental Conference held that focussed upon environmental issues which took much global attention. The Stockholm Conference participants articulated, “The right of the people to live in an environment of a quality that permits a life of dignity and well-being.” This forum paved the way for country representatives to discuss strong and divergent views related to environmental issues. The concerns were raised mostly on the biophysical environment such as wildlife conservation, water pollution, land degradation and soil conservation. The first body of ‘soft law’ in international environmental affairs emerged in the Stockholm Declaration and its principles. One of the objectives of the Stockholm Convention was to incorporate environment into the development planning. The United Nations Environmental Program (UNEP) was established in 1972 based on the recommendations of the Stockholm Convention. Following the Stockholm Convention, many countries have passed numerous national environmental laws. Before Stockholm there were only 10 Ministries of the Environment, whereas, by 1982, 110 countries had such ministries or departments (GEO3).

Severe environmental devastations occurred even after the Stockholm Convention have led the international community to take further steps to address these issues. There have been many meetings, international conferences, international conventions, discoveries, publications, national and international environmental legislative measures, and new institutions emerged since then. The following list, highlights major events that took place from 1972 to 2001 as reported by GEO3, that are key to what we now realise we must do in SCP.

Table 4.2 presents an analysis of the major international events between 1972 to 2002 related to sustainable development. The details of these events are presented in Annex 1 of the dissertation.

Table 4.2 : An overview of the major international events that have taken place between 1972 to 2002 related to sustainable development.

Events	Time span			
	1972-1979	1980-1989	1990-1999	2000-2002
Meetings	4	2	11	3
Conventions	3	4	7	2
Disasters	9	8	3	1
Publications	1	5	2	1
Discovery	1	1	1	1
Legal action	-	1	-	-
International events	-	1	3	-
New Departures	3	3	4	1
New institutions	1	2	3	-
Total	22	27	34	9

Source: GEO3

The World Conservation Strategy launched in 1980 by International Union for Conservation of Nature (IUCN) has recognised the need for long-term efforts and integration of environment in the development planning which is the basis for sustainable development. The concept of SD was advanced as a central theme of the development discourse since the establishment of World Commission on Environment and Development (Brundtland Commission) in 1983. The Brundtland Commission held hearings around the world for three years and produced a formal report titled “Our Common Future,” which addresses the issues of environment and development worldwide. “Our Common Future” defined sustainable development as ‘Development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.

The United Nations Conference on Environment and Development (UNCED) commonly known as the “Earth Summit” held in Rio de Janeiro, Brazil in 1992, twenty years after the Stockholm Convention on Human Environment, can be cited as a remarkable milestone

which paved the way to focus on economic, social and environmental development together as three pillars based on which sustainable development is built. UNCED was attended by an unprecedented number of representatives of state, civil, and economic society. At the Earth Summit, countries adopted a new agenda for the 21st century (Agenda 21) based on the principles of the sustainable development.

The Agenda 21 recognised the need to move into SPC. Changing consumption patterns is the title of Chapter 4 of the Agenda 21. The four broad sections presented in the Agenda 21 (Section 1: Social and Economic Dimension, Section 2: Conservation and Management of Resources, Section 3: Strengthening the Role of Major Groups, and Section 4: Means of implementation) spell out the agenda for SD considering its three main pillars: Economic, Social and environment. However the slow progress that has been made since then underscores the need to develop more coherent and strategic approaches to address the challenging economic and social issues embedded both in the developed and developing countries with special emphasis on equity issues.

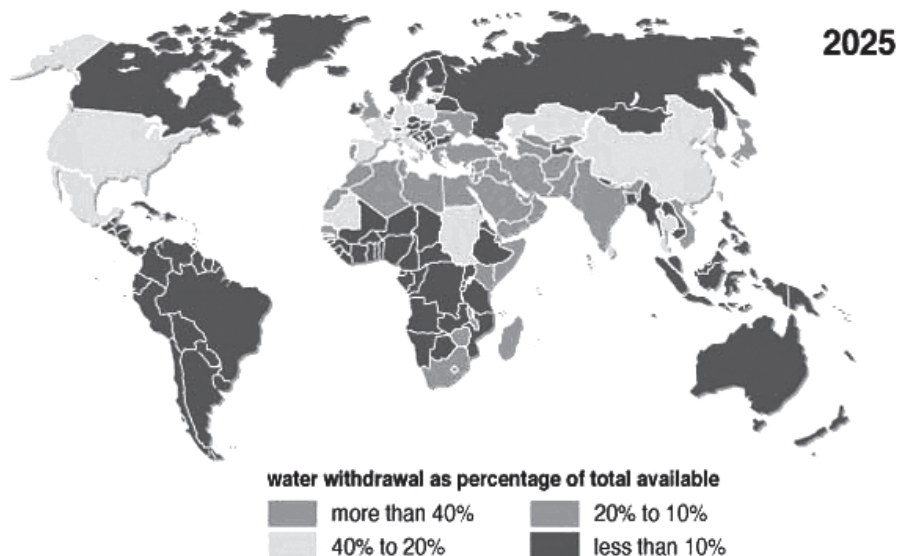
Agenda 21 adopted at the Summit provides policy directions towards sustainable development and emphasises the need to set up institutional and coordination mechanisms at national level to realise the goals of sustainable development. The cost of implementing Agenda 21 in developing countries was estimated by the Earth Summit secretariat to be about US\$625 billion a year, with the developed countries meeting 80 percent, US\$500 billion, of it. Developing countries were expected to foot the remaining 20 percent or about US\$125 billion annually, by meeting their long-established official development assistance (ODA) target of 0.7 percent of gross national product (GNP) (GEO3). These commitments have never been met. Even though many actions proposed by Agenda 21 are yet to be implemented by the international community, many countries set targets to suit national conditions and to continue many activities related to SD based on it.

Initiatives and actions taken by the international community at the global environmental policy level by signing and adopting various Multinational Environmental Agreements (MEAs) and declarations have created an impact to reverse the trends of the global production and consumption of certain material, e.g. Montréal Protocol on Ozone Depletion at satisfactory levels; and the Basel Convention on Hazardous Wastes, Stockholm Convention on Persistent Organic Pollutants, Biodiversity Convention, Framework Convention to Climate Change and Kyoto Protocol to different limited levels.

In addition to these initiatives taken at international level, continued environmental pollution activities and resulting health impacts have driven attention further to the need for a multi-sectoral approach in sustainable development. As a result the World Industry Conference on Environmental Management has been co-organised by the UNEP in 1984. In the same year “Responsible Care of the Business Community” and the concept of “Eco efficiency” were introduced as a means of simultaneously reducing environmental impacts while increasing profitability. The World Business Council for Sustainable Development (WBCSD) was created in 1995 to encourage industry to look for improvements in profitability by reducing waste of both resources and energy and by reducing emissions. In 1996 a new voluntary standard for environmental management systems in industry, the ISO 14000 was created by the International Organisation for Standardisation (GEO3). These concepts have now been extended to the concepts of “Extended Producer Responsibility (EPR)”, “Corporate Social Responsibility (CSR)” etc. to broaden the involvement of many actors in the industry sectors to improve environmental management.

It is seen that spreading and penetration of these initiatives across the globe is not up to the expected levels and unsustainable consumption and production patterns continue at a high rate thereby often negating the limited success gained by individuals and groups, and by national and international institutions in the world. A single country and an institution will not be able to make the desired changes in isolation and most of the activities are not sustainable since the activities are mostly centered around a few personalities who wish to make the changes. More coordination and collaboration to integrate and synergise the initiatives taken on an integrated basis are necessary to achieve the desired outcome of decisions taken at the various environmental fora.

International environmental policies lagging behind equitable economic and social development will not be able to achieve the expected results as the process of globalising frequently causes increases in the gaps rather than bridging the gaps of unequal distribution of production and consumption in the present context. Globalisation with strong influences of modernisation without linking to equity issues possess serious challenges to the security conditions within, between and among countries and societies. Since 1950, the economy has more than quintupled in size. In terms of income, the global per capita average is now 2.6 times what it was in 1950 (in real terms) and if present consumption patterns continue, two out of three persons on Earth will live in water stressed conditions by the year 2025 (GEO 2000).



Source: GEO 2000

**Figure 4.7: Water withdrawal as a percentage to the total available**

The Johannesburg Declaration (2002) and the Millennium Development Goals (MDGs) (2000) are among the forefront considerations in the international agenda to make an attempt to improve the human development of the underserved and unprivileged communities. The pressing need to focus on the equity issues together with economic, social and environmental development has been recognised by these two instruments. However, many developing countries are facing problems in achieving MDGs in the absence of financial resources and instability of local political situations. Imbalances of security conditions between and within regions widen the social unrest causing serious threats to the sustainable development all over the world locally, regionally and globally.

At the World Summit of SD (Johannesburg Summit) held in 2002 countries have adopted: a Political Declaration that expresses commitments and directions for sustainable development, and a negotiated Plan of Action (PoI) that would guide the government activities. The PoI of the Johannesburg Summit requires globalisation to be fully inclusive and equitable, and reiterate the need for policies and measures at the national and international level and implementation of these policies with the full and effective participation of developing countries

and the countries with economies in transition. Mutual understanding of the different players in economic, social and environmental development is necessary across the globe in order to share the limited resources available and to maintain the carrying capacity of the ecosystem in while seeking to reverse the income disparities and threats to the global security system. The Johannesburg Summit called for formulating National Sustainable Development Strategies at national level by 2005 and establishing National Councils for Sustainable Development to give effect these strategies.

The critics describe the Johannesburg Summit as a missed opportunity to come up with a meaningful plan of concrete targets, timelines and funding for implementation of Agenda 21. They argue that the outcome documents of the Johannesburg Summit more explicitly acknowledge the links between poverty alleviation and environmental protection than the outcome of the Rio Earth Summit 1992, and they argue that the summit rhetorically has put poverty eradication in the forefront while advancing economic growth as the main strategy for poverty eradication (<http://www.worldsumit2002.org/guide/wssdoutcome.htm>).

It is necessary to take measures to promote policy development and implementation to; reorient the present production and consumption patterns, increase the efficiency of resource utilisation and make structural changes to the economy to allow the growth maintaining the sustainability of the ecosystem. The challenge to the present generation, international and local alike is how to maintain the present consumption in developed regions, upgrade the living standards of the underserved regions and to maintain the stability of the ecosystem at the same time. This will undoubtedly require a paradigm shift of present economic development patterns focusing more on sustainability of the natural ecosystem upon which the life on earth depend.

In the recent past, environmental awareness and knowledge have been increased in the world leading to the focus on different ways of environmental management. Most of the regions are now focusing on implementing a mix of command and control regimes coupled with market based instruments and subsidy reforms to improve the efficiencies in environmental management.

Development of Information and Communication Technology (ICT) sector has made revolutionary paradigm changes of production and consumption patterns, trade and commerce, educational systems, working habits and lifestyles of the people. Internet, mobile phones and satellites have brought all the parts of the world together to a global village shrinking time and

space. In 2001, more information could be sent over a single cable in a second than was sent over the entire Internet for a month in 1997 (GEO3-UNDP 2001).

Rapid advances of ICT create a tremendous opportunities for human development providing accesses to information and communication from remote places quickly and cheaply. However, the uneven diffusion of ICT and the digital divide provides more advantages to developed countries to compete with the world market in a better capacity depriving opportunities of developing countries. Internet users are predominantly urban and 79 percent of users live in OECD countries, which contain only 14 percent of the world's population. Nevertheless, even in developing countries the increase in Internet use has been dramatic – for example, from 3.9 million to 33 million people in China between 1998 and 2002 (GEO3-UNDP 2001).

Usage of mobile phones is increasing at unprecedented levels as it has overcome the infrastructure barriers of fixed lines. The number of subscribers has increased from slightly more than 10 million around the world at the start of the 1990s to more than 725 million at the beginning of 2001, or one mobile phone for every 8 inhabitants (GEO3- ITU 2001). While enhancing opportunities for better communication and information rapid advances of ICT signals the necessity for environmental friendly design of these products. It has been recognised that the e-waste is the fastest growing waste stream in the world.. Integration of sustainability criteria is essential considering the lifecycle of the products and services, which require national, regional and global collection and proper recycling to achieve the desired outcome.

#### **4.7 Application of the Concept of Cleaner Production (CP)**

The Concept of Cleaner Production (CP) with its principle of promoting preventive environmental strategies as contrasted with the 'end-of-pipe' pollution control approaches. CP prevention oriented approaches evolved in the late 1980s, 90s and continue to do so within the current century advances in zero-waste or closing-the-loop solutions in production processes. Studies from US office of Technology assessment (OTA, 1986) and 'Waste Minimisation Opportunity Assessment Manual' (1998) of the Environmental Protection Agency of US made the pollution prevention approach more explicit. In Europe, university experts initiated CP projects using the expertise of Professor Huisingh in the 1980s (Baas 2005).

Baas (2005) described the life cycle of CP implementation with its four phases viz. from the emergence phase to growth, maturity and integration in the Netherlands. A Project of



Industrial Successes with Pollution Prevention (PRISMA) ref implemented in 1988-1991 in the Netherlands found that with the innovative-oriented waste preventive policy, remarkable achievements were obtained. The results of this study were presented to the Dutch Parliament. In order to promote CP and build the capacity related to CP activities worldwide, professional CP dissemination processes have been initiated through various publications such as journals (e.g., *The Journal of Cleaner Production*), and through Post Graduate Courses.

Application of CP was highlighted formally in the international forum in 1992 at the UNCED. Agenda 21, the agenda for the 21st century adopted at the Summit made significant references to promote CP in sustainable development. Since then various initiatives and activities have been adopted on CP around the world in many countries by regional, national and international level institutions. However, the progress of these activities has not reached the levels anticipated due to various constraints prevailing at different levels all over the world. Effective adoption/implementation of CP programmes has been constrained due to lack of integration of CP at the policy level, weak institutional mechanisms of policy implementation, inadequate training and technical capacity, inadequate integration of CP into the social issues and thereby, implementation has encountered major resistance to change, and lack of sustainable financing mechanisms for implementation of CP activities until the projects become self sustaining. Limiting of CP related initiatives to single loop learning processes confined to single level interactions without considering feedback loops has been one of the major causes of failures of many CP initiatives in the industry sector.

At the Johannesburg Summit (2002), the need to promote CP was reiterated specifically to promote changing from the unsustainable patterns of production and consumption. Johannesburg Summit proposed to increase investment in cleaner production and eco-efficiency in all the countries through; inter alia, incentives, support schemes, policies along with appropriate regulatory and financial and legal frameworks.

CP, with its basic principle of “promoting preventive environmental strategies” is applicable to all the Multilateral Environmental Agreements (MEAs). Several International Conventions have recognised CP as one of the solutions in sustainable resources utilisation and preventing environmental pollution. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal in its Ministerial Declaration (1999) has included provisions for the application of CP in preventing and minimising waste generation. In the ten-year action plan of the Basel Convention adopted in (1989) has specific provisions for application of CP.

The Division of Technology Industry and Economics of UNEP (UNEP DTIE) launched a Cleaner Production Programme in 1989. The UNEP DTIE had taken steps to create awareness of the concept of CP, build institutional capacities and demonstrate its benefits to foster sustainable development. Numerous awareness and capacity building programs have been conducted under this programme at various levels and various guiding materials have been produced and published. In order to secure commitment of stakeholders at various levels including national governments, in 1998, UNEP took steps to launch an International Declaration of Cleaner Production (IDCP), which is a voluntary but public commitment to the strategy and practice of CP. The launch of the Declaration took place at a high level seminar on CP in South Korea. As of March 2002 the IDCP has over 300 signatories and the report has been translated into 15 languages (Cleaner Production Global Status (GPGS) Report 2002).

Many demonstration projects were implemented in various countries under various sectors mainly in textile, pulp & paper, metal finishing, food processing and tanneries to convince the industrial leaders of the economic and environmental benefits of CP (CPGS Report 2002).

GPGS 2002 highlighted progress in the continuation of CP promotion efforts taken after the success achieved in many demonstration projects such as PRISMA, in the Netherlands, Landskrona in Sweden, SPURT in Denmark and, AIRE/CALDER and Catalyst in the United Kingdom. Also, trend setting demonstration projects have been implemented in; India - DESIRE, (implemented by the National Productivity Council with the support from UNIDO), Produksih in Indonesia (implemented by the BAPEDAL under the support of GTZ), and SEAM in Egypt (implemented by EEAA with the support of DFID, UK). Multi-country demonstration projects have been supported by various agencies such as the Asian Productivity Organisation (APO), Tokyo under Green Productivity, Programme of USAID under EP3 project, World Environment Centre (WEC) and World Cleaner Production Society (WCPS) *ibid*.

UNIDO and UNEP jointly launched the National Cleaner Production Centres (NCPCs) program in 1994 to create a model institutional setup to promote CP at national level taking into consideration of the Dutch PRISMA project implemented with pollution prevention strategies.

UNIDO administers the operation of internationally funded NCPCs/NCPPs (National Cleaner Production Programmes) and has the majority of the total resources available for the total program. UNEP provides strategic inputs, primarily through separately funded multi-

country projects on emerging topics in Sustainable Consumption and Production (SCP) and also involves in the NCPCs/NCPPs in its series of regional and global strategic dialogs (UNIDO 2008).

All the regions have organised Cleaner Production Regional Roundtables facilitating networking and knowledge sharing (e.g. European Roundtable, African Roundtable, Asia and the Pacific Roundtable). Also, many education and training programs are conducted at several universities and institutions at different levels providing opportunities to build capacity on CP including technology development (e.g. The International Off-Campus PhD programme in Cleaner Production, Cleaner Products, Industrial Ecology and Sustainable Development of Erasmus University in the Netherlands).

In relation to the policy side, a number of countries have developed and adopted National CP policies and strategies. The European Union has established the Industrial Pollution Prevention and Control (IPPC) Directive in 1996, and many of its member states are in the process of aligning their national CP related policies and strategies with the IPPC (GPGS report 2002).

With regard to CP financing, a number of initiatives were taken worldwide especially for the implementation of specific projects and programs. However, there is no specific financing system operating exclusively for CP. Several funding mechanisms have been made available for various countries for pollution prevention and recycling. Revolving loan programs, and Multilateral Investment Fund systems are also in existence in a limited way in some individual countries and clusters (e.g. UNESCO Revolving Facility set by Norway in several countries, Multilateral Investment Fund (MIF) in the Latin and Caribbean region, P2 Loan Program of OHIO State and RENEW Loan Program in Colorado in the USA, Industrial Pollution Control and Prevention (IPPP) of the World bank in India (GPGS report 2002).

The UNIDO/UNEP CP program also helps to secure funding for their NCPCs at the initial stages from various donor countries such as Switzerland, Austria, and Norway. In addition to that there are opportunities of securing funding through investment projects such as EU Pro Eco Program. Most of these programs are more or less tailor-made and supply driven. Long term planning for continuation of most of these projects is not possible due to uncertainty of provision of funding until the projects get matured enough to continue their activities. Especially for most of the Small and Medium Enterprises (SMEs) in developing countries, there are no financing systems since the companies that need the financial support are generally considered to not be credit worthy according to the rules of the current funding mechanisms.

Innovative policies, strategies and approaches are necessary to meet the present challenges of integrating CP policy into the local, regional and international agenda. Mere technical assistance to isolated/scattered efforts/programs without focusing on wider social aspects would only result in fragmented achievements locally and globally. Integrated approaches connecting economic, environmental and social aspects are necessary to promote CP worldwide. Systems within which the integration would operate are dynamic and interrelated and therefore, evaluation of future scenarios needs in-depth analyses of the current systems and impacts of different operations, dynamics and structure, and limitations of these systems to each other in order to make significant progress. A survey of the present status of the networks of cleaner production will be a useful exercise – to evaluate the potential of these networks to promote CP at national levels.

The knowledge management networks such as the Journal of Cleaner Production (JCLP) and Journal of Industrial Ecology contribute immensely to promote CP worldwide. Prof. Huisingsh, Editor-in-Chief of the JCLP confirmed that in 2010 he received more than 770 new documents in comparison with about 300 in 2008 and 250 in 2007. This is one trend indicator that increasing numbers of researchers are reporting on their CP and related SPC research within the JCLP. Impacts of the services of this type of low cost knowledge management network are significant in light of practical difficulties faced by most of the regional CP networks for their operation and maintenance, due to their financial constraints.

#### **4.8 Recent initiatives to promote change**

There are many initiatives launched by various countries at different levels to promote SCP (SPC) including cleaner production (CP). These programs are mostly being implemented under different names and are diverse in nature. According to “Planning for Change” published by UNEP in 2008, more than 30 countries throughout the world have developed or are developing national SCP programmes. Mostly these programs are not driven by an integrated approach and therefore, the benefits gained by these programs are offset by the other programs which do not focus on sustainability issues. At present Africa, Europe, Latin America and Caribbean and Asia and the Pacific, West Asia and North America have regional SCP programs in place (Planning for Change 2008)

At the Johannesburg Summit, the need to initiate a worldwide process where governments could facilitate and ensure significant progress in achieving SCP was reiterated. Accordingly, the Johannesburg Summit called for developing a ten-year framework of programs (10YFP)

in support of regional and national initiatives to accelerate the shift towards SCP to promote social and economic development within the carrying capacity of ecosystems. This initiative was later titled the “Marrakech Process on SCP” after the city where the First International expert Meeting on the 10 YFP took place in 2003.

The Marrakech Process on SCP is a global platform to bring all the stakeholders together to work jointly in the promotion and implementation of SCP patterns. The Marrakech Process will be reviewed by the Commission of Sustainable Development (CSD) in 2010-2011. UNEP and UNDESA are the leading agencies of this global process (UNEP 2008)

Planning for Change (2008) by UNEP, provides Guidelines for National Programs of SCP for governments and other stakeholders on how to plan, develop, implement and monitor a national SCP program and to facilitate countries that already have a SCP program but are keen to improve and sustain the process.

The guidelines stipulate the following 10 steps:

1. Establish an advisory group;
2. Conduct a scoping exercise;
3. Set the institutional framework;
4. Select the policy areas;
5. Define objectives and set targets;
6. Select policies and initiatives;
7. Obtain official approval of the program;
8. Implement the program;
9. Document, monitor and evaluate;
10. Sustain and improve.

These steps were tested in several demonstration projects in 2007/8. A Training workshop to introduce these guidelines was conducted for the countries in the South Asian Region in June 2008 in Kathmandu, Nepal. Similar workshops have been conducted for the other regions too.

Promoting SPC at national level even following the above guidelines would mostly depend on the socio-economic-political situation of the country concerned as well as the external

forces impacting upon the country, both regional and global. It is necessary to analyse the strengths and weaknesses of and the opportunities and threats to the existing coordination mechanisms and systems, and to develop innovative mechanisms and strategies as appropriate to improve and to sustain the collaboration of the stakeholders at national and international levels. Analyses of the potential of the existing international networks to initiate and promote SPC, taking into consideration the lessons learned will be useful to overcome the barriers. Development of linkages of SCP programs with other SCP-related programs can facilitate synergy and thereby help to optimise the use of limited resources available in SCP dissemination processes.

#### **4.9 Indicators to measure the status of Sustainable Development**

Development and use of indicators would be one of the important approaches to measure the performance of the policies, strategies and implementation activities. The indicators however, should reflect the real performance of implementation to facilitate and guide the policy makers and implementers to take future decisions. At present, the SCP community is using various indicators to measure the progress of economic development, social welfare and status of the environment.

Traditionally Gross Domestic Product (GDP) is considered as the measure of development of a country. GDP measures the value of goods and services in the economy. The major criticism of use of GDP as a measure of development is its inability to capture the equity issue and social well being such as quality of life as a measure of development. The traditional understanding was that economic development would improve the standard of living of the people and the strategies to be used to increase the economic growth without paying attention to the ‘Limits to Growth.’

The Human Development Index (HDI) was developed and published in its Human Development Report by UNDP since 1990 providing a better estimate of human wellbeing. It measures the average achievement in a country in three basic dimensions: A long and healthy life, as measured by life expectancy at birth; Knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight); and A decent standard of living, as measured by GDP per capita in purchasing power parity (PPP) terms in US dollars.

Performance in each dimension is expressed as a value from 0 to 1, by applying the following general formula:

$$\text{Dimension Index: } (\text{Actual value} - \text{Minimum value}) / (\text{Maximum value} - \text{Minimum Value})$$

The HDI is then calculated as a simple average of the dimension indices.

**Table 4.3: Goalposts for calculating the HDI for a sample country**

Indicator	Maximum value	Minimum value
Life expectancy at birth (years)	85	25
Adult literacy rate (%)	100	0
Combined gross enrolment ratio (%)	100	0
GDP per capita (PPP US\$)	40,000	100

*Source: Human Development Report 2007/2008*

All countries included in the HDI are classified into one of three clusters in human development: high human development (with HDI of 0.800 or above), medium human development (HDI of 0.500-0.799) and low human development (HDI of less than 0.500).

The following table shows the present status of human development in few selected countries in the Asian Region and world averages under few thematic areas that would provide insights of socio-economic issues related to SPC and MDGs as indicated in the UNDP HDR (2007/2008)

There are 70 countries in the world with high HDI, 85 countries with medium HDI and 22 countries with low HDI out of which 55 countries are in the high income category, 97 countries in the middle income category and 54 countries in the low income category. There are 30 OECD (Organisation for Economic Co-operation and Development) countries out of which 24 are high-income OECD countries (Human Development Report 2007/2208). Table 4.4: HDI, GDP and Water, Sanitation and Nutritional Stats, Human Poverty and Income poverty

**Table 4.4: HDI, GDP and Water, Sanitation and Nutritional Stats, Human Poverty and Income poverty**

Country	HDI	GDP Per capita (PPPUS\$)	MDG Population using Improved Water Source (%) 2004	MDG Population Using Improved Sanitation 2004 (%)	MDG Population under nourished 2002/2004 (% of total population)	MDG <1US\$ a day 1990-2005	<2 US\$ a day 1990-2005	National Poverty line 1990-2004
Sri Lanka	0.743	4,595	79	91	22	5.6	41.6	25
Japan	0.953	31,267	100	100	<2.5			
Singapore	0.922	29,663	100	100	..			
Korea (Republic)	0.921	22,029	92	..	<2.5			
Malaysia	0.811	10,882	99	94	3	<2	9.3	15.5
Thailand	0.781	8,677	99	99	22	<2	25.2	13.6
China	0.777	6,757	91	47	12	9.9	34.9	4.6
India	0.691	3,452	86	33	20	34.3	80.4	28.6
Bangladesh	0.547	2,053	74	39	30	41.3	84.0	49.8
Developing countries	0.691	5,282	79	49	17			
OECD	0.916	29,197	99	96	..			
HHD	0.897	23,986	98	92	..			
MHD	0.696	4,876	82	48	16			
LHD	0.436	1,112	49	34	34			

Source: UNDP Human Development Report 2007/2008



**Table 4.5: Energy and Environment**

Country	HDI	GDP Per capita (PPPUS\$)	Electricity consumption per capita (Kilowatt-hours) 2004	Population without electricity (millions) 2005	Forest area (% of total land area)	Co2 Emissions (total Mt) 2004	Share of world total (%)
Sri Lanka	0.743	4,595	420	6.7	29.9	11.5	(.)
Japan	0.953	31,267	8459	..	68.2	1257.2	4.3
Singapore	0.922	29,663	8685	0.0	3.4	52.2	0.2
Korea (Republic)	0.921	22,029	7710	..	63.5	465.4	1.6
Malaysia	0.811	10,882	3196	0.6	63.6	177.5	0.6
Thailand	0.781	8,677	2020	0.6	28.4	267.9	0.9
China	0.777	6,757	1684	8.5	21.2	5007.1	17.3
India	0.691	3,452	618	487.2	22.8	1342.1	4.6
Bangladesh	0.547	2,053	154	96.2	6.7	37.1	0.1
Developing countries	0.691	5,282	1221	1569.0	27.9	12,303.3	42.5
OECD	0.916	29,197	8795	..	30.9	13,318.6	46.0
High income OECD	0.947	33,831	10360	..	31.2	12,1375	41.9
HHD	0.897	23,986	7518	..	36.2	16,615.8	57.3
MHD	0.696	4,876	1146	..	23.3	10,215.2	35.2
LHD	0.436	1,112	134	..	29.8	161.7	0.6

Source: UNDP Human Development Report 2007/2008

Consideration of HDI as a measure of human well-being is not free from criticism. There are claims that HDI does not take into account the environmental sustainability, equity issues, and gender disparities etc. that contribute to or detract from human well-being. The UNDP Human Development Report recently introduced many additional indicators other than HDI that would also connect to the Millennium Development Goals (MDGs). Several initiatives have been taken by some countries and individual organisations to develop indicators to measure happiness and human well being in different ways with a view to arrive at more realistic interpretations.

The Happy Planet Index (HPI) ([www.happyplanetindex.org](http://www.happyplanetindex.org)) is one such indicator of human well-being and environmental impact introduced by the New Economic Foundation (NEF), in July 2006. The HPI has been developed based on the premise that human well-being is not merely dependent upon materials and goods. The extraction of nature's resources is also an important parameter to be considered. Happiness is measured as a number of happy life years while extraction from nature is measured using the ecological footprint, defined as the amount of natural resources per capita both local and foreign to sustain a given country's lifestyle. The ranking shows that a country with a large per capita ecological footprint uses more than its fair share of resources, both by drawing resources from other countries, but also by causing damage to the planet while will impact future generations. Vanuatu is ranked 1st in the world with HPI 68.2, while USA is ranked 150th with a HPI of 28.8, and Zimbabwe ranked last 178th with a HPI score of 16.6. Sri Lanka is ranked 15th with a HPI score of 60.3.

#### **4.10 Sustainable Human Development Index**

Several other indicators of human and economic development as well as social well-being have been estimated by various other international and multinational agencies. A new proposal has been put forward by the Ministry of Environment and Natural Resources, Sri Lanka (2008), with modifications to HDI to measure sustainability aspects of the development as well as other environmental assessment parameters including carbon emissions, which have global impacts. The objective is to assess the real nature and extent of the human development process and the sustainability of such development. The proposal is to construct a more comprehensive index that would provide an assessment of each country's sustainability in terms of its ecological footprint, its bio-capacity, and its carbon emissions as well as the extent of poverty, which have not been incorporated into the HDI. The HDI, has included life expectancy, education and GDP but does not expressly measure actual poverty in terms of

population of households below the poverty line. However some of these issues are addressed in the poverty indicators estimated in the UNHDR.

A study undertaken by Sirinivasen T & Richardand (2008) is the first systematic global analysis of the ecological damage imposed by rich countries. The study team analysed the externalities or costs to the environment that are not fully paid for goods consumed in the west, which cause environmental or ecological damage in the developing world producing such goods. The results of the study show that, greenhouse emissions from low-income countries have imposed a \$ 740 billion of damage on rich countries. Rich countries have imposed a \$2.3 trillion of damage on poor countries. CFC emissions from rich countries have inflicted between \$25 billion and \$57 billion of damages to the poorest countries. Increased ultraviolet levels from the ozone hole have led to higher health care costs from skin cancer and eye problems, costing the rich countries between \$0.58 and \$ 1.3 billion (Ministry of Environment and Natural Resources (2008).

All these attempts provide foundations for future efforts to promote SCP patterns which could be encouraged to develop further to evaluate more realistic indicators of sustainable development with common understanding.

The proposal put forward by the Ministry of Environment and Natural resources (MENR), Sri Lanka (2008), suggests to modify HDI to measure sustainability aspects of development as well as other environmental assessment parameters including carbon emission, which have global impacts. As such a modified index could better assess the real nature and extent of the human development process and the sustainability of such development. The proposal is to construct a more comprehensive index that can provide an assessment of each country's sustainability in terms of its biological footprint, its bio-capacity, and its carbon emissions as well as the extent of poverty, which have not been incorporated into the HDI.

The proposed index by MENR (2008) estimates the proposed Sustainable Human Development Index considering the Ecological Index, Climate Change Index and Poverty Index as follows:

### **1) Ecological Index (ECI)**

$$ECI = (BCI - EFI)$$

ECI - Ecological Index

BCI - Bio capacity Index

EFI - Ecological Footprint Index

$$BCI = \frac{(\text{Bio-capacity of Country} - \text{Minimum Bio-Capacity})}{(\text{Maximum Bio-Capacity} - \text{Minimum Bio-capacity})}$$

$$EFI = \frac{(\text{Ecological foot print of the Country} - \text{Minimum Ecological Foot Print})}{(\text{Maximum Ecological foot Print} - \text{Minimum Ecological Foot Print})}$$

National Ecological Footprint is a measure of the biological capacity needed to produce the goods and services consumed by residents of that country, as well as the capacity needed to assimilate the waste they generate. Resources used for the production of goods and services that are exported are counted in the Ecological Footprint of the country where the goods and services are ultimately consumed.

The Bio-Capacity is the capacity of the ecosystems to produce useful biological materials and to absorb waste materials generated by humans using current management schemes and extraction technologies. Bio-capacity is calculated for all biologically productive land (including inland water) and sea areas on the planet area that supports significant photosynthetic activity and biomass accumulation that can be used by humans.

Both indices are estimated in the Living Planet Report and National indices are estimated by various ecological organisations with Global Footprint Network's (GFN) National Footprint Accounts serving as a standard.

## (2) The Climate Change Index (CCI)

$$CCI = [1/3 (CEI) + 2/3 (CETI)]$$

CCI - Climate Change Index

CEI - Carbon Emission Index

CETI - Carbon Emission Trend Index

$$\text{Carbon Emission Index (CEI)} = \left[ \frac{(\text{Carbon Emission of the Country} - \text{Minimum Carbon Emission})}{(\text{Maximum Carbon Emission} - \text{Minimum Carbon Emission})} \right]$$

$$\left. \begin{array}{l} \text{Carbon Emission} \\ \text{Trend Index (CETI)} \end{array} \right\} = \frac{(\text{Per capita Carbon Emission of Country} - \text{Minimum Per capita Carbon Emission})}{(\text{Maximum Per capita Carbon Emission} - \text{Minimum Per capita Carbon Emission})}$$

The CEI is calculated based on the total emission of carbon, while the CEIT is based on per capita emission of carbon. Both indices indicate the trend as well as the overall quantum of

emissions as relating to each country. High indices would suggest that the particular country is a high partner and is negatively affecting the overall global sustainability.

The data for calculating the above indices are published annually both in the HDI Report as well as the Key World Statistics published by the International Energy Agency.

### **(3) The Poverty Index:**

PI = [(1-% of Population below poverty line)]

In this index the MENR (2008) proposes to add only an index measuring the proportion of non-poor population as some aspects of poverty are included in the HDI.

MENR (2008) notes that most countries do have annual statistics of population below poverty line and another measure is to use the population below 50% of median income as used in the HPI-2 indicator in the Human Development Report. .

MENR (2008) argued that development of a country cannot be sustained if a considerable population of the country is living in poverty and thus any human sustainability index should include a measure of the level of the poverty as a component of the index. MENR (2008) further expresses the usefulness of incorporating of the Gini coefficient as a measure of income equity. However due to non-availability of annual data, the Gini coefficient has not been taken into the calculations. Nevertheless MENR (2008) promotes research and surveys on detailed socio economic or household income and expenditure to further improve the SHDI.

### **(4) The proposed Sustainable Human Development Index (SHDI)**

The proposed Sustainable Human Development Index is the simple average of the four HDI, ECI, CCI and PI indicators.

SHDI =  $\frac{1}{4}$ [HDI + ECI-CCI+PI]

MENR (2008) provides the following table (4.6) to understand the characteristics of the proposed SHDI index.

**Table 4.6: Estimates of Sustainable Human Development Index**

Country	HDI	ECI	CCI	PI	SHDI
Sri Lanka	0.743	-0.065	-0.009	0.75	0.363
USA	0.951	-0.568	-0.624	0.83	0.149
Bolivia	0.695	0.677	-0.009	0.37	0.439

Source: *Human Development Report 2007/8, Key energy Statistics 2007 and Living Planet Report (2006).*

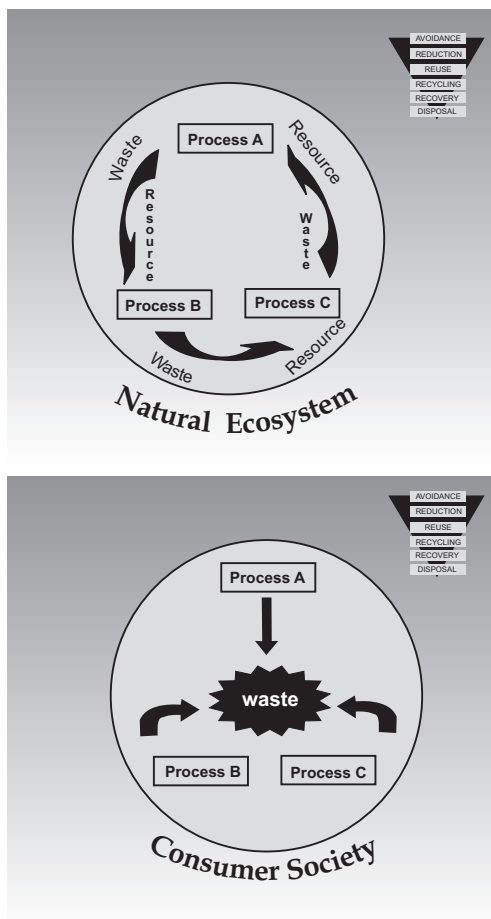
The above table illustrates that even though Bolivia has a low HDI and low poverty index<sup>18</sup> than that of USA and Sri Lanka, its SHDI is high due to its high ecological index (high bio capacity and low carbon emission<sup>19</sup>). Even though the ecological foot print of Sri Lanka is lower than that of Bolivia, the SHDI is lower as the bio capacity of Sri Lanka is very much less than Bolivia.

It may be useful to add the population growth trends also into the formula as population growth is directly related to sustainable development. Population growth trend index can be calculated as carbon emission trend index and include into the formula with an appropriate weighting factor to reflect the sustainability of individual countries.

The recent economic crisis situation provides ample evidence of the problems of taking GDP as a measure of development in the calculations of human development. For an example Iceland has been ranked 1 of the human development index 0.968 HDI published in the HDR report 2007-2008. and 3<sup>rd</sup> in per capita GDP )53,290 US\$. However, Iceland faced a severe, financial crises in 2008. It was the first country which declared its economic crisis. This suggests that GDP is not an adequate measure of sustainable economic development. Neither is the GDP an indicator of ecological sustainability as it does not capture the limitations of resource and sink limitations of the ecosystem. Therefore, development of realistic indicators to measure human development is an essential prerequisite to guide countries to develop and implement policies and strategies in their path of sustainable development.

<sup>18</sup> Poverty index is measured as the proportion of non poor population.

<sup>19</sup> CO2emissions of Bolivia is 11.85, Sri Lanka – 12.27, USA- 5816.96. Bio Capacity: Bolivia – 15, Sri Lanka- 0.4, USA – 4.7. Ecological Footprint (gha): Bolivia – 1.3, Sri Lanka – 1, USA – 9.6 .



Source: Ministry of Environment of Sri Lanka

**Figure 4.8: Functioning of the Natural ecosystem and Consumer society**

Natural Eco-Systems are sustainable systems because they are circular. It is necessary to change the behaviour of the consumer society towards more SCP with circular economic and material systems. Development and use of indicators to reflect the present production and consumption systems could enhance the understanding of the trends of the present system at the national level and their impacts on the global and local ecosystems, which in turn could provide incentives to reverse the trends of unsustainable production and consumption collectively in collaboration with each other.

#### **4.11 What Can be Learned from the Past Experiences that Can Help Us in the Future**

The historical perspective discussed in the previous sections show the need to reconsider the development processes reflected in the two schools of thoughts as expounded in the modernisation and dependency theories. These theories, once singled out, would not adequately guide the currently required new and modified integrated approaches and practices that are necessary and appropriate to suit the local conditions based on sustainability criterion. It is necessary to combine adaptations of both theories to the extent they are applicable to a country's particular conditions and status of development. Transfer of new technologies as well as utilisation of the indigenous knowledge among countries can help to lead the development process to become more sustainable locally, regionally and globally.

Developing countries need not follow the pattern of economic growth followed by the developed countries in the past, as inherent negative impacts associated with the past economic development strategies have been observed and experienced in all the regions in the world with scientific evidence. There is a high potential for continuous growth by reorienting the present pattern of resource consumption and production. Innovative methods and technologies are necessary to accelerate growth and poverty alleviation by application of CP to products, production processes and services, optimising resource use efficiency and following a circular economy by transforming outputs into inputs.

Initially, the necessary changes will require incremental costs. However, developed countries and international institutions have the capacity to assist developing countries by increasing access to markets, technology transfer and research & development to reverse the trends in unsustainable economic development that is based upon more ecologically friendly strategies and practices to ensure efficient utilisation of limited resources. This approach can be an incentive to ensure the political will of developing countries to make the local reforms necessary towards sustainable development.

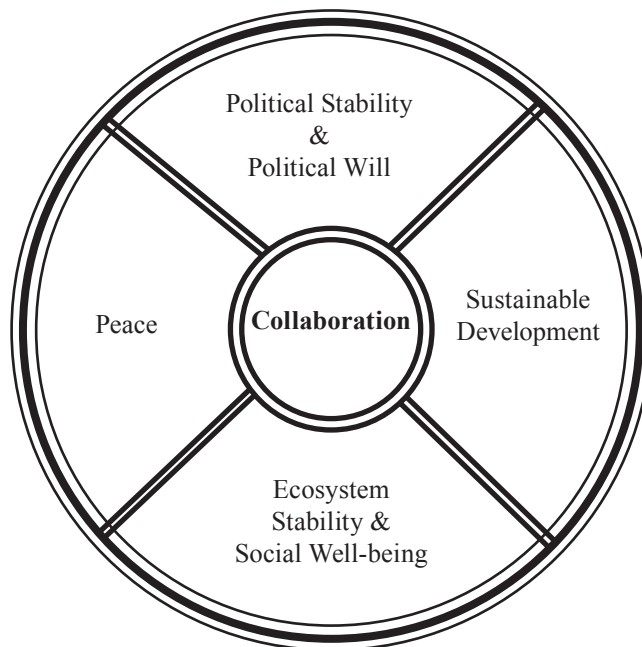
To understand the mutually supportive roles, key stakeholders working for economic, social and environmental development should come to a common forum and make common decisions on sustainable ways of limited resource utilisation within the carrying capacity of the ecosystems. The past experiences document that there are ample international forums working on sustainable issues. Passive participation of the stakeholders in common decision-making



platforms alone is not a sufficient condition even though participation facilitates mutual understanding. Collaboration of the key stakeholders is an essential prerequisite to ensure effective implementation of the common decisions with responsibility and accountability leading to the desired change that in turn can help us make progress toward more sustainable society-ecosystem interactions.

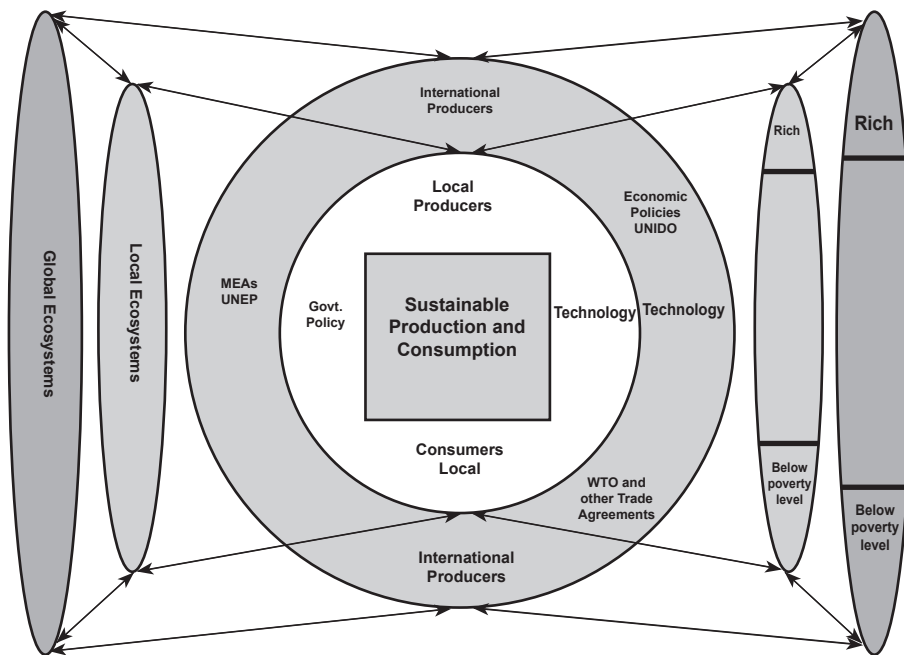
The root causes of the present unstable global social-security/environmental-sustainability problems and the related social unrest are mostly driven by the failure of rational management of the limited non-renewable and renewable resources available globally. Absence of mutual understanding and trust among countries and regions limit the progress of SD at all levels.

Figure 4.9 presents the cyclic events essential for sustainability, which link “Sustainable Development”, “Political Stability and Political Will”, “Ecosystem Stability and Social Well Being” and “Peace” together that have to be well balanced to continue and to maintain SD at all levels. In turn, SD will help to ensure Ecosystem Stability and Social Well Being, and thereby, Peace and Political Stability.



**Figure 4.9: Cyclic Processes and Conditions for Achieving and Maintaining Sustainability at the Global, Regional and Local Levels**

It is evident from past experiences that, political stability of one country or region is not adequate to meet the targets of SCP globally because ecosystems of each country and region are inextricably interlinked. Environmentally harmful activities of one country or region can lead to numerous chain reactions and create negative impacts to the other countries and regions. Use of realistic indicators to measure the status of SD in individual countries and their contribution for the ecosystem stability would be a useful tool to improve mutual understanding of the countries on the role that has to be played to reverse the unsustainable production and consumption patterns or practices in relation to the national, regional and global bio-capacity.



**Figure 4.10: Ecological and Social systems & major Stakeholders of SPC**

Figure 4.10 shows the linkages of major ecological and social systems and, major stakeholders within, between and among which the desirable changes have to occur in order for countries to make progress towards more SCP patterns.

Meadows (1999) explained the dynamics in a system and places to intervene to maintain the sustainability of the system. ‘The rules of a system of a country or an organisation define

its scope, its boundaries, and its degree of freedom. If one wants to understand the deepest malfunctions of the system, it is necessary to pay attention to the rules of the system and who has power over them. Constitutions are strong social rules. Power over the rules is real power. The Supreme Court has powers to interpret and delineate the constitution. The rules for writing the rules have even more power than congress.’

Meadows (1999) compared the manmade rules through constitutions with physical laws of nature. In the functioning of the ecosystem, the rules are governed by nature itself. The interpretations and delineations by humans over the functioning of the ecosystem can be overruled by the rules of the nature, which is more powerful. Physical laws of nature are absolute rules whether mankind understands them or not.

It is clear that manmade systems designed without paying attention to the rules of the functioning of the ecosystem can initially cause fluctuations and eventually destroy the carrying capacity of the ecosystem which in turn will impact the social systems. The development of modern environmentalism was a result of the challenge posed by the rules of nature interacting with the feedback loops of the social systems.

Meadows 1999 signalled alarm bells on the systems of the world trade systems with the rules designed by competitors, run by competitors for the benefit of the competitors, excluding any feedback systems from any other sector of the society. She interpreted that system as a recipe for unleashing “success to the successful” loops, until they generate enormous accumulations of power and huge centralised planning systems that will destroy themselves.

Past experiences provide abundant evidence of the importance of incorporating feedback loops into the system operation to ensure its stability and long-term sustainability.

The future global trends and conditions on environmental and sustainable development approaches would be different from the experiences that we gained since the first international UN Conference on Human Environment in 1972, Brundtland Report on “Our Common Future” followed by the Earth Summit in 1992, and the Johannesburg Earth Summit in 2002. Different trends of behaviour are foreseen in different regions and countries mainly due to the fluctuations of social security conditions and food safety. These trends are however, very much inter-related to social development, thereby, they are connected to the economic development and to the ecosystem development and to societal SD. These inter-linkages must be considered as a new challenge that has to be faced by all in the coming years.

GEO3 emphasised that the next 30 years will be as critical as the past 30 years for shaping the future of the environment. GEO3 notes that old troubles will persist and fresh challenges will emerge as increasingly heavy demands are placed upon resources that, in many cases, are already in a very fragile state. The increasing paces of change and degree of interactions between/among regions and issues have made it more difficult to look into the future with confidence. GEO3 presented four scenarios to explore what the future could be depending on different policy approaches. These scenarios are: Market first, Policy first, Security first and Sustainability first.

The Sustainability First Scenario was presented as: “A new environment and development paradigm merges in response to the challenge of sustainability, supported by new, more equitable values and institutions. A more visionary state of affairs prevails, where radical shifts in the way people interact with one another and with the world around them stimulate and support sustainable policy measures and accountable corporate behaviour. There is much fuller collaboration between governments, citizens and other stakeholder groups in decision-making on issues of close common concern. A consensus is reached on what needs to be done to satisfy basic needs and realise personal goals without beggaring others or spoiling the outlook for posterity” (GEO3- UNEP).

Realisation of these aspirations requires Mutual Understanding, Trust, Incentives, Financial and Technical Resources at different levels across the globe and thereby, securing collaboration among stakeholders for effective implementation of SPC programs will have to be based on the successes and failures of the policies & strategies and implementation mechanisms.

The cyclic events for sustainability shown in the Figure 4.10 will create feedback loops and reflect on the imbalances of the functioning of the ecosystem if timely action is not taken at national, regional and global levels to reverse the present unsustainable production and consumption patterns.

## **CHAPTER 5**

### **AN OVERVIEW OF LOCAL TRENDS AND CONDITIONS RELATED TO SUSTAINABLE PRODUCTION AND CONSUMPTION**

#### **5.1 Introduction**

This Chapter provides information on local trends and conditions related to SPC in Sri Lanka. The objective is to evaluate strengths, obstacles, opportunities and challenges for application of SPC practices in the country within the local system and identify strategies to be used to develop and implement the SPC model for Sri Lanka which is the main objective of this dissertation (see Chapter 1, section 1.5 and Chapter 3). The information, data and conclusions in this Chapter together with the international trends and conditions (Chapter 4), the literature review in Chapter 2, and subsequent chapters on the case studies were used to develop the SPC model for Sri Lanka considering the developing country perspective.

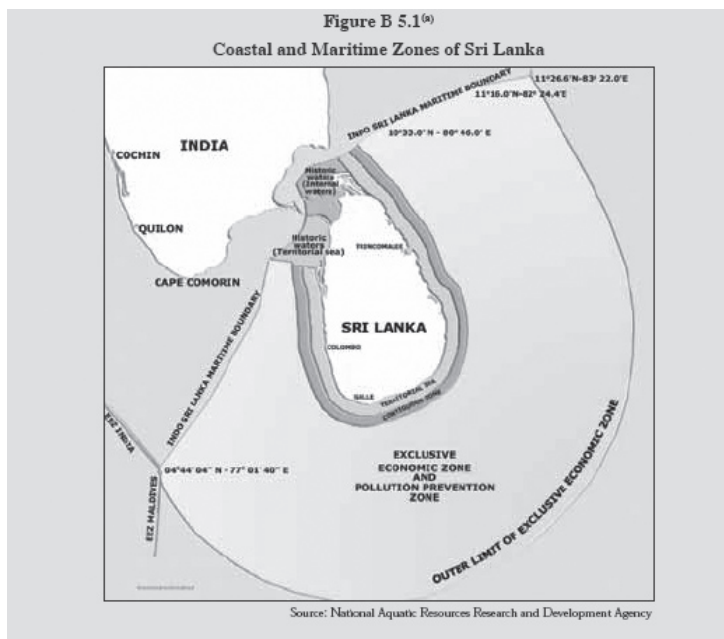
The country's geographical situation, population and its growth, socio-economic aspects, and environmental management strategies used by the country are important elements to be considered in the development of a SPC model in any country. The current status, trends and conditions of these important elements are presented in this Chapter with special emphasis on the coordinating mechanisms practiced and proposed in the environmental management sector. The objective is to identify the failures and successes of these coordinating systems and formulate effective coordinating mechanisms to secure collaboration of stakeholders in promoting SPC in the country. The assumption is that, collaboration of stakeholders is the key for the successful and effective implementation of the SPC model in the country.

Section 5.2 of this Chapter presents information about Sri Lanka's geographical location, its climate and average rainfall. Section 5.3 describes some details about Sri Lanka's human population growth trends, which are a significant driving force for application of SPC. Section 5.4 presents an overview of the income and economic development, which reflects disparity within the country and underscores the need for economic development with integration of environmental considerations. Section 5.5 presents information about some significant CP partnerships and programmes implemented in Sri Lanka. Sections 5.6 and 5.7 describe strengths and opportunities for implementation of the SPC model in Sri Lanka, and a brief overview of the status of environment of the country. Finally, section 5.8 presents an overview of environmental management in Sri Lanka that includes national policies and

strategies, legislation, national environmental action plans, decentralisation of environmental activities and coordination mechanisms. Within these contexts, Sri Lanka’s SPC model was developed.

## 5.2 Geography and population

Sri Lanka is a tropical island located in the Indian Ocean lying 29 km off the south- eastern part of the coast of India. The country has a total area of 65,610 km<sup>2</sup>



**Figure 5.1: Coastal and Maritime Zones of Sri Lanka**

The islands coastal systems that have evolved along its 1620 km coastline are important repositories of the natural resources of the country. At present 59 per cent of the Sri Lankan population lives in coastal districts with maritime boundaries.<sup>20</sup> This shows the vulnerability of Sri Lanka’s population due to environmental changes such as climate change due to possible sea level rise. The coastal zone is important economically as they contain around 90% of the industrial units and about 80% of the tourist infrastructure of the country.

<sup>20</sup> The Study of Economic Significance of Coastal region in the Context of Environmental Changes of Pre and Post TSunami (2007 – unpublished)

Water is one of the most important resources in the country. On average Sri Lanka receives an annual rainfall of 2000 mm. However, there is a considerable variation in the spatial and temporal distribution.

Beginning around 500 BC and spanning a period of several centuries, Sri Lanka's rulers developed what is now referred as a "hydraulic civilisation" where water resources were harnessed for the sustenance and wellbeing of the people. Thousands of reservoirs were built in the dry zone with associated distribution systems throughout the dry zone for agricultural development as a means of adapting to drought situation.

Population of Sri Lanka now stands at 20,450 (2009) million with a growth rate of 1.0 (2008). Between 1981 and 2001, the population increased from 15.01 to 18.73 million. However, the population growth rate has decreased from 1.9%/yr. to 1.2%/yr during the same period and declined to 1.1%/yr. by 2005; this is the lowest in South Asia and many other countries in the region. There is a sharp difference in the distribution of population in the country among its 9 provinces with the highest population density in the Western Province.

The young population creates demands for adequate educational facilities and employment opportunities and in contrast the elderly population needs social security and different types of built environments. Increasing population density creates more pressure on the limited natural resource base and increasing consumption. It also results in high public spending on education, health and food subsidies, which are creating economic problems and social unrest. Therefore, integration of sustainability issues and concerns in the economic and social development policies and practices, at all levels, will be a basic prerequisite to ensure optimum resource utilisation and long-term sustainability of the natural ecosystem.

The declining trend of rural-urban migration reflects people's preferences to live in smaller communities and to retain in the rural sector. Migration from rural to rural is also seen for alternative livelihoods where more land resources are available. Instead of migration from rural to urban areas there is a tendency of shrinking the rural areas and thereby, eroding the rural ambience. This trend, while reducing the energy demand and urban pollution on the one hand, it also increases their dependency upon the natural resources and upon ecosystem services to maintain their livelihoods. Ecosystem services are an integral part of their livelihoods. Therefore, there is an urgency to ensure that the sustainability of all natural capital is maintained and enhanced via proper valuing and effective, long-term management. One part of this process is to develop and implement effective and holistic ecosystem management

governmental policies designed to provide incentives for empowering the community to maintain the sustainability of the ecosystems for their and their children's livelihoods for all future generations.

### **5.3 An overview of income and economic development**

Sri Lanka has been predominantly a country with an agricultural economy. It is being transformed into a diversified economy with a very gradual change until the late 1970s, and with more rapid changes since then. This diversification is due to structural changes where manufacturing and the services sectors make an increasingly larger contribution to the Gross Domestic Product (GDP) than agriculture. In 2009, for example, industry and service sectors accounted for 28 and 59 per cent of GDP respectively, whereas the agricultural sector accounted for only 12 per cent. This is in sharp contrast to the structure of the economy in 1950, when agriculture sector contributed 41 per cent to the GDP and manufacturing, consisting mainly of processing of tea, rubber and coconut accounted for only 16 per cent of the GDP.

However it has been noted that the proportion of the population in the agricultural sector is significant. Labour force participation in the country accounts for 37.2 per cent of the total population of which 32.6 per cent are engaged in agriculture, forestry and fisheries. (Central Bank Report (2009) - Sri Lanka). The agrarian heritage is still very significant.

The GDP per capita has increased sharply from US \$295 in 1981 to US \$2053 in 2009. Increasing population and changes of lifestyles demand a diversified economy in the country with more emphasis on poverty alleviation. Poverty has declined from 22.7% in 2002 to 15.2% in 2006/2007.

However poverty in certain areas of the country is as high as 27 to 34%; therefore there is need for an intensive and on-going emphasis on poverty alleviation programmes, because the population with an income of less than US \$1/day is 5.6% and 41.6% of the population exists on less than US \$2/day. Table 5.1 shows the increasing trends of GDP with the sectoral composition to the economy from 1981 to 2009.



**Table 5.1: GDP per capita and the sectoral composition to the economy**

Year	1981	1985	1990	1995	2000	2008	2009
GDP Per Capita US\$	295	367	466	755	899	2014	2053
Sectoral Composition %							
Agriculture	27.7	27.7	26.3	23.0	19.9	12.1	12.0
Manufacturing	16.2	14.7	14.9	15.7	16.8	17.5 (28.4)*	17.4(28.6)*
Other	56.1	57.6	58.8	61.3	63.3	59.5	59.3

Source: Department of Census and Statistics

\*Industry

The provincial share of GDP and the per capita income show significant inequalities, especially between the Western Province and the other provinces. While the Western Province accounted for 50.1 percent of the GDP in 1996, each of the other provinces accounted for less than 10 percent of GDP. Even on a per capita basis, the Western Province leads the other provinces. The fig. 5.2 presents the inequalities of per capita income of different provinces of the country with their contribution to GDP.

**Table 5. 2: Provincial Shares of GDP and per capita income – 2006**

Province	GDP Share (%)	Per Capita Income (Rs.)
Western	50.1	222,598
Southern	9.3	97,377
Sabaragamuwa	6.2	82,575
Central	8.8	85,833
Uva	4.6	92,615
Eastern	4.7	75,364
North Western	9.3	103,792
North Central	4.1	88,333
Northern	2.9	64,185

Source: Central Bank of Sri Lanka

US\$ 1 is approximately equal to Sri Lankan Rs 110.

Sectoral contributions to the GDP by each province are significant indicators to note the social inequities and to underscore the need to mobilise more resources in the other provinces to uplift their economic development. This legitimate need signals the demand for additional resources and therefore, also for the need for more coherent approaches to optimise the sustainable resource utilisation in the development process of the country.

Although health indicators have improved in the country, as a whole, the morbidity pattern still discloses a high incidence of illnesses associated with poverty, poor housing and malnutrition. Challenges of sustaining the economic growth with the increasing population and globalisation and with on-going unequal distribution of wealth demand a diversified economy with more emphasis on poverty alleviation.

Food security has been a special matter of concern, for the past few years, due to price fluctuations. The Food and Agriculture Organisation (FAO) reported that while the impact of weather-related factors on cereal and dairy production are significant in short and medium term, there are other factors that have contributed to the price increases, which are of significance for the long term. Amongst these factors is the increasing use of cereals such as maize, sugar and edible oils for bio-fuel production. Another important factor in relation to international food security is the increasing demand for consumption of meat by developing and emerging economies (CBR 2008).

India, Pakistan, Vietnam, Egypt, Brazil, Serbia, Ukraine, and Zambia imposed export restrictions on their food in order to maintain sufficient stocks to cater for their citizen's consumption. This situation resulted in national governmental incentives for national food production increases. For example, Malaysia has taken steps to increase food production whereas countries such as Indonesia, Mongolia, Morocco and Turkey have removed or reduced import restrictions on food. China, India, Russia, Argentina, Morocco, Egypt, Mexico, Jordan, Zimbabwe, Benin and Senegal have made arrangements to provide subsidies and food control systems to face the food crisis situations (Satahana Magasine (2008), Central Bank of Sri Lanka).

In Sri Lanka, several national programmes were initiated to increase food production domestically. In the government's ten-year policy framework, the need for increases in agricultural production has been identified as a key factor for ensuring food availability for all

Sri Lankan citizens.

Annual usage of fertiliser has increased from 606,000 mt in 2004 to 818,000 mt in 2008. Fertiliser use in paddy cultivation has increased from 301,000 mt in 2004 to 602,000 in 2008. Fertiliser usage for tea production has reduced from 178,000 mt in 2004 to 132,000 in 2008. More strategies are necessary to improve the efficient usage of fertiliser in the agricultural sector.

Sri Lanka has banned the use of persistence organic pesticides stipulated under the Stockholm Convention on Persistent Organic Pollutants. Stringent controlling systems are in place in the country to control pesticide importation and its use. Imports of chemicals are also controlled under the Rotterdam Convention on Prior Informed Consent. Country has banned importation of hazardous wastes under the Basel Convention.<sup>21</sup>

#### **5.4 Some significant CP Partnership Programmes implemented in Sri Lanka**

This section presents an overview of some significant CP partnership programmes conducted in Sri Lanka since 1990s. The objective is to provide some insights of the CP dissemination phases evolved since then.

Since 1993, several initiatives have been taken by the government and private sector to promote application of CP. Progress of these activities was mostly confined to availability of financial resources for technical assistance and wider dissemination.

Some of the significant partnership programs conducted in Sri Lanka related to CP are summarised in Table 5.3.

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<sup>21</sup> Stockholm Convention on POPs adopted in May 2001 ([www.pops.int](http://www.pops.int)). Rotterdam Convention on PIC was adopted in September 1998 ([www.pic.int](http://www.pic.int)), Basel Convention was adopted in March 1989 ([www.basel.int](http://www.basel.int)).

**Table 5. 3: Some significant CP Partnerships Programmes implemented in Sri Lanka**

Program	Objectives and Targets	Components and Implementation	Result and Obstacles
<p><b>Industrial Pollution Reduction Programme (IPRP)</b></p> <ul style="list-style-type: none"> <li>● Funding: UNDP US\$2,157,000; GOSL SLR 4.0M</li> <li>● Sep tember 1993- May 1998</li> <li>● CEA- implemented</li> </ul>	<p>Build awareness of CP and introduce CP technology</p> <p>High-polluting industries-tanneries, metal finishing, rubber processing and manufacturing, distillery, frozen meat packaging, glass manufacturing, and hotel</p>	<p>Training of CP advisors, CP audits, CP revolving fund, no-interest loans for process upgrades, publications, media publicity, demonstration centres in factories</p>	<p>Stimulated creation of the Cleaner Production Centre.</p> <p>Awareness of CP technology introduced to limited number of industrialists did not lead to full scale adoption of CP technology or popularization of CP Industrialists did not recognize beneficial economic impacts of CP and were wary of a program led by the CEA.</p>
<p><b>Energy Management Centre, National Engineering Research and Development (NERD) Centre:</b>                      UNIDO and local funding</p>	<p>Promote energy savings in industrial and other sectors through efficient energy use</p>	<p>Conducts training programs on energy saving since 1985 (3-4 per year) and energy audits for industry (3-4 per year) and consults on conservation (60 assignments per year) with costs paid by clients</p>	<p>Leaders of industrial enterprises are very receptive to energy audits and implement energy conservation measures readily. Cost of audits is an obstacle, especially when possible profit enhancement is not clear.</p>

Program	Objectives and Targets	Components and Implementation	Result and Obstacles
<p><b>Pollution Control and Abatement Fund</b></p> <ul style="list-style-type: none"> <li>● Management: National Development Bank (NDB)</li> <li>● May 1995-August 2001</li> <li>● KFW: DM 7.5 million-6.0m as credit, 1.5m as TA</li> <li>● Hatton National Bank, Ceylon Commercial Bank, DFCC Bank, Sampath Bank, and Seylan Bank</li> </ul>	<p>Objective of the NDB is to ensure that industrial growth does not lead to environmental degradation. The Fund (PCAF) provided financial assistance to industrial enterprises tackling waste minimisation, resource recovery and pollution control and abatement.</p>	<p>Made non-repayable development grants for consulting services to recommend waste minimisation solutions. Loans at concessionary rates of interest enabled implementation: equipment to reduce emissions, lower waste, or monitor; to reduce use of hazardous materials; for treatment plants; or to move polluting industries to sites with treatment plants.</p>	<p>Some waste treatment facilities were constructed but response of participating industrialists to the PCAF was not satisfactory. Use of the facilities was limited due to increased costs. Consultants had limited knowledge of pollution control and waste minimisation measures.</p>
<p><b>E-Friends, Environmentally Friendly Solutions Fund</b></p> <ul style="list-style-type: none"> <li>● March 1999,</li> <li>● JBIC (Japan): US\$22M National Development Bank (NDB) with participating banks as above</li> </ul>	<p>Technical assistance and low cost loans to firms for waste minimisation, resource recovery/savings and pollution control and abatement to conform to the regulations and standards of the NEA</p>	<p>Similar to PCAF but adds resource recovery and energy efficiency measures.</p>	<p>Emphasis on end-of-pipe treatment, therefore, implementation of CP options has not been a regular practice.</p> <p>Enterprise leaders were reluctant to implement waste treatment that entailed capital and operational cost increases. Accounting of small firms inadequate to qualify for loans</p>

Program	Objectives and Targets	Components and Implementation	Result and Obstacles
<p><b>CleaNet</b>  <b>(www.cleanet.lk)</b></p> <ul style="list-style-type: none"> <li>● April 1999, ongoing                      Funded by World Bank and Industrial Technology Institute, with promotion by Ceylon Chamber of Commerce</li> </ul>	<p>Serves as a clearinghouse to promote cleaner production options among industrial enterprises.</p> <p>Offers phone information service to firms without internet access</p>		
<p><b>Industrial Pollution Reduction through CP application.</b></p> <ul style="list-style-type: none"> <li>● Funding: Royal Government of the Netherlands; SLR 5 Million, released only 1.2 million</li> <li>● 2007 - 2008                      Implemented by; CEA &amp; NCPC</li> </ul>	<p>Build awareness of CP among industrialists and introduce CP technology to minimise waste to control pollution.</p> <p>Awareness and comprehensive training to CEA officers on CP.</p> <p>Apply CP technology to industries mainly high and medium pollution.</p> <p>125 industries ranging from textile, food, chemical, tanneries, metal finishing, rubber processing and manufacturing, distillery, frozen meat packaging, and hotel were selected for the audit.</p>	<p>Initial CP audit to ascertain the waste discharge streams and quantities from selected industries.</p> <p>Produce an audit report with recommendations to implement the CP options thereby reduce pollution loads.</p>	<p>Submitted CP audit reports were not up to the expected standard.</p> <p>Funds were released to implement the 1st phase. 2nd phase could not continue due to limited HR to carryout audits.</p> <p>Awareness of CP technology introduced to limited number of industrialists did not lead to full scale adoption of CP technology.</p>

(Ref. Integrating Cleaner Production into Industrial development (2001), CEA)

Even though the Industrial Pollution Reduction Programme (IPRP) initiated in 1993 was not continued as expected, it stimulated the CP dissemination process in the country. Energy savings systems are continuously promoted by the NERD centre even though at much lower levels. More strategies and collaborative actions are needed for scaling-up of these processes across the country. Pollution Control Abatement Fund (PCAF) was considered as an incentive to facilitate industries initially to comply with the environmental protection licensing scheme established in 1991 by CEA under the national environmental act (NEA). PCAF was later modified as E-friends to provide funding to encourage application of environmentally friendly technologies in the industry sector.

The E-Friends II scheme was started in 2002 as a continuation of the E-Friends I project with financial assistance of the Government of Japan ODA. The program is implemented by the Ministry of Enterprise Development and Investment Promotion through banks. It was envisaged that such mechanisms will continue to improve the ability of participation of the financial institutions in environmentally friendly investment promotion. Financial allocations under this scheme were completed in December 2009.

However, as in the case of E-Friends I scheme, preventive environmental strategies have not been considered in the projects as expected, but emphasis was placed on end-of-pipe treatment. Implementation of CP options has not been a regular practice. Enterprise leaders are reluctant to implement waste treatment that entails capital and operational cost increases. Access to funding for small-scale firms is limited due to difficulties to secure co-financing and due to difficulties for them to qualify for loans.

Industrial Pollution Reduction Programme implemented by CEA with NCPC through CP application in 2007/8 was in one way useful for continuation of CP dissemination to a certain extent. However, inadequacies of qualified human resources to conduct CP audits in larger scale and produce reports with recommendations acceptable to industrialists was a challenge for continuation of this program. This shows the need for extensive capacity building programmers and establishment of a skilled human resource base to promote CP in the country. On the other hand, inadequate demand for CP prevents emergence of such a resource base entering in to the market system. This issue was analysed in-depth under Case study 1, presented in Chapter 6 as a review of the potential of NCPCs and its network to promote CP.

More recently many large-scale apparel industries have introduced green eco-friendly manufacturing mechanisms to compete with the global market developments. These mechanisms consist of global benchmarking for low energy consumption, water conservation, solid waste management, and low carbon emissions (CBR 2008). Also, initiatives were taken by a few leading industries to implement reporting systems of their carbon footprints. These initiatives are useful for the industries to compete with other industries in the international market and also to make further improvements in the production processes by self evaluation. The efforts also catalyse others to do so.

Some firms within the hotel sector have embarked on measuring and reporting carbon footprints. There are three projects supported with EU funds to promote SMEs to implement SPC in the food and beverage sector, the hotel sector and in the export development sector under the SWITCH-Asia programme.<sup>22</sup> Also many industries have switched from petroleum-based to biomass-based energy sources. These initiatives were made in response to increases in petroleum prices. Chambers of Commerce proposed to continue Green reporting systems in the industries under the SWITCH Asia programme.

All these programmes were designed to help to facilitate gradual changes in the industry sector from business as usual to SPC practices.

Establishment of the National Cleaner Production Centre (NCPC) in Sri Lanka under the UNIDO/UNEP CP programme in 2002 is another significant milestone in CP dissemination in the industry sector. However, even though the NCPC is carrying out various attractive CP promotion and implementation activities, much more concerted efforts are required for scaling up integration of CP activities in all industrial and service sectors across the country. The potential of NCPC and the global NCPC network to promote application of CP/SCP in the country was evaluated in-depth and is presented in Chapter 6 under Case study 1.

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<sup>22</sup> The SWITCH – Asia programme is currently (2009) being implemented by the Ceylon Chamber of Commerce to promote SCP in SMEs in the Food & Beverage sector and the Hotel sector and by the Industrial Technology Institute (a semi government organisation) in the Export Development sector with financial assistance from the European Commission.



## **5.5 The Recent Government Development Policy and Potential for Application of CP/SCP**

Economic development policies and strategies of any country are key driving forces either positive or negative in application of SPC principles. This section presents the potential of harnessing the opportunities of integrating SPC policies in to the recent government development policy in Sri Lanka. The country needs rapid economic development to improve the standard of living of its citizens.

The government has identified the following two major economic challenges in its path of development to which application of SPC will be of vital importance.

The two major economic challenges in the path of economic development of the country include:

- (i) Ensuring growing economic prosperity in the country and ensuring that the benefits of the developments will filter down to all Sri Lankan people;
- (ii) Laying the foundation for long-term sustainable development.

Therefore, timely action is required to promote paradigm changes from business as usual to SPC practices.

The Haritha (Green) Lanka program developed under the National Council for Sustainable Development<sup>23</sup> and launched in 2009 includes activities, which require integration of SPC activities for its effective implementation. The details of this program are presented in section 5.9.9. The Sri Lankan Central Bank Report (2009) included a special note recognising the need for greening the economy for sustainability.

The Ministry of Power and Energy established the goal of ensuring 10% of the electricity supply to be from renewable resources by 2016. A separate institution, the ‘Sustainable Energy Authority,’ was established by the government to coordinate the processes to achieve this goal.

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<sup>23</sup> The national Council for Sustainable development is chaired by the President of Sri Lanka.

## 5.6 An Overview of the Status of the Environment

The diverse climatic and topographic dimensions of Sri Lanka have given rise to a unique biological diversity of the country. It is significant to note that more than 35% of the flora is endemic to the country, while more than 65% of the plants found in the wet zone are endemic. Standing out among the fauna are 59 endemic species of land/fresh water crabs, while more than 50% of land snails, amphibians, and reptiles are endemic. The majority of the endemic species are found in the wet zone. Sri Lanka, along with the Western Ghats of India are classified as one of the 35 “Biodiversity Hotspots.” Sri Lanka recognises the uniqueness of its biological diversity, but it also must take urgent action for reversal of the current deteriorating trend (Sri Lanka Environment Outlook 2009)

Sri Lanka is richly endowed with water resources. The annual rainfall provides a total of nearly 13 million-hectare meters of water. It has been estimated that about 40% of the water goes off as surface run-off, about 20% seeps into the soil and replenishes soil moisture and ground water, and the balance is returned to the atmosphere as evaporation and transpiration. Of the surface run-off, a part is harnessed for irrigation and hydropower leaving about 3.3 million-hectare meters, which finally drains into the sea. The groundwater resource availability in the country is around 7250 million cubic meters per year, which is about 15% of the surface water resource.

The coastal area has the highest population pressures (around 30% of the human population lives in the coastline), the biggest concentration of development projects and the highest degree of industrialisation and urbanisation (about 24% of the land area). It contains a number of critical habitats (some 80% of the fish are harvested through near-shore fishing), and some of the richest biodiversity reserves. Coral mining, clearing of coastal vegetation, clearing of mangroves, sand mining in beaches and coastal dunes, haphazard construction, and the dumping of waste have led to pollution, coastal erosion and degradation of habitats. These critical habitats, which include lagoons, estuaries, mangroves, coral reefs, sand bars and salt marshes, are small and highly vulnerable to exploitation and degradation. Since they shelter valuable species of aquatic life, act as buffer zones for protection from coastal erosion, and have rich non-renewable or slowly renewing natural resources, they need to be managed sustainability (Sri Lanka Strategy for Sustainable Development).

The country’s present environment problems are mainly due to its high population and the high population density, which create tremendous pressures on the natural resource base of the country.

Land degradation (especially in the sloping land), loss of bio-diversity, water pollution and water scarcity in some parts of the country, destruction of coral reefs, urban pollution, and solid waste are negative consequences mainly due to the high population in the country.

About 90% of Sri Lankans use public transport services such as trains, buses, three wheelers, etc., for their day-to-day travel. However, about 10% of the population drives private vehicles and occupy a large portion of the roads. This situation has given rise to a series of complex social issues. To address this, key components in the government policy on public transport will be to equip public transportation with information technology and to operate it in an environment friendly manner (Mahinda Chintana 2010).

## **5.7 Environmental Management in Sri Lanka**

This section covers an over-view of environmental management in Sri Lanka which include: policies and action plans, legislation, market based instruments, voluntary actions, decentralisation of environmental management activities and coordination mechanisms which are useful to be considered in development of the SPC model referred in Chapters 1 and 3.

### **5.7.1 Environment Policy, a brief history**

Sri Lanka has a long tradition of caring for the environment and for engaging in conservation of natural resources. One of the wildlife sanctuaries in the world was established in the 3rd century B.C. under a decree from the king Devanampiyathissa (Citizen's Report on Sri Lanka's Environment and Development 1993). The ancestors took great care of the natural resource base when setting up the hydraulic civilisation over 2000 years ago. They practiced rainwater harvesting to sustain agricultural fields, and at the same time keeping the vital watershed forests untouched to ensure that water flowed through the country, thereby benefiting many people before it finally reached the sea. Preservation of the modern history of environmental law and policy is traced back to the mid 19th century. The importance of conservation of watershed forests was legally recognised as far back as 1938, where state land above 5000 feet was legally protected (Judges and Environmental Law (2009)). Culturally, water was considered as a Purifier, Lifegiver, Symbol of Fertility, Symbol of Transfer, the Destroyer of Evil (Water in Culture 1992). These functions of water in Sri Lanka's cultural heritage and its contribution in social welfare created an environment for the sustainable utilisation of these resources. The concept of life cycle management was also ingrained into the ancient culture due to the influence of Buddhism that promoted/promotes reusing the consumables until their natural degradation.

The cultural values of reusing material even after the original intended purpose can no longer be met continues as a practice in most parts of the country. However with the increasing population more natural resources are used for economic activities.

The recognition of the concept of SCP, even in those days, was a positive attribute and was used as an opportunity to promote sustainable development practices in the country. Those practices were mainly focused on natural resource management as pollution levels were insignificant; this resulted in the fact that pollution prevention and pollutant or waste management was not addressed within governmental policies until recently.

### **5.7.1.1 Policy Transition to Address Emerging Environmental Issues**

The traditional practices of environmental management inclined focused primarily upon on natural resource management were transformed in the 1980s after the enactment of the National Environmental Act. (NEA) in 1980 covering both natural resource management and pollution control aspects. This act was amended several times to accommodate emerging trends of environmental pollution and natural resource degradation and is the avenue through, which many new regulations are promulgated. In addition to NEA there are several other important laws and authorities which supervise, regulate and enforce environmental management practices in the country.

The constitution of Sri Lanka (1978) recognises that “*The State shall protect, preserve and improve the environment for the benefit of the community*” (Article 27(14) of the constitution). The constitution shared this responsibility with the community by stipulating a corresponding article stating that “*It is the duty of every person in Sri Lanka to protect nature and conserve its riches*” (Article 28(f)).

Establishment of the Ministry of Environment (MoE) in 1990 provided more impetus for development and implementation of national policies, strategies and action plans in environmental management in the country. The MoE is charged with the responsibility of facilitating sustainable development through the promotion of sound environmental management. This mandate makes the MoE responsible for monitoring and reporting the status of environment periodically based on which new policies and strategies are developed to address unresolved and emerging issues.

### **5.7.1.2 National Environmental Action Plan (NEAP)**

The formal designing of the National Environmental Policy Framework commenced from a modest National Conservation Strategy (NCS)<sup>24</sup> towards the first comprehensive National Environmental Action Plan (NEAP) as a response to address the multi-sectoral approaches of the development of the country in a sustainable manner. The first National Environmental Action Plan (NEAP1) was prepared in 1991 and commenced its implementation in 1992 coinciding with the United Nations Conference of Environment and development (UNCED) held in June 1992. NEAP1 specifies action to be undertaken in 14 sectors and indicated a time frame and the level of investment required.

Since then, five NEAPs were developed by 2009. Evolution of successive NEAPs led to gradual reforms of the coordination mechanisms with more holistic planning processes based on previous experiences.

Since the 3rd NEAP (1998-2001) sectoral perspectives were considered in the development process covering major sectors of the economy with improved, integrated coordinating mechanisms and by assigning the shared responsibility with each sector for its implementation.

New sector-based policies were developed to address the environmental issue to be addressed. Recognising the complex nature of the environment and natural resources management in the light of emerging social, economic, and ecological considerations, which have political significance, in 2003 the Ministry of Environment, developed a National Environmental Policy (NEP) to guide decision-makers towards a more sustainable development pathway.

### **5.7.1.3 The National Environmental Policy (NEP)**

The NEP underscores the point that the solution to Sri Lanka's environmental and natural resources related challenges lies within the wider concept of sustainable development. The objective is "Protection and conservation of the integrity of the nation's environment and natural resources through ecologically sustainable development, with due recognition of the contribution of natural resources to economic development and to the quality of life."

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<sup>24</sup> The NCS development commenced in 1982 and was approved by the Cabinet of Ministers in 1988.

The NEP also recognises the importance of the life cycle management and application of cleaner production principles as basic principles of the national policy.

#### **5.7.1.4 The National Cleaner Production Policy**

The Ministry of Environment developed a National Cleaner Production (CP) Policy in 2005 to promote preventive environmental strategies in the development process instead of or in addition to end-of-pipe pollution control strategies.

#### **The Goals of the National CP Policy**

1. Achieve sustainable development in Sri Lanka;
2. Improve environmental quality throughout Sri Lanka;
3. Improve eco-efficiency across all sectors of the economy in Sri Lanka;
4. Alleviate poverty and improve living standards of all Sri Lankans.

#### **The Objectives of the National CP Policy**

1. To reduce consumption pressure on the natural resources base by efficient use of raw materials;
2. To improve environmental performance by using ecologically sound practices in the production processes, design and use of products, and in the provision of and use of services;
3. To improve efficiency of water and energy consumption by minimising wastage and excessive exploitation and use through improving the production processes of better products and provision of services;
4. To improve competitiveness in the local and global economy through environmentally sound practices;
5. To improve social responsibility towards sustainable development.

The national CP policy calls for the development of sectoral policies to sufficiently integrate CP practices in the sectoral development agenda. Accordingly, the respective ministries in collaboration with the MoE developed CP policies for the health, tourism and fisheries sectors subsequently. CP policy for agriculture sector is almost completed. The Ministry of Industrial Development (MID) also developed the industrial CP policy and the National Cleaner Production Centre (NCPC) was established under the MID as part of the UNIDO/ UNEP NCPC network.

### **5.7.2 Environmental Legislation**

The NEA passed in 1980 is the principle umbrella legislation that covers a variety of environmental issues covering environmental conservation & sustainable management, including pollution management issues. The act was amended 1988, 2000 and 2005.

The Act covers the following major approaches to environmental conservation and sustainable management:

- i) Environmental protection;
- ii) Environmental Quality; and
- iii) Environmental Assessment

The major tools used include the Environmental Protection Licensing (EPL) system and the Environmental Impact Assessment (EIA) system. The NEA makes provisions for the Environment Minister to prescribe activities which require environmental protection license before the activity can commence or continue. Environmental standards have been prescribed for the implementation of these provisions. The NEA provides for the development and enforcement of regulations prohibiting any person from carrying out polluting activities listed in the particular section.

Similarly, the NEA makes provisions to approve projects through an EIA procedure. This approach is considered to be a planning tool that is embedded within the law in environmental protection and management. Further to EIA, the government took a policy decision to make it mandatory to perform Strategic Environmental Assessments (SEAs) for the major national policies, programmes and plans proposed by governmental institutions to improve the effectiveness of the integration process.

The NEA recognises both end-of-pipe treatment and prevention of environmental degradation and pollution. While the EIA process can be used exclusively for preventive approaches, the EPL process basically fostered end-of-pipe with lesser provisions to promote preventive environmental strategies such as “cleaner production.” At present the NEA is being amended to strengthen the EPL process to promote preventive environmental strategies such as load based licensing schemes where industries are encouraged to reduce the pollution load moving beyond compliance with the formal environmental standards.

The present NEA delegated powers to the environmental minister to prohibit the use of any material for any process, trade or industry and to prohibit the use of any equipment or industrial plant, which will endanger the quality of the environment and to require the installation, repair, maintenance or operation of any equipment or industrial plant within a specified area thus, enabling the implementation of CP approaches (Judges and Environmental Law – 2009, NEA section 23W). It is expected that the proposed amendments will strengthen the powers of CEA to more effectively enforce the provisions of NEA in these areas.

The NEA has powers for declaration of environmentally sensitive/protection areas and also to declare that any planning scheme or project in a protected area, which conflicts with the objectives of NEA shall cease to operate. Forest and Wild Life Ordinances<sup>25</sup> also have such powers to act within their jurisdictions.

The NEA includes provisions to empower the Central Environmental Authority to give directives to the local authorities for safeguarding and protecting the environment within the their jurisdictions.

In addition to the NEA, the Coastal Conservation Act has powers to protect the coastal zone and the marine environment. In addition to that, the Marine Environmental Protection Act, The Merchant Shipping Act, and the Ports Authority Act have specific provisions for protection of the marine environment. Recently, the Fauna and Flora Protection Ordinance relating to the functions of the Department of Wildlife Conservation, The Forest Ordinance, The Marine Environmental Protection Act and the Mines and Mineral Act were amended to empower them to take action to bridge the gaps and loopholes of the previous provisions.

All of these provisions can be strategically used to promote and manage ecological sustainability and to promote SPC in Sri Lanka.

However, notwithstanding these legal provisions which are used to control and manage environment, increasing demand for natural resources<sup>26</sup> underscore the urgent need for a wide range of additional tools and mechanisms to more effectively promote SPC in Sri Lanka.

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<sup>25</sup> These are two separate ordinances

<sup>26</sup> According to the recent government policy, 8% annual economic growth is expected in the next six years as against the present growth of around 6%.



### 5.7.3 International Conventions & Treaties Signed by Sri Lanka

After experiencing significant environmental calamities due to rapid industrialisation, the global community adopted many multilateral environmental agreements/treaties (MEAs) to address global environmental challenges. Almost all the significant MEAs were ratified by Sri Lanka to streamline the environmental management systems in the country as well as to collaborate with the international community in global environmental management.

**Table 5. 4: MEAs signed by Sri Lanka which promote application of SPC in the country for their effective implementation**

MEAs* directly related to natural resource management	MEAs* directly related to pollution management
The International Plant Protection Convention 06.12.1951	The Convention on the High Seas 29.04.1958
The Plant Protection Agreement for Asia and Pacific Region 27.02.1956	Treaty banning nuclear weapons tests in the atmosphere, in outer space and under water (1963)
The Convention on the Continental Shelf 29.04.1958	Treaty on principles governing the activities of states in the exploration and use of outer space including the moon and other celestial bodies (1967)
The Convention on Fishing and Conservation of the Living Resources of the High Seas 29.04.1958	International Convention on Civil Liability for Oil Pollution Damage 29.11.1969
The Ramsar Convention on Wetlands 02.02.1971	The International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties 29.11.1969
The Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)	The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 18.12.1971
Convention on International Trade in Endangered Species Of Wild Fauna and Flora (1973)- CITES	The International Convention for the Prevention of Pollution from ships (MARPOL-1973)
The Convention on the Conservation of Migratory Species (CMS 1979)	The Convention on the Prohibition of Military or any other Hostile use of Environmental Modification Techniques 25.04.1978
The Convention on Biological Diversity (CBD-1992)	The United Nations Convention on the Law of the Seas 10.12.1982

<b>MEAs* directly related to natural resource management</b>	<b>MEAs* directly related to pollution management</b>
The Agreement for the Establishment of the Indian Ocean Tuna Commission 25.11.93	The Agreement Relating to the Implementation of part XI of the United Nations of the United Nations Convention on the Law of the Sea of 10 December 1982
4. The United Nations Convention to Combat Desertification (UNCCD-1994)	Vienna Convention for the Protection of the Ozone Layer (1985)
Agreement for the implementation of the provisions of the United Nations Convention on the Law of Seas relating to the conservation and management of straddling fish stocks and migratory fish stocks (1995)	The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (biological) and Toxin-Containing Weapons and on their Destruction 18.11.1986
Cartagena Protocol on Bio Safety (2000)	The Convention Concerning the Protection of Workers Against Ionising Radiations 18.06.1986
	Montreal Protocol on Substances that deplete the Ozone Layer (1987)
	The Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and Their Disposal (1989)
	The United Nations Framework Convention on Climate Change (UNFCCC-1992)
	The Convention on the Prohibition of the Development, Production, Stockpiling and use of Chemical Weapons and their Destruction 10.08.1994
	Kyoto Protocol (1997)
	The Rotterdam Convention on Prior Informed Consent (PIC) 10.09.1998
	Stockholm Convention on Persistence Organic Pollutants (POPs-2001)

Note: \* Even though the MEAs were categorised into two broad categories for clarity, it is noted that all these MEAs are inclusive and mutually supportive.

Progress of the implementation of these MEAs varies based on the availability of technical, financial and skilled human resources. Lack of skilled personnel both in the government and the private sector is a challenge to achieve expected outcomes of many of these conventions throughout the country even though conditions of compliance have been fulfilled at various levels. Sri Lanka needs sustainable capacity building programmes to effectively fulfil the objectives of these conventions. There are no systematic and predictable funding mechanisms for the effective implementation of most of these conventions. The limited number of highly qualified and skilled personnel currently available in the country is insufficient to achieve the expected results, thus more capacity building programmes are required, especially at the provincial and local levels.

It is highlighted that Sri Lanka ranked number one in the implementation of the Montreal Protocol on Protection of the Ozone Layer because adequate financial and technical resources were made available by the protocol in a timely manner. The Montreal Protocol is the only MEA which had a sustainable and predictable funding mechanism for effective implementation.

Recently, UNEP has initiated a review of the governance structure of the UN system in environmental management. An overview is presented in Chapter 6 under Case Study One.

#### **5.7.4 Market Based Instruments (MBIs) in Environmental Management**

The government imposed a cess<sup>27</sup> on plastic and polythene products even before the imposition of the environmental conservation levy act, in order to discourage the use of such non-degradable items and to encourage the use of alternatives. Environmentally sound collection and recycling of polythene and plastic wastes was another objective for this policy decision. Such attempts, with effective monitoring and evaluation mechanisms of their impact, can help to improve the efficiency of integration of SPC policies into the economic development processes.

After a comprehensive study on “evaluating the potential of the use of market based instruments for the medium and long term environmental management,”<sup>28</sup> Sri Lanka enacted

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<sup>27</sup> The cess (a shortened form of assess) is generally a tax. It is a term formally applied to local taxation, in which it is still used as an official term in many countries.

<sup>28</sup> The report titled “Development of Market Based Instruments for Environmental Management in Sri Lanka”. It was published in May 2008.

an Environment Conservation Levy Act.<sup>29</sup> in 2008, which provided for the imposition of an Environmental Conservation Levy on specified items and services that are likely to have a harmful impact on the environment. The revenue accumulating from this levy could be directly utilised for taking corrective action to eliminate or alleviate the hazard. All levies collected were to be remitted to an “**Environmental Conservation Levy Account**” of the Consolidated Fund.

The Act was being implemented by the Minister of Finance (MoF). The items and services and the quantum of the levy was to be determined by the minister in charge of the subject of finance in consultation with the MoF. The decision would be published in the government gazette as an Order made under the Environment Conservation Levy Act. The Order comes into effect on the date specified in the Order. According to the provisions of the Act, every Order made under the Act has to be approved by a resolution of the Parliament as soon as convenient after it is published.

Some of the items identified under the Levy Act initially was challenged in the form of a petition filed by the public with the Supreme Court who claimed that such levy constitute an infringement of their fundamental rights guaranteed under the Constitution of Sri Lanka. However, while the Supreme Court order nullified the levies relating to some products, in its judgment, the Supreme Court stated that, “The imposition of further levies would be considered by the executive in consultation with the respective parties.” Therefore, it was clear that the declaration of more items and services will be liable to the imposition of the Environmental Conservation levy. The protest could be positively viewed and considered to streamline the decision making process acceptable to majority of the general public providing positive outcomes/benefits for the public contribution. However securing political will be a challenging task during the whole process. In December 2010, the Sri Lankan Ministry of Finance introduced a new integrated taxation system during the budget process that rendered the Environmental Conservation Levy Act non-operational.

The Ministry of Environment is now planning to introduce a national green accounting system in collaboration with the Department of Census, Ministry of Finance and other relevant stakeholders such as the Central Bank. Initial activities have started considering the forestry sector. Introducing a National Green Accounting System is very complex and required

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<sup>29</sup> Act (No. 26) of 2008

multi-disciplinary expertise to effectively value environmental dimensions into the national accounting system. Therefore, the progress is slow due to lack of skilled human resources with multi-disciplinary skills. Some local funds have been allocated to continue the process.

### **5.7.5 The Environmental Charter for Sustainable Environment**

While imposing regulations and MBIs, the MoE launched an Environmental Charter on the ‘World Environment Day’ in 2008 to promote voluntary action in environmental management. The charter includes a shared vision, five principles and seven habits to commit and practice for all citizens of Sri Lanka; this is directly related to the SPC efforts at all levels.

#### ***5.7.5.1 Shared vision of the Environmental Charter***

- 1. The ecosystem possesses a limited carrying capacity. It cannot absorb unlimited pollution and natural resources depletion arising from the unsustainable production and consumption of humankind.*
- 2. Unsustainable production and consumption leads to degradation of natural ecosystems and creates grave imbalances of the quality of life of all life forms including human beings.*
- 3. Ecosystems are inextricably interlinked and any adverse impact on one could lead to numerous chain reactions on the others.*
- 4. Sustainable systems are circular in nature self sustaining. Outputs become inputs.*
- 5. “Time” cannot be regained once lost and productive use of time with environmental care is essential. I added the ‘is essential.’ Maybe it is not in the original but something is missing as you now have it stated.*

#### ***5.7.5.2 Five principles of the Environmental Charter***

- 1. It is the duty of every person in Sri Lanka to protect nature and conserve its riches as stipulated in the Constitution.*
- 2. All national environmental policies, statutes and standards are minimal compliance requirements.*
- 3. It is necessary to resort to a lifestyle having minimal environmental footprint, which goes beyond mere compliance.*

4. *Each of us has an important role in addressing environmental degradation caused by unsustainable production and consumption.*
5. *Living in harmony with the environment with a simple lifestyle leads to a sustainable future.*

#### **5.7.5.3 Seven Habits of the Environmental Charter**

1. *Practice water conservation and efficient use in all water consuming activities.*
2. *Ensure optimal utilisation of land with minimum impacts to the environment.*
3. *Adopt energy conservation and efficient practices in all energy-consuming actions.*
4. *Promote and adopt environmentally responsible purchasing of goods and services.*
5. *Practice waste avoidance over recycling and recycling over the other forms of treatment and disposal practices.*
6. *Be a 'change agent' to promote environmental best practices and transfer such knowledge to future generations.*
7. *Live as citizens and corporate entities within a minimum permissible environmental footprint, and thereby, be an example to other countries in the world.*

This charter was posted on the official website of the Ministry of Home Affairs and Public Administrations in the same year (2008) for information of all the government institutions requesting them to adhere.

In addition to that, there were requests of hard copies from volunteers for dissemination to their groups. However, absence of effective dissemination and follow-up mechanisms with sound monitoring systems, covering the country prevents adequate monitoring of progress toward the expected outcome of these types of voluntary programmes. These types of tools are complementary and can be effectively used with integrated SPC practices in the country, especially via demand side management with attractive recognition schemes such as awards systems. The MoE started a “green jobs” awards scheme to recognise those who have made remarkable contributions in greening the economy in 2009 on the world environment day. This programme was continued in 2010 is scheduled to be a continuous process in the coming years.

### **5.7.6 Decentralisation and devolution of Environmental Activities**

The subject of environment is handled by different administrative divisions/levels in accordance with the legal provisions made by their acts, statutes and ordinances within the provisions of the constitution of Sri Lanka. There are three administrative systems that can be used to promote SPC throughout Sri Lanka.

These three systems are as follows:

1. The Civil Service Structure;
2. The Provincial Council Structure;
3. The Local Governmental Structure.

The civil service structure contains 25 districts under which 324 divisional secretariats are functioning. There are 9 provincial councils established under the 13th amendment to the constitution in 1987. Below the provincial level are elected Municipal Councils and Urban Councils, responsible for municipalities and cities respectively, and Pradeshiya Sabhas (village councils), again elected. This local government system has been in operation well before the provincial council system starting from the colonial era. At present there are: 18 Municipal Councils, 42 Urban Councils and 270 Pradeshiya Sabhas.<sup>30</sup> The Local Government Acts and Ordinances have powers related to environmental management within their area of jurisdiction.<sup>31</sup>

NEA contains provisions for devolution of its powers to other institutions/authorities. CEA has delegated authority to local authorities to issue EPLs for low polluting industries. CEA has also designated project approval agencies under the EIA system.

It is significant to note that out of 330 local authorities, 270 are village councils (Pradeshiya Sabhas). The large number of village councils reflects the rural nature of the country. The present governmental policy, to empower communities in rural areas, has to be made with care in keeping with the rural ambiance. SPC should therefore, be the key to such development.

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<sup>30</sup> Annex 2.

<sup>31</sup> A more detailed description of these administrative structure are presented in Annex 2.

### **5.7.7 Evolution of Coordination Mechanisms in Environmental Management**

Effective coordination and collaboration are essential for the successful implementation of SPC programmes in Sri Lanka. This section highlights some significant coordination mechanisms used in the past in Sri Lanka and provides information pertaining to the evolution of these mechanisms, based on work done by the author in developing the coordination mechanism for the proposed SPC model for Sri Lanka.

The MoE is charged with the responsibility of facilitating SD through the promotion of environmentally sound management. This mandate makes the MoE responsible for monitoring and reporting progress in implementing the NEAP. Evolution of the NEAP, since its beginning in 1990, involved a gradual transformation of its agenda from project-based activities to becoming more of a dynamic planning process focusing upon short, medium and long-term programmes. Coordination mechanisms were also reformed from time-to-time at successive NEAP cycles, based on the previous experiences.

Until the development of the third NEAP (NEAP3), interagency coordination was fulfilled through various coordinating committees based on the issue or the subject to be addressed. Separate national coordinating committees were formed to coordinate the activities related to implementation of international environmental conventions.

In 1998 all these coordinating committees were integrated to form nine inter-ministerial coordinating committees under the nine sectors identified in NEAP3 (1998-2001). This inter-ministerial coordinating mechanism was named the “Committee on Environmental Policy and Management (CEPOM)” mechanism. The main objective was to integrate environmental policy and management issues into the other development sectors. Accordingly, nine CEPOMs were established to cover the sectors recognised in the NEAP. The main functions of these CEPOMs were to co-ordinate and monitor the progress of implementation of the NEAP, in collaboration with the sectoral line ministries and other agencies. The new mechanism was used as a strategic approach to facilitate sharing the responsibility with other ministries and with line agencies in addressing environmental issues in Sri Lanka. The remarkable feature of this mechanism is that, the Chairpersonship of the CEPOMs was offered to the Secretaries of the Sectoral line Ministries, with the Secretary of the MoE appointed as the Co-Chair. This strategy improved the shared responsibility to implement the decisions made by these committees with improved collaboration of other sectors and thereby, it strengthened the effectiveness of the implementation of NEAP.



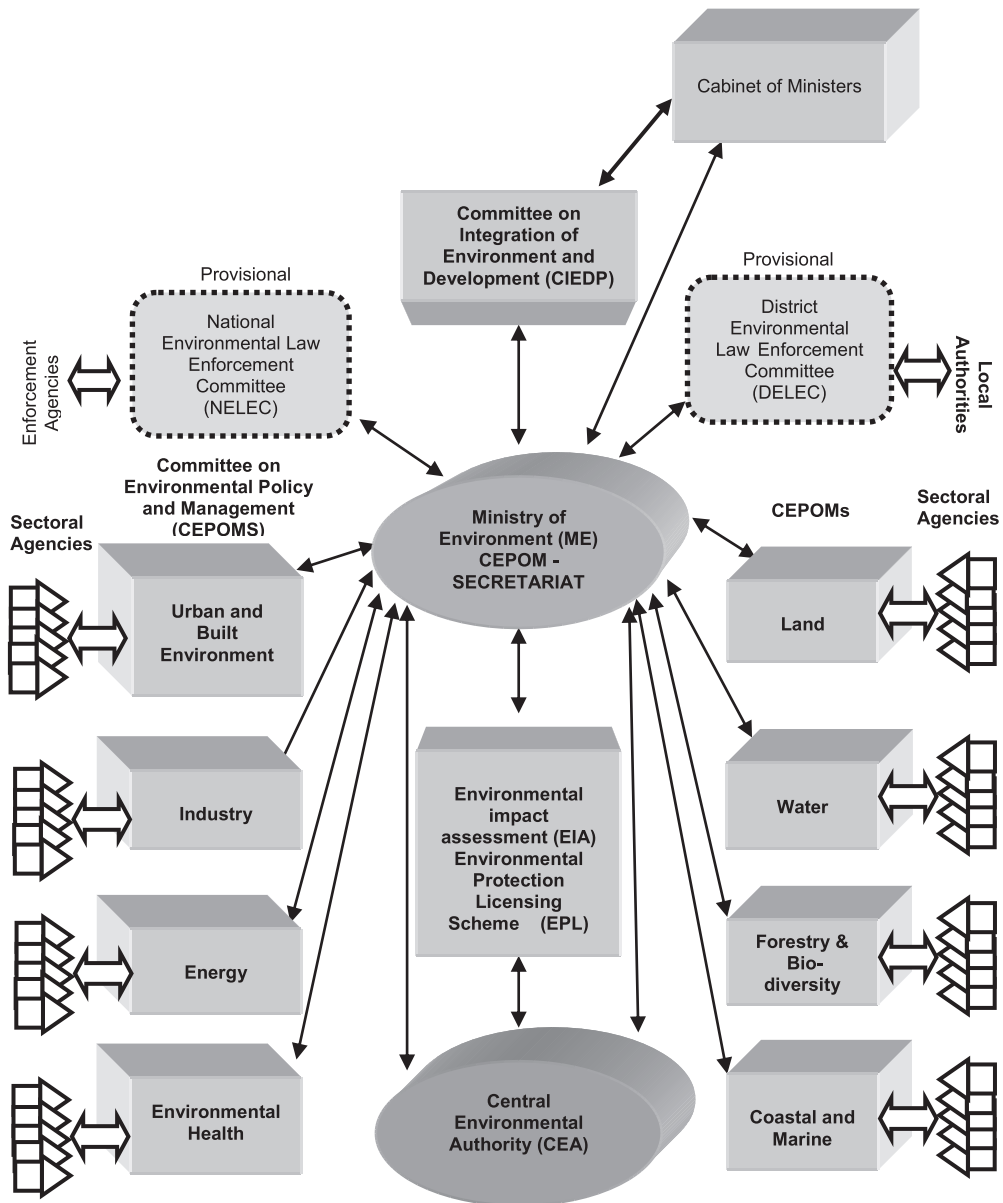
The CEPOM development mechanism was not a supply driven approach. The concept of the CEPOM model to share responsibility was conceived during the development of NEAP3. After completion of the NEAP3, its “industry sector committee” suggested that the same committees, which assisted the development of the sectoral action plans should be charged with the responsibility of monitoring the implementation too, thus sharing the responsibility of NEAP implementation with each sector. It was expected that this mechanism, in turn, would facilitate integration of environmental concerns into the development process with a better understanding of economic and social development scenarios.

An apex body was established above the CEPOM structure with the chairmanship of the Secretary of the Ministry of Finance with a view to integrate the sectoral policies, to facilitate development of national policies related to cross cutting issues and to facilitate mobilisation of financial resources for implementation of the entire NEAP. The Secretary of the Ministry of the Environment was the Co-chair. This committee was named “The Committee on Integration of Environment and Development Processes (CIEDP).” It was generally expected that CEPOMs would meet quarterly and that the CIEDP would meet bi-annually.

A part from the CEPOM mechanism, A National Environmental Law Enforcement Committee (NELEC) and District Environment Law Enforcement Committees (DELECs) were established under NEAP3 to facilitate law enforcement authorities in environmental management at district and local authority levels. The NELEC was chaired by the Secretary of the MoE and included national level enforcement institutions including the Department of Legal Draughtsman. DELECs were chaired by the District Secretaries. Although these committees did not have a legal mandate, committees functioned successfully with the financial assistance provided by the EAIP project. However, once the EAIP project was finished, the effectiveness of these committees were very limited to one or two districts. NELEC was also could not continue later due to lack of skilled manpower resources.

The lessons learned from this well-functioning system, at the initial stage, were that robust mechanisms with skilled manpower resources with adequate resources are necessary for continuation of this type of programme with sound monitoring and reporting mechanisms that are regularly utilised.

The Figure 5.2 presents the coordination mechanism of NEAP3 with CEPOMs.



**Figure 5.2: The Coordinating Mechanism of NEAP using Committees on Environment Policy and Management (CEPOMs)**

#### A Few Significant Achievements of the CEPOM Coordinating Mechanism:

- Establishment of the NCPC by the Ministry of Industrial Development was one achievement of the NEAP3 and of the CEPOM mechanism. An effort of the MoE to create a NCPC in the early 1990's, at the same time the first round of NCPCs were established, failed due to inadequate support of the Ministry of Industrial Development.
- Many initiatives were taken to address human health-related environmental issues by the Ministry of Health as the chair of CEPOM on Environmental health. Secretaries of the MoE and of the Ministry of Health had separate meetings on their own initiatives with other relevant agencies for securing final disposal facilities for municipal and clinical wastes as an outcome of the CEPOM decisions.

However, frequent governmental changes occurred<sup>32</sup>, the different priorities in their portfolios and more attention of short-term strategies of economic development posed many challenges for continuation of the CEPOM mechanism.

The CEPOM mechanism is effective under certain conditions. In fact, this mechanism was sighted as a 'best practice' in many regional environmental management forums as an effective tool to practice shared responsibility in environmental management. But due to the frequent government changes, it was not a continuous process yet in Sri Lanka. It is however, an effective system for catalysing collaboration of different stakeholders in SCP management. A mix of supply driven and demand driven strategies have to be developed to make this system more effective and sustainable.

#### 5.7.8 Evaluation of the effectiveness of the CEPOM mechanism

Analysis of the progress of NEAP/CFE1<sup>33</sup> identified the following three external forces that could lead to improved effectiveness of a mechanism like CEPOM:

- Leadership;
- Ownership of the activities included in CFE that are common to many sectors;
- Availability of predictable financial resources.

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<sup>32</sup> There were frequent governmental changes within a limited period of their establishment from November 2000 to October 2001, from January 2002 to February 2004 and from May 2004 to April 2008.

<sup>33</sup> After NEAP3, the name of the National Action Plan was changed to 'Caring for Environment' (CFE).

### **5.7.8.1 Leadership**

With regard to the leadership for the implementation of the sector-based activities of the NEAP, it was documented that assigning the responsibility for monitoring the progress of CFE to the different sectoral line ministries, improved the effectiveness of the implementation of many activities in the CFE. An illustrative example is the establishment of NCPC under the Ministry of Industrial Development. That was highly successful due to the specific responsibilities assigned to that ministry. A study done by the Institute of Policy Studies confirmed that there is incremental progress in CFE implementation through the CEPOM mechanism.

The system improved “Mutual Understanding” of the different stakeholders, which had different mandates in the development processes of Sri Lanka. In fact, one of the four minimum criteria proposed by the author in the theoretical model for effective collaborations of different stakeholders is “Mutual Understanding” of the stakeholders. However “Mutual Understanding” itself was not sufficient to ensure that progress is made with some actions due to lacunae within, between and among other factors such as lack of infrastructure facilities, technological and financial barriers, and inadequate supplies of skilled human resources.

### **5.7.8.2 Ownership**

The mandate for the implementation of many activities has been vested beyond the CEPOM framework (E.g. Solid Waste Management). Solid waste management is a function of various sectors such as industry and urban development, and more importantly it is a function of the local authorities by legislation. On the other hand there are national level enforcement authorities such as the Central Environmental Authority, which has been charged with the responsibility of environmental management of the country.

Such program-based activities could not be effectively coordinated or monitored by the CEPOM mechanism when the major stakeholders were outside of its framework. Based on these past experiences, the need to re-formulate the CEPOM mechanism with more planning responsibilities was considered by the Ministry of Environment at the later part of the 2nd NEAP cycle. However, based on the overall progress of internalisation of environmental concerns into the development process of Sri Lanka, a mix of project-based and program-based activities would be necessary to support the other line ministries to keep up the momentum of the process of internalisation. Based on the need for sectoral level collaboration project based activities can be linked to the CEPOM mechanism.

### **5.7.8.3 Availability of predictable financial resources**

Initially, during the first NEAP cycle (1998-2003), many project-based activities were supported by the Environmental Action 1 Project, which was the prime environmental capacity building program in environmental management. Decentralisation of environmental activities was supported by this project.

The EA1P project provided support for implementation of actions based upon major policy decisions in integration of environmental concerns into the sectoral development programs and provided support towards policy formulation. It also helped in establishing institutional mechanisms to ensure integrated environmental management. Once the project funding ended, almost all the line ministries and their respective departments reduced their interest in implementing environmental programmes. Although, related attempts were made during the subsequent NEAPs (CFE's), implementation to incorporate environmental programmes into the sectoral plans of the line ministries, due to inadequate financial resources and due to lower priority of such programmes among sectors, these programmes were no longer considered for implementation (Ref. Caring for the Environment II (2008-2012) CFEII).

The CEPOM mechanism will be a better mechanism for internalising of environmental concerns provided that adequate and predictable financial and human resources are available to support and to motivate stakeholders to become engaged in implementation of the collaborative decisions taken at the meetings. Enhancing the role of CEIDP and increasing its effectiveness and the capacity to adequately address the issues that cannot be resolved by the CEPOM mechanism, is or can be an important external force on the effectiveness of the CEPOM mechanism.

The report of “Sri Lanka Strategy for Sustainable Development (SLSSD)” prepared during 2005-2007 and published in 2009, suggested the CEPOM mechanism as one of the three models identified for the implementation of the strategy.

### **5.7.9 National Council for Sustainable Development**

In 2009, the Sri Lankan national government established a National Council of Sustainable Development (NCSD) under the leadership of the President as its chair. The NCSD is responsible for strengthening the national policy framework and for promoting environmentally friendly development to help ensure long-term sustainability of the country by promoting environmentally sound, green economic development. It was envisaged that to address the

complex and interlinked socio-economic issues prevailing in the country, the highest level of political leadership and guidance is necessary, thus it was placed directly under the leadership of the President.

Members of the NCS D consist of 23 Ministers of the major economic and social development sectors. The convener of NCS D is the MoE. Progress of implementation of the decisions of the NCS D is monitored by the Ministry of Plan Implementation which is responsible for monitoring the overall progress of all ministries.

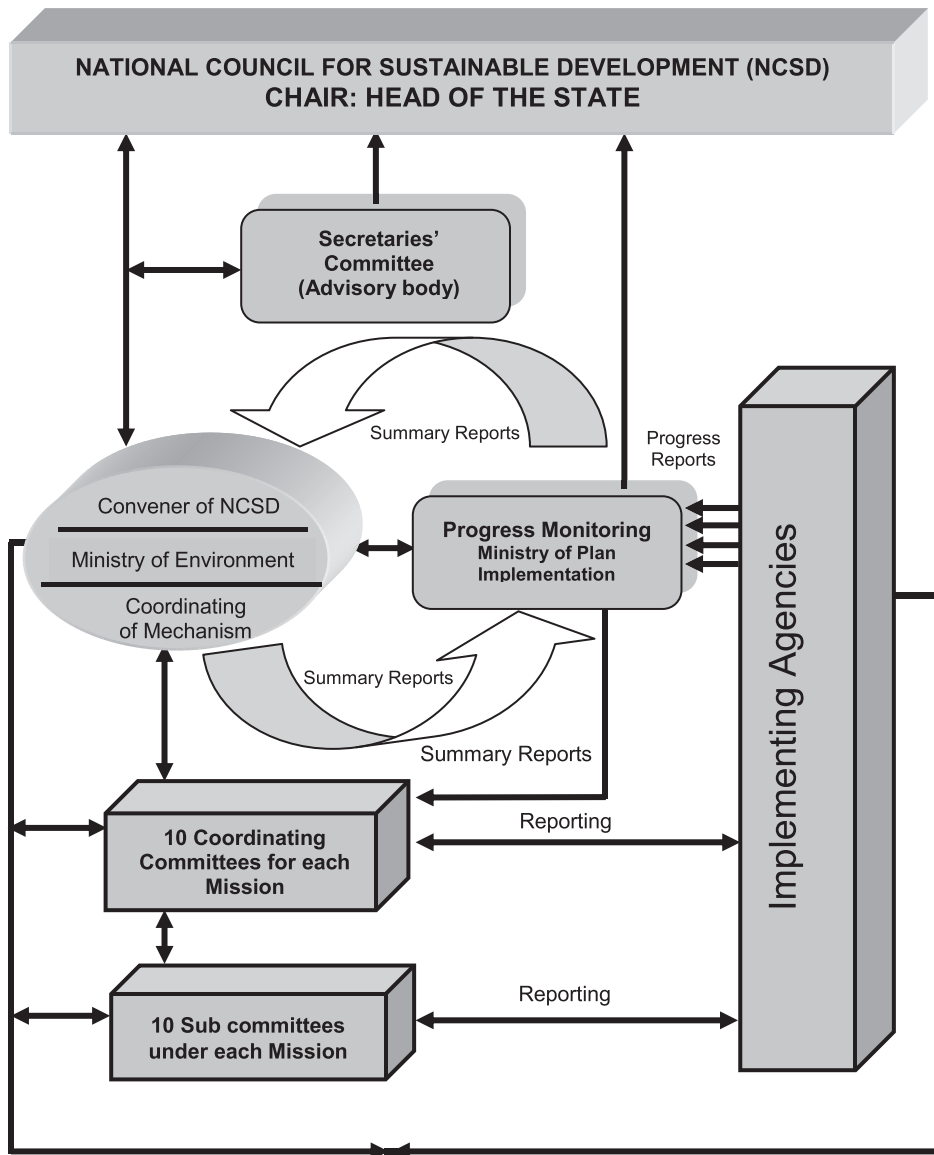
An action plan titled, ‘The Haratha (Green) Lanka Action Plan,’ (GLAP) was developed with the member ministries of the NCS D reorienting their activities to ensure sustainability of development programs with major emphasis on addressing energy and climate change issues and other environmental aspects.

The GLAP covers the following ten broad thrust areas:

1. *Clean Air – Everywhere;*
2. *Saving the **Fauna, Flora and Ecosystems;***
3. *Meeting the Challenges of **Climate Change;***
4. *Wise Use of the **Coastal Belt and the Sea Around;***
5. *Responsible Use of the **Land Resources;***
6. *Doing Away with the **Dumps;***
7. ***Water for All and Always;***
8. ***Green Cities for Health and Prosperity;***
9. *Greening the **Industries;***
10. ***Knowledge for Right Choices.***

Short-term, medium-term, and long-term targets spanning the period 2009-2016 and performance indicators are included in the each thrust area of the action plan. Comprehensive, achievable and measurable indicators were established for 82 strategies and 375 actions that were set up under the eleven broad thrust areas of GLAP. It is being implemented by the 23 member Ministries of NCS D, by thirteen non-member Ministries of NCS D and by 70 governmental and non-governmental institutions.

The Figure 5.3 presents the Coordinating Mechanism of the National Council for Sustainable Development.



**Figure 5.3: Coordination Mechanism of the National Council for Sustainable Development**

The coordination mechanism referred in Figure 5.3 was necessary to secure political support at highest level for implementation of the Haritha (Green) Lanka programme. The perception was, that the monitoring and implementation part of the Green Lanka programme should be the responsibility of appropriate line ministries, while overarching policy making and overall monitoring should be the prime responsibility of the NCSD because the leadership of the head of the state is secured in this system because the head of the state chairs the NCSD.

The Ministry of Environment has a main and leading role to play to adequately and prudently convince the head of the state and the other members of the council the need to ensure long-term sustainability of the economic and social development systems promoting effective consultations and deliberations at the sectoral coordinating committees of such needs. Keeping abreast with the international and local trends and conditions will be of paramount importance in this process. The proposed SPC was developed considering all these coordinating mechanisms to ensure effective integration of SPC concepts, at all levels, within Sri Lanka (see Chapter 8).



## **CHAPTER 6**

### **CASE STUDY ONE**

#### **Evaluation of the potential of the UNIDO/UNEP National Cleaner Production Centre (NCPC) network to promote CP/SPC globally and locally**

##### **6.1 Introduction**

Chapter 6 provides information related to Case Study One that was developed for this dissertation. Case Study One is one of the major component of this dissertation devoted initially to an evaluation of the potential of the UNIDO/UNEP National Cleaner Production Centre (NCPC) network to promote cleaner production (CP)/(SPC) globally and locally. As written in Chapter 3, in addition to the evaluation of the potential of UNIDO/UNEP NCPC Network, the scope of Case study one includes additional data and information gathered by using “participant-observation” methodology at three leading multiple international fora to enhance the findings of the evaluation of UNIDO/UNEP network by adding further global perspectives. Such consolidation of information from several events was necessary as a case study to identify gaps and to link global and local perspectives which are significant to develop strategies for the SPC model locally (fig.6.2). Multiple sources of data and information provided valuable insights of the global and local perspectives of application of SPC and linked the wider global perspectives to local perspectives, which are dependent on each other at different levels in the real life context. Theoretical perspectives of the sampling logic and the validity of such consolidation were presented in sections 1.4 and 3.2 in detail.

Section 6.1 provides an overall introduction to Chapter 6.

Section 6.2 presents the methodology of the Case Study. It includes the methodology of data collection and a conceptual framework of the analysis of the data considering three systems: “the internal management system of NCPCs”; “the local/national system surrounding the service delivery of NCPCs”; and “the international system surrounding the local system.” Performance of the outcome of the service delivery of NCPCs at three different levels (poor, moderate and satisfactory) were linked to the local capacity and the potential to promote SPC (local perspectives) and thereafter linked to international perspectives (figs.6.1 and 6.2) based on which the sources of data and information were used to help the author to develop strategic approaches to develop the SPC model for Sri Lanka considering the developing country perspective.

Section 6.3 presents an overview of the UNIDO/UNEP Cleaner Production Program.

Section 6.4 presents the analysis and results of the survey conducted by the author on the NCPCs. The analysis includes: a general overview of the survey, the analysis of the internal management systems of NCPCs related to their service delivery, the analysis of the local system surrounding the service delivery and the analysis of the international system surrounding the local and internal management subsystems.

In addition to the information gathered from this survey, personal observations of the 9th Annual Meeting of the UNIDO/UNEP NCPC/NCPP program (2008) and the information gathered from the literature survey on an Independent Evaluation of UNIDO on NCPC/NCPP programme (2009) were used as inputs for the analysis.

Section 6.5 further discusses the impacts of the international external forces on the service delivery of SPC based upon observations made by the author at three high level international fora where high level political leaders attended. Political decisions made at these fora were directly related to the issue of SPC and the challenges and opportunities for the promotion of SPC worldwide.

Section 6.6 reviews the responses to the structured interview of major local stakeholders of SPC who led the development of the SPC model for Sri Lanka presented in Chapter 8 together with the in-depth analysis of the data and findings in the previous sections.

## **6.2 Methodology**

### **6.2.1 Data collection and organization**

The Case Study One was initially designed to evaluate the general performance of the UNIDO/UNEP-NCPC network to promote CP in developing countries through local NCPCs in addition to evaluating the potential of the local NCPC to promote SPC effectively and to guide in the identification and development of the strategic approaches for the national sustainable SPC model for Sri Lanka (see sections 1.4 and 3.2).

It includes the results of a survey that was comprised of data gathering by the following four methods:

1. A literature review on the background and on an overview of National Cleaner Production Programmes in the world;

2. A survey-questionnaire sent to the leaders of the NCPCs in the UNIDO/UNEP CP network;
3. A literature review of a report published in 2008, based upon an independent evaluation conducted by UNIDO on the UNIDO-UNEP Cleaner Production Programme; and
4. A structured interview of some of some leading stakeholders (section 6.6) related to cleaner production work in Sri Lanka.

Case Study One was based upon the survey method as the major component as one of the two nested arrangements specified by Yin (2009) under the category of mixing case studies with other methods. The literature review was used to strengthen and deepen the data and to strengthen the evaluation of the survey results.

In this case study, in addition to the original plan of using the above four methods of data collection, the author used the “participant-observation” methodology and collected data at the following international fora:

- The 9th Annual Meeting of the UNIDO/UNEP Cleaner Production Programme jointly organised by UNIDO and UNEP in 24-26 September 2007 held in Semmering, Austria;
- The 25th Session of the UNEP Governing Council/Global Environmental Ministers Forum held in Nairobi, Kenya from 16-20, February, 2009 (UNEP-GC/GEM Forum);
- The 17th Session of the Commission of Sustainable Development (CSD) held in New York, May 4-15, 2009;
- The 15th Conference of the Framework Convention on Climate Change (UNFCCC) and 6th Meeting of the Kyoto Protocol, famously known as (COP15), held from 7-18, December 2009 in Copenhagen, Denmark.

The proposed SPC model in this dissertation must be designed considering the international environmental governance structure and its capacity to effectively address wide-ranging and emerging environmental threats in the globalising world. In light of the multiple global crises that we are experiencing, such as: water, energy, food insecurity, the financial crises of 2008/09 and the increased recognition of the realities of the climate change and its overarching impacts on environment and socio-economic systems, it is important to consider the international perspectives and the trends, barriers, and shortcomings as well as the opportunities for the promotion of SPC policies and strategies internationally. In this context, gaining insights into the ability of the global community to sufficiently address the global environmental challenges by collaborative decision-making is extremely important.

The information gathered at the previously highlighted international fora was used as an additional intervention to evaluate the real world context of the problem domain. Yin (2009) specified the importance of considering additional sources of information, when feasible. The data gathered from these multiple sources were tremendously useful to validate and to fill the gaps of the information received from the other sources of information, thereby, strengthening the foundation upon which the author built the recommendations for the SPC model for Sri Lanka.

The observations and written comments of the UNIDO/UNEP NCPC community gathered at the 9th Annual Meeting of UNIDO-UNEP NCPC programme were considered by the author as valuable inputs, especially, in the areas of internal management of the NCPCs and the roles of the UNIDO/UNEP international and regional CP networks to facilitate local NCPCs to improve their outputs and outcomes of their service delivery.

A report published in 2008 by UNIDO on an independent evaluation of the UNIDO-UNEP Cleaner Production Programme, prepared between April to December 2007, was used as an input in the evaluation of the service delivery of NCPCs. Interim results of this survey was presented by the evaluator of the survey at the 9<sup>th</sup> Annual Meeting of UNIDO-UNEP NCPC program for review before finalising the report<sup>34</sup> ([www.unido.org](http://www.unido.org)).

## 6.2.2 An Overview of the Framework of the Analyses

The data gathered from the multiple sources were analysed within the context of the two research propositions of this dissertation.

In the case study research, the unit of analysis is considered to be a critical factor. It is a system of action rather than individual or groups of individuals. Case studies tend to be selective, focusing on one or two issues that are fundamental to understanding the system being examined (Winston T (1997). In Case Study One, “Service delivery of NCPCs” was considered to be an embedded unit of analysis considering the two research propositions (section 3.2.3) taken together. Both propositions are important, as the SPC model has to develop taking into consideration of the internal and external forces and their positive and

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<sup>34</sup> The findings of the evaluation have been considered to: analyse the diversity in programme implementation at the national levels (‘portfolio analysis’); assess the Program against the evaluation criteria; and provide overall conclusions and recommendations. The evaluation criteria include: relevance, effectiveness, efficiency and sustainability (four primary criteria) and capacity development and ownership (secondary criteria) respectively (Ref .Report of the independent evaluation conducted by UNIDO on the UNIDO-UNEP Cleaner Production Programme (2008) ([www.unido.org](http://www.unido.org)))

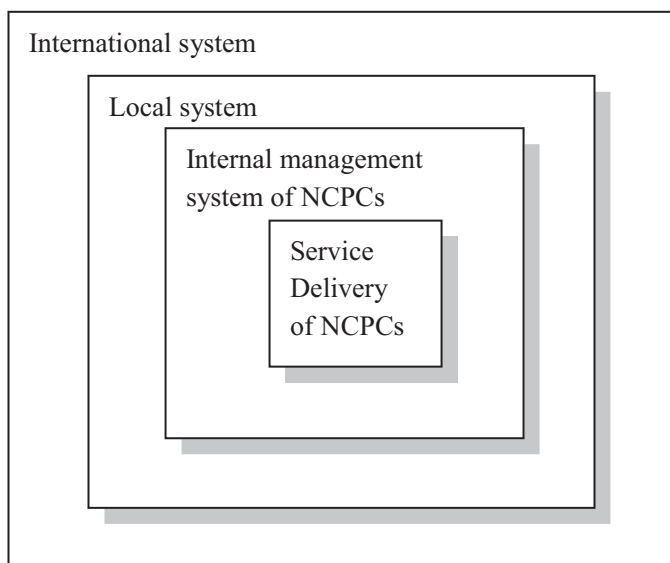
negative impacts. The other embedded unit of analysis was the performance of the local system to promote application of SPC locally. In this dissertation type 2 case design was used (Yin 2009) which allows multiple units of analysis in a single case study (section 3.2). Both were important to develop strategies for a SPC model for Sri Lanka. The performance of the service delivery of NCPCs was considered at three levels namely: ‘poor’, ‘moderate’ and ‘satisfactory’ which linked to the performance of the service delivery of local/national and to the international systems to facilitate wider coverage of the scope of this dissertation via its two propositions identified as a case study. Multiple sources of information in Case study one covered the stakeholders identified in Figs. 3.1 and 3.2 representing their countries/organisations.

**Proposition 1:** In the light of globalisation and related market mechanisms, no single country would be able to address the global environmental challenges and related national impacts in isolation.

**Proposition 2:** Even though the concepts of cleaner production (CP) and SPC have been promoted around the world since 1992, implementation is far short of expectations and needs.

A system surrounding the service delivery of NCPCs was conceptually developed using the baseline information received from the 14 responses to the questionnaire sent by the author to the leaders of the NCPC’s and from the literature review. Taking the “Service delivery of the NCPC” as the core, both outputs and outcomes of the service delivery were linked to the following sub systems (Figure 6.1):

- a) Internal management system of the NCPCs;
- b) National/Local system surrounding the service delivery of the NCPCs;
- c) The International system surrounding the local system



**Figure 6.1: Diagram of the system boundaries of the international, local and internal management systems of the service delivery of the NCPCs**

In a globalising world, none of these systems can function in isolation. Therefore, the data gathered from all the sources were analysed and presented in section 6.4 under these three systems separately as appropriate to identify linkages and impacts with each other in a globalising economic development system.

The concept of single-loop, double-loop and triple-loop learning was used to understand the dynamics of these three systems, which operate in the context of the service delivery of NCPCs.

Single-loop (incremental) learning refers to learning new skills and capabilities through incremental improvement, doing something better without examining or challenging underlying beliefs and assumptions. The service delivery of NCPCs was connected to the internal management of NCPCs by a single loop.

Double-loop (reframing) learning occurs by fundamentally reshaping the underlying patterns of our thinking and behaviour so we are capable of doing different things by going beyond single-loop or incremental thinking. The local/national system surrounding the internal management system of NCPCs was connected to the service delivery of NCPCs by a double loop. The idea was to consider the role of the national/local system (national system dynamics)

to facilitate NCPCs and other related institutions to provide a satisfactory service delivery on SPC through national policies etc. (see fig.6.2), because an effective internal management system of NCPCs alone is not sufficient to provide a satisfactory service delivery even though it is a necessary condition. .

Triple-loop (Transformational) learning involves moving beyond double-loop learning toward deep analysis of the overarching rules that govern the change. The international system surrounding the local system was connected to the service delivery of NCPCs by a triple-loop (Figure 6.2). The idea was to consider the role of the international community (international system dynamics) and their capacity/potential to facilitate national/local systems, governments and institutional mechanisms such as NCPCs to promote and provide a satisfactory service delivery on SPC through international policies, financial and technical assistance etc. (see fig.6.2).

The main governing variables operating in the three subsystems were identified and linked to the output and to the outcome of the service delivery of NCPCs in order to evaluate the strengths and weaknesses of the system.

The status of the outputs of the service delivery was divided into two major components namely: “Satisfactory” and “Not Satisfactory”. When the status of the output was “Not Satisfactory,” it was linked to the internal management of the NCPCs via the single feedback loop assuming that the output of the service delivery depends on the internal management system of NCPC. When the output of the service delivery was “Satisfactory,” the status of the outcome of the service delivery was considered. The status of the outcome of the service delivery was divided into three major components namely: “Satisfactory”, “Moderate” and “Poor.”

The status of the outcome was linked to both the “local/national” and “international” systems, as the outcome of the service delivery greatly depends on the national systems such as national policies, strategies and priorities as well as positive and negative pressures of the international systems. When the output of the service delivery was satisfactory and the outcome was poor it was linked to the local system via the double feedback loop and when the output of the service delivery was satisfactory and the outcome was moderate, the outcome was linked to the international system via the triple feedback loop (Figure. 6.2).

The assumption was that when the output of the service delivery of the NCPC was satisfactory, at least a moderate outcome could be achieved if the national/local system is

working to promote SPC. Also, it was observed that the outcome of the service delivery could be satisfactory if the international governing system was supportive for SPC, worldwide. This is one of the major challenges that all the countries are facing today, in general, and particularly, in developing countries. This issue is analysed further in sections 6.2.5, 6.4 and 6.5.

The governing variables of all three subsystems are interconnected at different levels. The outcomes of the service delivery of NCPC depend on the dynamic behaviour of these variables at different levels and conditions. Therefore, the rules of these systems, especially at the local and the internal management of NCPCs, have to be designed and redesigned to promote positive feedback loops, which are self-correcting and self-reinforcing.

### **6.2.3 The Governing Variables of the Internal Management System of NCPCs**

The six governing variables were identified namely: Adequacy of the Staff; Type and capacity of the host institution; Vision, mission, goals and objectives; Organisational structure; Geographic distribution; and financial mechanism of the NCPC. These six variables are connected to the output of the service delivery.

### **6.2.4 Governing Variables of the Local/National System Surrounding the Service Delivery of the NCPCs.**

Five governing variables were considered in the Local/National system namely: Government Policy, Financial capacity, Technical capacity, Public institutions and Private institutions.

While the main governing variables in the local system have a direct impact on the service delivery of the NCPC, the feedback loops of each governing variable are linked with the governing variables of the internal management system of NCPC. Changes of these variables create positive or negative feedback loops that can be/should be fine-tuned to help to achieve satisfactory results.

### **6.2.5 Governing Variables of the International System Surrounding the Local System**

In light of globalisation, no single country can function in isolation. The international operating system creates a heavy impact on the local operating systems through trade oriented market systems as well as through other international economic and environmental policies and thereby, they have impacts upon the outcome of the service delivery of the NCPCs.



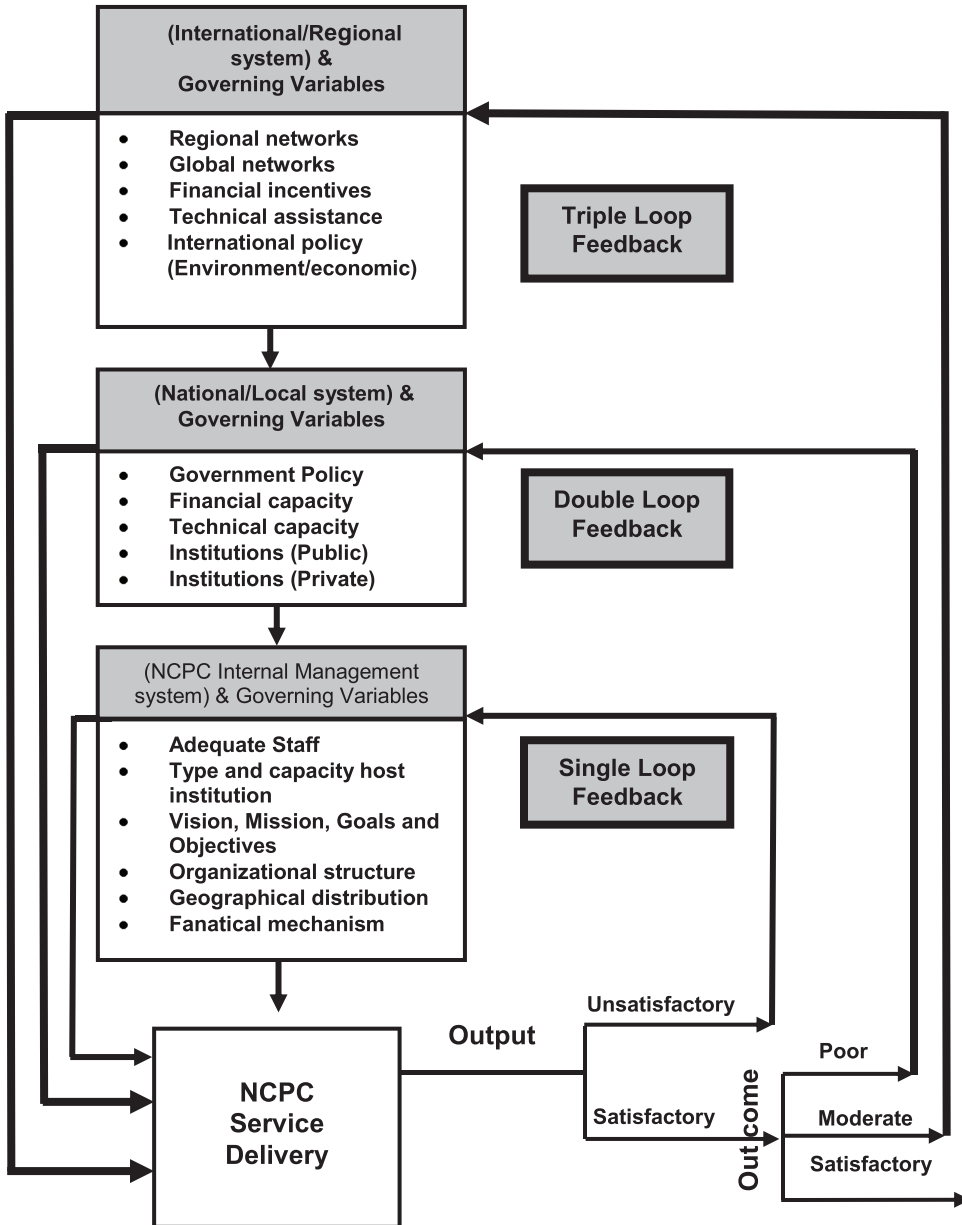
Five governing variables were identified in this system: Regional networks, Global networks, Financial incentives, Technical assistance, and International Policy (Environmental and economic).

Figure 6.2 presents the linkages of the performance of the service delivery of NCPCs to the governing variables of the three subsystems (internal management of NCPCs, Local/National system and International/regional system) considered in the main system.

Detailed analyses of the linkages of the governing variables are presented in section 6.4 based on the data gathered. The strength and effectiveness of the feedback loops and their influence to the service delivery of NCPCs are discussed in detail in the same section. Section 6.5 further addresses, significant international, external forces on the service delivery of NCPCs.

The integrated system presented in 6.2 was modified based on the findings and the observations and comments received from the structured interviews of carefully selected, major stakeholders. Interviews with these key local stakeholders were used to evaluate the potential for promoting positive feedback loops to maximise the output and outcome of the service delivery of the NCPCs (see section 6.6).

The observations and findings of these analyses along with the personal experiences of the author were used to develop the SCP model for Sri Lanka.



**Figure 6.2:** Three Systems with their governing variables connected to the performance of the ‘Service Delivery’ of the NCPCs through feedback loops

### **6.3 The UNIDO/UNEP Cleaner Production Programme – An Overview**

In response to the environmental disasters, which occurred in many industrialised countries and the public concerns over the environmental and health impacts of industrialisation without environmental safeguards, attempts were made by most industrialised countries during the later half of the 1980s to focus on preventive environmental strategies instead of solely upon pollution control methods. Even though these initiatives were taken by various countries at the local level, they did not sufficiently address the problems related to unsustainable production and consumption in a sustainable manner, these programs did create a tremendous impetus for UNIDO and UNEP to partner in establishing the international networks of the National Cleaner Production Centres (NCPCs) and of the National Cleaner Production Programs (NCPPs)

These networks were initiated in the early 1990s as one of the strategies to promote ecologically sound industrial development in developing countries and in countries with economies in transition. One of the roles of the NCPCs NS NCPPs is to promote implementation of the Cleaner Production Strategy in enterprises and in government policies in harmony with local conditions, in order to develop local capacity to create and meet cleaner production demands throughout the country ([www.unido.org](http://www.unido.org)).

UNIDO bears primary responsibility for promoting sustainable industrial development throughout the developing world, in cooperation with its 171 Member States and is also active within 35 developing countries. UNEP's division of Technology, Industry and Economics and UNIDO jointly manage the NCPC program. UNEP is responsible for developing and disseminating conceptual, strategic and policy guidance and educational materials on CP while UNIDO functions as the executive agency for the program, managing donor funding and providing technical expertise. Leela, provide the complete web addresses for both of them as a footnote.(UNIDO/UNEP - website).

UNEP's CP activities were begun in response to UNEP's Governing Council Decision in 1989. UNIDO was set up in 1966 and became a specialised agency of the United Nations in 1985.

By 2008, NCPC centres or programs were functioning in the following 35 countries: Armenia (2005-NCPP), Brazil (1995), Cambodia (2004), China (1994), Costa Rica (1998), Croatia (1997), Cuba (2001: A network with 5 Focal Points ), Czech Republic (1994), Egypt (2004), Ethiopia (2001-2000), El Salvador (1998), Guatemala (1999), Hungary (1997), India (1995), Kenya (2000), Lao (2004), Lebanon (2002), Macedonia (1999), Mexico (1995),

Morocco (2000), Mozambique (2001?), Nicaragua (1997), Republic of Korea (2001), Russian Federation (2001), Slovak republic (1995), South Africa (2002), Sri Lanka (2002), Tanzania (1995), Tunisia (1996), Uganda (2001) , Uzbekistan (2005), Vietnam (1998), Zimbabwe (1995), Ukraine (2001), Kazakhstan (2002).

These Centres were established by UNIDO and UNEP in several phases.

The Table 6.1 presents details of the different phases of establishment of NCPCs in the UNIDO/UNEP NCPC network (Baas (2005)).

**Table 6.1: NCPCs/NCPPs in UNIDO-UNEP Network**

<b>1<sup>st</sup> Phase starting in 1994</b>	<b>2<sup>nd</sup> Phase starting from 1998</b>	<b>3<sup>rd</sup> Phase in 2002</b>
<p><i>Brazil, China, the Czech Republic, Hungary, India, Mexico, the Slovak Republic, Tanzania, Tunisia, and Zimbabwe</i></p> <p>(10) Centres</p>	<p><i>Costa Rica, <u>Ecuador</u>, El Salvador, Guatemala, Honduras, Morocco, Nicaragua, Russia, and Vietnam in 1999.</i></p> <p><i>Croatia, Ethiopia, Kenya and Mozambique started in 2000</i></p> <p><i>Cuba, Republic of Korea and <u>Panama</u> joined in 2001</i></p> <p>(16) Centres</p> <p><i>Macedonia (1999), Ukraine (2001)</i></p>	<p><i>Lebanon, the Republic of South Africa, Sri Lanka, Uganda, Uzbekistan and <u>Zambia</u>.</i></p> <p>(6) Centres</p> <p><i>Egypt (2005), Cambodia (2004), Lao (2004), Kazakhstan(2002),</i></p>

Source: Baas (2005)

## **6.4 The Survey of UNIDO/UNEP Network of NCPCs**

### **6.4.1 General overview of the survey**

A survey was conducted to evaluate the resource mobilisation capacity of NCPCs to promote CP locally and internationally and to enhance SD in their countries.

A questionnaire was developed to obtain information from members of the NCPCs on the following areas:

- a) General information pertaining to the objectives and strengths of the NCPCs;
- b) Geographical distribution of CP networks and linkages of the NCPCs;
- c) Contributions of the NCPCs to meet the national goals of their countries;
- d) Governmental policies and opportunities for NCPCs to assist in incorporation of CP activities in to the government policies;
- e) Implementation of UNIDO's strategies;
- f) Sources of financing of NCPCs and the ways and means for ongoing self-support and their sustainability.

It was expected that the vast practical experiences developed by the members of the NCPCs in promoting and implementing CP and CP related activities in their countries with their existing resource mobilisation capacities, would help the author to gain insights into the capacities of the NCPCs in meeting the challenges of CP dissemination and promotion activities.

The questionnaire was sent via email to the leaders of the thirty-five NCPCs of the UNIDO/UNEP network. At the beginning of the survey, an independent request was made by a faculty member of Erasmus University to all the NCPCs, inviting their responses. This invitation was resubmitted during the survey period to non-respondents of the first invitation.

Although nineteen Centres committed to provide information requested in the questionnaire, only fourteen provided completed responses. These Centres provided valuable information pertaining to their system of operation by reflecting upon their strengths, opportunities and challenges. The Centres that responded included: China, Czech Republic, El Salvador, India, Lebanon, Macedonia, Morocco, Mozambique, Nicaragua, South Africa, Sri Lanka, Tunisia, Ukraine and Vietnam.

In addition, Cuba and the Russian Federation provided information during ‘face-to-face’ interviews at the 9th UNIDO/UNEP annual meeting held in Austria in 2007. Several leaders of NCPCs, even though they expressed their willingness to provide information, were not able to do so. Interim communication with these NCPC leaders provided valuable information and insights on NCPC’s challenges due to limited resources and time constraints.

#### **6.4.2 Analysis of the Internal Management System of NCPCs**

The responses of NCPCs were analysed based on the following criteria:

- a) Financial resource mobilisation;
- b) Organisational profile (Host institution, vision, mission, goals and objectives, staff and the organisational structure), geographical location and coverage of services, linkages and institutions mechanism, and financial stability;
- c) Linkages with government (Linkages with governmental institutions, ability to influence national policy development, ability of empowering government officials with required knowledge and skills to promote SPC and ability to assist in the implementation of ‘Multilateral Environmental Agreements’);
- d) Social sector development (ability/potential to empower community with required knowledge and skills to promote SPC);
- e) Linkages with business the community (ability/potential to influence business community in application of SPC and the capacity to provide assistance to help business community);
- f) Networking (ability to maintain networks with other NCPCs and to exchange expertise and knowledge).

The responses from the 14 Centres were used as the baseline information and the other sources were used to verify or to qualify the findings.

In general the NCPCs offer six basic services:

- a) Awareness raising about the benefits and advantages of CP;
- b) Training of local experts and building local capacity for CP;
- c) Offering individual enterprises technical assistance in CP;
- d) Assisting in preparing project proposals for CP investments;
- e) Disseminating technical assistance;
- f) Providing policy advice to national and local governments.

It was found that the internal management system of the NCPCs varied widely based on their capacity to mobilise adequate resources in a sustainable manner for wide dissemination of CP activities. Performance of each variable has a significant inter-connected impact on all the other elements of their service delivery.

### **6.4.2.1 The Financial Resource Mobilisation Mechanisms**

This section includes the analysis of data and information on financial resource mobilisation mechanisms gathered by three sources:<sup>35</sup> Based on the responses received from the NCPCs seven different financial models were developed and presented in the table 6.2 to provide insights of the structure of the financial mechanisms of these centres of which models 1, 2, 3 and 7 reflects the financial mechanisms used by the NCPCs. As the expected end results should be to make all the NCPCs to be able of self-financing, conceptual models were developed and included (models 4, 5 and 6) to bridge the gaps and reflect different stages that can be followed gradually until self-reliance is achieved.

#### **(A) Analysis of the information received from the survey of the NCPCs**

The NCPCs were initially supported by UNIDO through various donor countries such as the Netherlands, Norway, Switzerland, Austria, and Italy. However after the initial support, the funding mechanisms were not clearly mentioned in the responses sent by the NCPCs. This may be due to the absence of predictable sources of funding that can be documented and reported. Continuous funding from donor countries is rare.

Until NCPCs reach maturity and financial independence, it is necessary to provide sufficient financial resources to CP dissemination activities. A NCPC reaches its financial maturity once it has sustainable and predictable financial resources to meet its objectives and provide expected services. In order to be financially mature, the organisational structure of the NCPCs can basically be divided into two components/divisions. One division can handle CP dissemination, awareness raising and capacity building activities on a “not for profit” basis, and the other division can provide technical services to the industries and the service sector on a commercial basis and should operate financially independently from the other division. Based on the local conditions, NCPCs can move forward aiming at reaching financial maturity following various stages. Table 6.2 shows these stages in the form of models to better understand the levels at which different NCPCs are performing.

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<sup>35</sup> Survey of NCPCs, Observations made at the 9th Annual Meeting of the UNIDO/UNEP national CP programme, and Observations made of the Independent Evaluation of UNIDO on the CP programme (section 6.2.1).

**Table 6.2: Financial Mechanisms/Models of NCPCs**

Evolution of NCPC performance*	External funding (Donor/UNIDO-UNEP/ Government)		Self finance through service delivery		Remarks
Model 1	1. General Administration				Two Centres out of 14 that responded have discontinued their activities after their initial funding was used since there was no financial support for continuation. (These were the Centres in Tunisia and Macedonia) Out of these, Tunisia Centre is planning to restart with UNIDO assistance and the other Centre is waiting for financial support.  One Centre still operates with 100% external (donor) funding since their establishment and they expect donor assistance to continue. (Sri Lanka)
	2. Program Activities				
	General Awareness	Specialised CP services			
Model 2	1. General Administration				Three Centres are operating in this category.  El Salvador, Vietnam, Lebanon,
	2. Program Activities		2. Program Activities		
	General Awareness	Specialised CP services	Specialised CP services		
Model 3	1. General Administration				This model was developed conceptually as a way forward to reduce the dependency on external funding gradually.
	2. Program Activities		2. Program Activities		
	General Awareness		General Awareness	Specialised CP services	
Model 4	1. General Administration		2. Program Activities		Another step for improvements
			General Awareness	Specialised CP services	
Model 5	1. General Administration		1. General Administration		Model with further improvements.
			2. Program Activities		
			General Awareness	Specialised CP services	
Model 6			1. General Administration		One Centre is operating in this category.
			2. Program Activities		
	Special projects		General Awareness	Specialised CP services	Ukraine



Evolution of NCPC performance*	External funding (Donor/UNIDO-UNEP/ Government)	Self finance through service delivery		Remarks
Model 7		1.General Administration		Two Centres operate with 100% government funding
		2. Program Activities		
		General Awareness		(One Centre was started with private sector (NCCP) and later the NCPC was taken over by the government)  (Czech Republic, South Africa)
		1.General Administration		
				One CP Centre operates with self financing
		2. Program Activities		(China)
		General Awareness	General Awareness	

Note: The financial mechanisms of Morocco, Mozambique, Nicaragua, and India were not clearly mentioned.

The financial model one basically represents the first stage/cycle of NCPC establishment and operation. Most NCPCs have entered into other financial mechanisms/models gradually since their establishment as specified in Table 6.2. It is seen that most of the NCPCs have been able to secure bilateral and multilateral donor assistance for specific projects and programs and thereby, they were able to continue activities while depending on continuous external funding for general administration such as staff salaries etc., at different proportions by diverse donor governments. With maturity<sup>36</sup>, few NCPCs have been able to generate sufficient funds to become self-sufficient through user fee charges for their services as expected by the UNIDO/UNEP program plans. At the same time, several NCPCs have been able to continue with 100% government funding from their own nation; this shows the interest of their government in the NCPC's CP activities.

**(B) Observations Made at the 9th Annual Meeting of UNIDO/UNEP NCPC Network on financial resource mobilisation**

The existing pattern of financial support by UNIDO/UNEP is limited to cover only the initial years/stage after establishment of NCPCs. At the 9th Annual Meeting of UNIDO/UNEP NCPC Network, a new proposal was made by the directors of NCPCs to change this system to

<sup>36</sup> Maturity means acquiring competency to build the confidence of the client.

suit different situations of the countries where NCPC are located in order to ensure sufficient funds are available for continuation of NCPC activities until they reach self financing.

### **The proposal:**

Supporting two years initially and then apply “a progressive phasing out of financial assistance (over eight years) during which time NCPCs would be able to build their capacity for self financing while keeping the UNIDO/UNEP brand”. It was expected that this mechanism also would help UNIDO/UNEP for keeping a “control”/tighter link with the NCPCs over a longer period and to follow up and monitor the CP In plant assessments to which funding was provided and facilitate that Centres are always at the leading edge of CP now-how and technology. The conceptual financing models presented in table 6.2 facilitate accommodation of this proposal.

### **(C) Observations of the Independent Evaluation of UNIDO on financial resource mobilisation**

The report of the Independent Evaluation of the UNIDO/UNEP Cleaner production Programme (2008) revealed that there are NCPCs that have not received any funding through the UNIDO-UNEP program but were, to some degree, connected to it either through original support in the design of a NCPC support project that then led to funding by a different source or through the bilateral funding through the SECO (Swiss State Secretariat for Economic Affairs), Program on Sustainable Enterprise Development Centres, which maintained close cooperation with the UNIDO-UNEP CP program. It was reported that some NCPCs have been established and are operated without any external funding (Brazil, Republic of Korea) whereas; almost all the other centres have been dependent on external funding, at least for the initial stage. Some centres have been able to become self-supportive after the initial financial support. Table 6.2 shows the financial mechanisms/models of the NCPCs.

The independent evaluation proposes the following dual funding model for both UNIDO/UNEP NCPC Programme and for NCPCs at national levels:

- (i) Country-based block funding to support NCPCs in their establishment phase;
- (ii) Programme funding for Competitive grants to multiple eligible NCPCs and possibly for other qualified CP service providers for:

- (a) Project based specialisation and/or diversification; and
- (b) Networking initiatives.

#### **(D) Comments and conclusions**

Most of the NCPCs failed to provide information on resource mobilisation strategies. That may be due to non-availability of predictable sources of funding. This situation creates negative impacts on building confidence for the continuous services of NCPCs and thereby on the sustainability of the Centres.

It is obvious that a single model will not fit all NCPCs.

Depending upon the country's capacity for CP investment, there are instances where continuous financial assistance is necessary to keep the momentum of CP promotional activities, especially, when there is a demand for CP in the country. However, it is important to note that total dependency on continuous external funding shows the vulnerability involved in the sustainability of NCPCs. There are CP Centres operating without any external funding in some OECD countries and countries in 'economies in transition.'

The ability to raise funds through user fees mainly depends on the following factors: on the national policy, the political will for CP investment, socio-economic conditions of the country, the level of industrial development, the degree of enforcement of environmental regulations, and the capacity of the NCPCs to promote CP activities and to transfer technology by taking responsibility for achieving the expected outcomes together with the client.

The model proposed by the independent evaluator of NCPCs performance (section 6.4.2.1.C) would be useful to be considered without conditions proposed therein for NCPCs to compete with each other to secure funding, as competition among NCPCs at this stage would prevent collaboration of NCPCs with each other. Performance of NCPCs would be a more appropriate deciding factor for funding and all the NCPCs should have equitable access for funding based on their performance in response to CP services demand.

The scope of the NCPC's service delivery should be decided, based on the availability of financial and skilled human resources. NCPCs may gradually expand their services/activities based on the demand and resource mobilisation capacity. A more appropriate approach may be for them to network & partner with CP-related institutions to provide a wider range of services for more of their potential clients throughout their country.

The need for more focused, effective and predictable funding mechanisms coupled with the availability of other infrastructure support such as national policies that promote CP, and skilled human resources to help to transfer SPC strategies into meaningful action can be essential internal and external forces that can help the NCPCs to more effectively work to fulfil their responsibilities.

The organisational structure, financial support and governmental policies should be integrated to help to ensure that each NCPC can effectively fulfil its functions based on the individual country situation in order to ensure wider participation of stakeholders in CP activities. This will certainly help them to be able to provide a supply of services with more confidence. A mix of supply and demand driven approaches would be necessary from both from the client side and the NCPC side to ensure continuous improvements of CP promotional activities.

#### **6.4.2.2 Host institutions**

This section deals with the information on host institutions obtained from the survey of the NCPCs.

According to the information received from the survey, the institutional mechanisms of NCPCs can be grouped under the following categories:

- Established as a governmental institution either in the, Ministry of Trade and Commerce, Ministry of Environment with full funding by the home country government, after the initial external financial support phase;
- Established in the Ministry of Industries with full or partial external funding;
- Established in a Governmental Research Academy as an independent body with 100% self financing;
- Established as a Private Sector organisation that is totally self-financing.

Out of the fourteen Centres, which responded, five were hosted by their own national government (China, Czech Republic, India, Nicaragua, South Africa, Vietnam), three by the private sector (Morocco, Mozambique and Sri Lanka), and one by an industry organisation (Lebanon). Two Centres do not have host institutions (Ukraine and Macedonia). The Macedonian NCPC was established with a government host institution under a special fund

(Eco-Fund). However when the Eco-Fund was cancelled in 2005, thereafter the Centre did not have a specific host institution to provide support, therefore it was closed. In El Salvador the NCPC is functioning as a Foundation, which has an independent administrative system. Even though the NCPC of Tunisia was established in 1996, the program has not been able to continue due to absence of funding. A new project proposal was developed later to re-establish the Tunisian NCPC (See Table 6.2).

The host institution model has its advantages, especially in resource mobilisation (China, India, Czech Republic, Nicaragua, South Africa, Vietnam). Generally the host institution provides office space, utilities, and sometimes staff to the NCPC on secondment. However this approach is not present in all countries; resource sharing mostly depends on the capacity and the priorities of the host institutions as well as changing the priorities of the individual countries. There are special advantages when the host institution is governmental especially, in supporting and fostering promotional activities, until the NCPCs reach maturity (self sufficient financially) to function without external support of a host institution (See table 6.2 model 7).

### **6.4.2.3 Visions, Missions and Scopes of the NCPCs**

This section includes the results of the analyses of data and information gathered by three sources:<sup>37</sup>

#### **(A) Analysis of the information obtained via the surveys of the NCPCs**

According to the survey findings, the overall vision of almost all the NCPCs is to promote application of CP in their respective countries. NCPCs attempt to realise this vision by using various strategies. Some NCPCs focus on industries in order to foster economic development of the country with direct links with the industrial sector while some NCPCs focus on integration of CP into national policies and into the educational systems of the country. One Centre has included issues such as corporate social responsibility in its goals.

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<sup>37</sup> Survey of NCPCs, Observations made at the 9th Annual Meeting of the UNIDO/UNEP national CP programme and Observations made of the Independent Evaluation of UNIDO on the CP programme (section 6.2.1)

Within this framework, it was reported that NCPCs provide one or a combination of the following services, depending on the ability and maturity of the NCPCs:

- a) Plan and coordinate pilot CP/SCP projects;
- b) Promote CP/SCP educational and promotion services;
- c) Provide governmental policy advise;
- d) Provide technology reference services;
- e) Provide quality assurance through CP award systems.

Common services delivered by NCPCs are listed as follows:

- Sector based CP programs at different levels, such as planning and coordinating pilot CP projects, including CP audits;
- Sector based CP programs at different levels, such as planning and coordinating pilot CP projects, including CP audits;
- Creating and supporting CP/SCP awareness creation;
- Serve as consultancies for CP technology transfer;
- Implement National Policies in the different industrial sectors;
- Engage in capacity building and training of trainers in CP and SCP.

Financial constraints and the lack of competent staff have hampered the ability of some NCPCs to deliver services satisfactorily in accordance with their objectives; this in turn limits the demand for their services. Additionally, some NCPCs do not have competent staff to fulfil the demand, especially in the transfer of technology.

Most of the NCPCs are involved in CP promotion activities in the industry sector while some NCPCs are involved in or are at the planning stages of diversified CP related services such as Corporate Social Responsibility (CSR), SCP training and other similar activities. Most of the centres conduct sector based CP programs at different levels as pilot projects as well as engage in awareness creation, and they provide technology transfer consultancies in general, based on their capacity.

Many NCPCs provide diversified services based on their area of interest and capacity without limiting to specialised services on CP. However the service delivery varies with local/national conditions and demand.

**Table 6.3: Diversification of activities conducted by NCPCs**

Diversification of Activities*	No of NCPCs
ISO 14000	5
CSR	6
EMAS	2
EIA	1
CDM	5
Chemical Management	1
Eco-labelling	1
Quality assurance and marketing	3
LCA	1
CP Awards	1
Assist Government to develop national policies	5
Assist implementation of MEAs	6
Partial Integration CP in to the University curricular	5
Sustainable production and consumption	2

\*The details of these diversified activities are discussed in this section with analysis.

Note: In some countries, there are national organisations that have been established specifically to cover some of the above activities (CSR in South Africa, quality assurance, eco-labelling and certification). Therefore, NCPCs in those countries are not directly involved in such activities.

NCPCs in three countries provided information on projected activities for the next ten years that basically covers activities related to: MEAs, ESTs, CDM, ISO14000, EIA, and industrial sector-specific services in technology transfer.

One Centre implements pilot projects based on Monitoring and Training on a ‘*no-cure no-pay*’ basis with guaranteed savings.<sup>38</sup>

<sup>38</sup> Guaranteed savings are the minimum savings to be achieved by the client to make the payment of investment made by the service provider (NCPC). If the service provider could not adequately guide the client to achieve the minimum agreed saving, the service provider need not be paid for the services provided. The minimum savings are based mainly on organizational measures. The actual savings will be higher.

In some countries there are private consulting companies that operate associations/teams of CP managers who carry out specific CP projects based on the demand of companies.

Another Centre plans to shift their main activities to:

- Taking a leading role as service facilitator/sub-contractor on CP activities in the framework of larger programmes financed by national authorities or international funding institutions rather than their direct involvement;
- Develop its competencies and extend its services to providing information, training and related services on: EMAS, ISO 14000, CSR (BSCI, SA8000), CDM, Eco-design, Eco-labelling and LCA and assisting in implementation of MEAs.

NCPCs contribute to implementation of governmental policies in various ways. Some NCPCs are also heavily involved in policy development. All NCPCs are involved in implementing national policies, mainly by promoting industrial development through encouraging the implementation of CP practices.

Even though there are no systematic programs to incorporate CP into the university curricular systems at the national level, there are curricula, which contain pollution prevention concepts and approaches in several counties and there are many initiatives taken to incorporate CP concepts and approaches in the university educational system. Some countries have established CP cells in some universities (e.g. Lanka).

Some Centres are widely focused on propagating CP principles in all the National Industrial Parks in line with the government policy of decentralisation. Efforts have been made to concentrate on the provinces where the poverty level is high. This is often done in collaboration with Confederation of Economic Associations and Civil Society in Poverty alleviation. However the progress of these efforts seems to be fully dependant upon sustainable financial mechanisms available in the NCPC system.

Some NCPCs have contributed to the government and the business community to create win-win situations by facilitating transformation of the by-products of production processes into useful products.<sup>39</sup> For example: One NCPC did a feasibility study to produce a beverage

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<sup>39</sup> For example: One NCPC did a feasibility study to produce a beverage based on whey, a by-product of cheese manufacturing, which causes serious wastewater problems for the companies and for the surrounding communities. It was found that this whey could be incorporated into beverages and be effectively integrated into the national program for feeding poor children.



based on whey, a by-product of cheese manufacturing, which causes serious wastewater problems for the companies and for the surrounding communities. It was found that this whey could be incorporated into beverages and be effectively integrated into the national program for feeding poor children.

Some NCPCs have embarked on development of sustainable development indicators to help to generate information on the consumption of natural resources by the main industrial sectors (e.g. Fishing, Ceramics, Dairy, Leather, Textiles, Wood manufacturing, Hotels, and Hospitals). Even though the usage of these indicators was not mentioned, development of these indicators itself can be sighted as a good practice which facilitates self-monitoring from the client's side.

Efforts have been made by several NCPCs to develop strategies for promotion of investments in CP in developing countries. Thus far, progress on such efforts is not clear. While financial institutions are facing problems in analysing proven CP options, which requires in-depth technical knowledge, similarly, most of the companies do not have the capacity to analyse the kind of CP investment needed for their company. This situation has resulted in an under utilisation of external CP funding sources in some countries. (This underscores the need for NCPCs to have more capacity for education and training of financial institutional and industrial people on how to effectively perform CP investment analyses.)

Some NCPC's ten year plans include promotion of voluntary agreements, investment projects, supply chain management and closing the loops projects in order to help their companies to improve their product design, their production processes, MEAs, ESTs, CDM, ISO 14000, EIAs by incorporating CP throughout the product's life cycle.

Some countries have included activities in their national plans to incorporate SCP principles and practices in schools, universities, and technical educational systems in addition to the awareness raising programs they have planned for the general public.

In terms of donor country offers to provide assistance, eight countries expressed their willingness to support other countries' NCPCs. Three countries' NCPCs stated that they needed additional financial support to cover their costs. One country stated that it only needed support to cover travel costs.

## **(B) Observations from the 9th Annual Meeting of the UNIDO/UNEP NCPC/ NCPP programme on the Form/Type of NCPCs**

At the 9<sup>th</sup> Annual Meeting of UNIDO/UNEP NCPC programme held in 2007 in Austria, future perspectives of the UNIDO/UNEP cleaner production programme were discussed.

The issues discussed were categorised under several themes namely:

- (i) Categorisation of NCPCs;
- (ii) Portfolio of services of NCPCs;
- (iii) International CP network, and
- (iv) Regional Networks.

As all the members of the UNIDO/UNEP NCPC network were present at the meeting and also as there was an opportunity for them to interact with each other and consider the responses collectively; this participant-observation methodology provided the author a valuable opportunity to both verify the information gathered by the survey and also to collect additional information that could not be found from the written answers to the questionnaire.

### **(i) Categorisation of NCPCs**

Different sectors such as incubator Centres, promotion service Centres, technology reference Centre etc and possible linkages of these categories with UNIDO and UNEP to improve the system were considered under categorisation.

There were divergent views expressed on categorisation.

The responses on the future perspectives of NCPCs are listed as follows:

- Not to be classified into any category mentioned above;
- All Centres be designated as National Cleaner Production Centres;
- Be a “Centre of Excellence”;
- Categorisation may vary from Centre to Centre;
- Technical service (80%) and policy advise (20%);
- New Centres - mostly a mixture and matured centres based on specialisation subjects;
- Core subjects for new centres and new subjects for mature centres;

- Technology and policy advice to be added;
- During its “life”, one Centre may “belong” more than one category and/or evolve from one category to another in this perspective. It is now the role of UNIDO/UNEP to provide specific service packages directed to the different categories.

The differences in the positions of directors of NCPCs show the need to promote demand driven approaches and to allow NCPCs to evolve, based on the national level requirements and on the capacity of NCPCs to offer effective service delivery. The responses observed on the portfolio of services, support this conclusion while recognising the need to provide more access to updated knowledge, technology and management support to promote innovative approaches in CP activities.

## **(ii) Portfolio of services of NCPCs**

Portfolio of services of NCPCs was considered under the following five different directions:

- Whether the international CP program should be moved towards a diversification or a specialisation of the CP services;
- How much should the CP program move in the two directions?;
- Which institutional setting would ensure that the Centres could also carry out policy activities?;
- How can it be ensured that follow up and monitoring is carried out in the companies after the in-plant training;
- How is it possible to make sure that the Centres are always at the leading edge of CP know-how and technology?

These five directions emphasise the vision of the program to be the lead international program on CP internationally and locally. In the rapidly changing world, development scenarios on trade, market competitiveness, depletion of natural resources and limitations of environmental space, demands a mix of quick starts as well as medium and long term programs that require a continuous supply of financial and skilled manpower resources. Unavailability of such predictable facilitation will be one of the most challenging tasks for most of the NCPCs to build confidence of their prospective clients

The responses of the directors and other members of NCPCs and NCPPs, and the other stakeholders, provide useful information on future perspectives of the NCPC program. Their responses are summarised below:

### **Diversification/Specialisation**

Some NCPCs were of the view that diversification is necessary and NCPCs should look forward to offer different types of services that have links to CP such as CSR, Chemical leasing etc., some NCPCs expressed their interest to specialise their CP services and to build an image as CP specialists. A few Centres have been able to assist other centres in various ways in designing of the NCPCs (e.g. Czech Republic to Macedonia) and other promotional activities.

Table 6.4 present the views of the directors of NCPCs on Diversification and Specialisation in their scope .

**Table 6.4: Views of the Directors of NCPCs on Categories of service delivery on diversification and specialisation**

<b>Diversification and specialisation</b>	<b>Profile of the scope</b>
<ul style="list-style-type: none"> <li>● Consider same core services as the backbone;</li> <li>● Strike a balance between both based on a clear strategy;</li> <li>● Permit it to evolve and be flexible to change based on market demand and country specific conditions;</li> <li>● Realise that policy training and related activities are important at certain development levels;</li> <li>● Ensure that new concepts and trends are evaluated continuously and are used to provide feedback into the network;</li> <li>● Secure support from other UN bodies/international organisations.</li> </ul>	<ul style="list-style-type: none"> <li>● Decide on a case-by-case basis;</li> <li>● Need driven/Market driven</li> <li>● Based on availability of resources specialise on CP and CP + services with external support.</li> <li>● NCPCs are service providers and should remain service providers</li> </ul>

However on the issue of diversification, the NCPCs expressed their concerns on various challenges and limitations that they have to face in decision-making.

Three major challenges they face include:

- Availability of specialised and stronger agencies/institutions in the respective countries with the mandate to provide specialised services in certain sectors;
- Uncertainty of predictable support for continuation of their centre's functioning;
- Risk of marketable topics emerging from time-to-time, such as Climate Change, CSR, etc., that can divert attention from the Centres other foci.

Therefore, it was felt by many NCPCs that even though diversification is good, CP should remain as their core activity. At the same time, NCPCs could also partner with other partners and coordinate integration of their activities.

Identification of the need to establish partnerships with the other CP service providers was sighted as a positive response to help the NCPCs to ensure an effective service delivery. However the degree of collaboration that exists at the present, calls for new approaches to ensure demand driven national and international networks.

It is important to note the experiences China, Ethiopia and Bolivia shared at the meeting, which provided the following important insights of the ground-level situation.

Experiences in China: There is already a lot to do in CP, especially relating to ESTs, and the resources are limited. A clear preference is therefore, being given to specialisation;

Experience in Ethiopia: Difficulty to sell CP for itself. Companies are more attracted by EMS. EMS is then used as a “door-opener” for CP once the companies realise that they need additional tools to make real improvements. CSR may be another option as a “door-opener” in the future. But CP remains the core, even when implementing CSR;

Comments from Bolivia: The programme is moving towards diversification (CSR, Chemical Leasing). The CP Centre in Bolivia is focusing on CP... as it is feasible in this specific country.

These conclusions support the need to follow demand driven approaches based on the institutional capacity of the NCPCs. Also this situation calls for more focused missions

and strategies taking into consideration the potential of networking with other specialised agencies to cover a wider CP service delivery in the country maximising the limited resources available.

### **Institutional setting for policy advice**

NCPCs' concerns over the boundaries of the service delivery on policy issues are significant. It shows the desire of some NCPCs to be involved in policy development with caution. The reason may be their desire to be independent without being politically biased.

The following recommendations of the directors of NCPCs provide some insights on their concerns about their involvement in governmental policy advice and in other related matters. They believe that NCPCs should:

- be independent from political parties;
- be independent or neutral in politics;
- provide facts without political influence;
- strive to become a centre of excellence/reference centre;
- be involved in the countries' strategic development;
- work through a strong national network;
- work, on a 'case-by-case basis';
- work through an advisory board/steering committee;
- perform a catalytic role in national policy advice;
- engage in policy activities by being "contracted" by the authorities to provide policy advice as consultants;
- organise, on their own initiative, CP Roundtables and other conferences and training programmes;
- be established as an institution with corresponding legal status, either public or private, or as an NGO but should not be viewed as 'just a project' to which CP promotion role is given.

Independent views and guidance in policy development based on scientific, technical, social, economic and ecological facts would be provided to the national authorities, which are mandated for policy development. NCPCs should ensure that they have an adequate capacity to provide prudent guidance for such endeavours.

## **Follow-up and monitoring**

There was no clear evidence of NCPCs establishing monitoring systems. Inadequate or absence of monitoring systems is the main root cause of failure to achieve expected outcomes of service delivery.

Proposals of the directors of NCPCs made at the 9th Annual Meeting of NCPC programme for ensuring follow up and monitoring, provided insights of the external support required to achieve the expected outcomes of the service delivery.

### **Approaches proposed by the directors of NCPCs on the need for follow up and monitoring of CP progress;**

- Benchmarking (internal and external) with key performance indicators compared to baseline before CP;
- Re-auditing scheme (similar to ISO), Voluntary standard or agreements (example of sectoral voluntary agreements);
- Implementing CP excellence award systems;
- Monitoring of green credit lines;
- CP laws/regulations are in place, renewal of environmental licenses; ensure support from the authorities by:
  - Providing information on a minimum set of indicators to be monitored (could be related to benchmarks);
  - Making approval procedures easier or reducing taxes/charges/discharge licenses when a company has implemented CP/is certified according to the standard;
  - Recognising CP certificates (extended period of permit of operation and other fiscal incentives);
  - Secure funding from donors for monitoring;
  - Combination of some of the above ideas.

These comments clearly show the need for more focused public policies, environmental regulations, rewards and penalties, responsive financial agents and prudent investments and responsive technology provides, to encourage producers in SCP activities and to ensure realisation of expected results.

It is clear that the views of the directors of NCPCs on the external support necessary to ensure that NCPC experts are always at the leading edge of CP knowledge and technology clearly shows their expectations from UNIDO/UNEP.

The following are the main proposals:

- UNIDO and UNEP should monitor the new activities and build necessary capacity of the centres to become involved in new activities (quality and experience);
- Financing for innovation, upgrading, pilots, hardware, etc. (seed money);
- Provision of training and expertise from UNIDO (Independently from the individual NCPC project funding);
- Allow longer transition phases;
- Conditions for keeping the authorisation to use the UNIDO logo;
- Ensure effective networking;
- Develop and use a new format for the Annual Meetings;
  - Peer review of the scientific presentations;
  - Stop reinventing CP.
- UNIDO should establish a network of contacts with expertise that can be accessed by the centres;
- Use the centres to test CP + activities competitive in market.

It is interesting to note the concerns of the some members of the audience as to whether NCPCs need to always be one step ahead of CP consulting or other related service provided.

This concern would also provide some insights into the need for more focused missions and strategies for NPCCs based on the local conditions. The need for human resource development has been recognised by almost all the NCPCs. Availability of green human resource developers was felt to be a basic prerequisite to ensure effective implantation of SPC practices at all levels.

### **(C) Recommendations of the independent evaluation of UNIDO on the program design ([www.unido.org](http://www.unido.org))**

The NCPCs/NCPPs should capitalise on their achievements and target their service delivery better to increase impact of their services on the uptake of CP practices, technologies and policies, in particular during the phase of support through UNIDO-UNEP and donors;



The Programme should be guided by a succinct programme document, with a clear strategy, a justification of the intervention logic and the specific roles and contributions from UNIDO, UNEP and local and international stakeholders;

The Programme should re-establish its primary focus on CP and articulate a dual strategy for its further development to enable specialisation (in policy and/or technology) and diversification (socially driven and/or environmentally driven) of NCPSs/NCPPs as they and their national stakeholders see fit in their respective national contexts;

#### **(D) Comments and Conclusions**

These observations provide ample evidence of the need to facilitate country-driven approaches with sound capacity building programs to transfer knowledge, rather than to transfer specific technologies from donor countries; this will enable the countries to decide upon the appropriate technologies needed by their industries. This process has to continue until NCPCs achieve maturity.

Creation of demand for CP also depends on the interest in and demands by governments and companies for implementation of environmental accounting systems, environmental management systems and market-based instruments. However, some NCPCs highlighted the difficulty of adhering to specific payback requirements that cannot be fulfilled under low water, energy and related commodity pricing systems. The re-pricing of such goods and services is clearly a political policy issue that must be addressed at the national level.

NCPCs can play a leading role in the feasibility analysis of CP investments and in making recommendations to the financial institutions, which are linked with the relevant companies.

From the demand side, in the long run, limiting the services of a NCPC to one category of services would not be appropriate because many external factors are influencing the sustainable development process at the local, regional and global level. At the initial stages of CP promotion, implementation of pilot projects was considered as a more appropriate strategy in the CP dissemination process. Thereafter, the need for the national level policy development and integration became an important supporting element to help to create a demand for and to ensure sustainability of the continuation of the pilot projects themselves. Thereafter, it is important to integrate CP into the service sectors, other than manufacturing sector. Several NCPCs are working on service sectors and policy development activities together with their national and local authorities. (e.g. China, The Czech Republic & Sri Lanka).

In summary, it is evident, based upon past experience, that diversification can help the NCPCs to attract many stakeholders to seek their services; this in turn creates more markets for their related CP services.

The NCPCs that preferred to deliver diversified services believed that CP should be considered as the foundation to diversification upon which their other services should be built.

Several NCPCs have sufficient skills and the willingness to provide services to other countries, provided that adequate sources of funding are available for such cooperation from the receiving end. Some NCPCs have assisted other countries in capacity building by providing technical assistance in various ways. However it is seen that much more networking is essential to promote CP nationally and internationally to make significant improvements to meet the national goals of the countries. Some Centres have gained financial independence along with maturity, whereas, some NCPCs continue to depend upon external funding for their functioning. Some NCPCs solely depend on external funding. One NCPC has not been able to continue because there is no host institution and also external funding support has not been continued.

A sound monitoring system with benchmarks will facilitate both UNIDO/UNEP and individual NCPCs to monitor the progress periodically in a more systematic and transparent way so that the strategies could be revised on the design, scope and portfolios based on the practical situation.

#### **6.4.2.4 Staff and the Organizational structure**

The staff and the organisational structure of the NCPCs were evaluated based on the information received from the survey.

##### **(A) Observations from the survey**

Internal staff of NCPCs has a heavy impact on the performance of CP dissemination and integration. Very few NCPCs have sufficient internal staff with designated mandates to achieve their objectives including managers for SCP whereas, many Centres lack adequate staff to manage activities of the Centre in a sustainable manner. Among the NCPCs who responded to the questionnaire, full time positions ranged from two (2) to twenty (20).

NCPCs regularly secure services from outside on a part-time basis. However there is a considerable variation of the cadre of part-time service providers. Some NCPCs obtain services from one or a combination of external expertise based upon their workload. In case of governmental host institutions, the officers engaged in specialised activities related to CP, serve the NCPCs on part-time basis. Directors of a few of the NCPCs serve the NCPC on a part-time basis while engaging in other official functions in the government. This situation arises especially when the government is the host institution. This arrangement has both advantages and disadvantages. Directors, who serve on a part-time basis, may be able to use their lobbying capacity to promote and enhance CP activities by using the other functional activities that they are engaged in within the governmental sector. On the other hand, a director who functions on a part-time basis would not be able to monitor the progress and effectiveness of the activities of the NCPC without sufficient supporting staff. This results in their failure of delivering services on time with the expected quality to the satisfaction of the client.

A minimum of cadre positions is necessary for two reasons; one is to manage the daily administration in an efficient manner and the other is to ensure effective service delivery in a sustainable manner. Mostly, even in full time service, the director of the NCPC has to attend all the activities related to CP promotional activities, transfer of technology and also the daily administrative activities resulting in failure to deliver the expected results within a given time frame with the required quality.

Even though this would be a better strategy in terms of human resources management, there should be a minimum cadre available in the NCPCs proportionate to the scope of work and their annual plans in order to achieve the expected output and outcome in order to attract CP customers.

Few NCPCs have been able to design their cadre positions to address priority and emerging issues that will help them to deliver better services to their clients by establishing key positions to cover new focused areas. For example, in addition to the post of director, separate key positions have been established by a few of the NCPCs as Heads of Departments to promote key issues such as SCP, energy conservation projects, CP training departments etc.. Also there are separate administrative assistants to manage the daily administrative activities, thereby, providing sufficient time for the heads of departments to concentrate on their responsibilities. Such an institutional structure could deliver a quality service and build confidence of their clients which in turn would create further demand on CP services in the country.

## **(B) Comments and Conclusions**

The organisational structure and the minimum number of staff requirements depend on the vision, mission, objectives, the promoter and the host institution of NCPCs. Initially NCPCs need to give priority to create general awareness among their target groups and to secure commitment for CP implementation among their members. However, when the NCPC reaches its maturity, which means they have the ability and skills to deliver the services to satisfactorily build the confidence of its clients, it can assign more priority for the technology transfer activities and less efforts on creating general awareness as effective technology transfer itself will enhance awareness and create more demand.

The general awareness activities can be outsourced via universities and other sub-contactable entities as they progress. Transfer of technology can be assigned to the relevant stakeholder institutions as well as individual experts who are members of the CP network. Attractive incentive schemes should be developed and be made available for stakeholders to sustain continuous improvements of CP activities.

The time-frame to reach maturity depends on the capacity of NCPCs to secure commitment of relevant stakeholders with the political support from national, regional and local governments. Appropriate strategies must be used by the NCPCs to secure and sustain commitment of the stakeholders e.g. International Environmental Treaties and related obligations, productivity improvements, awareness creation of the consumers related to possible environmental and health impacts of current practices on the present and future generations. There was no specific information received with respect to self-evaluation of the performance on NCPCs internally.

### **6.4.2.5 Geographical Coverage and Networking**

Analysis of the geographical coverage and networking was made using the information received from the survey of NCPCs.

#### **(A) Analysis of the information received from the survey of NCPCs**

Very few NCPCs have “Geographically spread & industry specific” networks to cover CP activities throughout their country whereas, most of the NCPCs do not have such networks even though there is a potential to link with various stakeholders. Two NCPCs have created networks with provincial and local authority (municipal council) networks. One NCPC has

regional CP networks. Some NCPCs have few regional networks to promote and establish links between industry and environment in other countries. Table 6.5 presents 10 models that were observed based on the responses received on the status of staff, organisational structure and the geographical coverage of the NCPCs.

Table 6.5 presents the diversities of the forms of the internal management systems of NCPCs currently in operation as reported. The different forms of staff, host institutions, availability of boards of management and networks have a significant impact on the service delivery of NCPCs. Some NCPCs manage to cover wider sectors with limited full time staff by using part time staff based on the demand for services. Local, sectoral and university networks also provide them to meet a wider coverage with less financial burden to the centre. However sufficient specialised full- time staff would be an asset to the NCPCs to secure confidence of the clients in undisturbed service delivery. The efficiency of each model depends on the demand for services and local conditions. The financial models presented in table 6.2 can also be fitted into any type of the models listed in table 6.5 depend on the local situation.

**Table 6.5: Different models of the structure of the internal management of NCPCs**

Type of NCPC	Scope and coverage	Staff		Host Institution	Board of Mgd/ Steering Com./ General Assembly	Network		
		Full Time	Part time			Local	Sectoral	University
Model 1	General Admin.	Yes	No	Private Sector	Yes	Yes	No	No
	Gen. Awareness							
	Specialised							
Model 2	General Admin.	Few	Yes	Private Sector	Yes	Yes	No	No
	Gen. Awareness							
	Specialised							
Model 3	General Admin.	Few	Yes	Private sector	Yes	No	No	No
	Gen. Awareness							
	Specialised							

Type of NCP	Scope and coverage	Staff		Host Institution	Board of Mgd/ Steering Com./ General Assembly	Network			
		Full Time	Part time			Local	Sectoral	University	
Model 4	General Admin.	Yes		Private sector	Yes				
	Gen. Awareness		Yes			Yes	Yes		Yes
	Specialised								
Model 5	General Admin.	Yes		Government	Yes		No	No	
	Gen. Awareness		No			Yes			
	Specialised								
Model 6	General Admin.	Yes		Government	Yes		No	No	
	Gen. Awareness	Yes	Yes			Yes			
	Specialised								
Model 7	General Admin.	Few		Government	No		Yes	No	
	Gen. Awareness		Yes			Yes			
	Specialised								
Model 8	General Admin.	Yes	No	No	No		Yes	Yes	
	Gen. Awareness					Yes			Yes
	Specialised								
Model 9	General Admin.	Yes		No	No	No	Yes	Yes	
	Gen. Awareness		Yes						
	Specialised								
Model 10	General Admin.	Yes	Yes	Foundation <sup>40</sup>	Yes				
	Gen. Awareness								
	Specialised								

<sup>40</sup> An independent organization.

## **(B) Comments and conclusions**

Most NCPCs have a vision of being the Centre of Excellence of a consultancy. However, many more innovative strategies must be used by all the NCPCs with the assistance of major stakeholders, globally, nationally, and regionally to create and sustain such systems linked with national priorities. Notwithstanding the capacity of the staff in terms of the number and skills without networking with the other sectoral entities, NCPCs would not be able to provide adequate services to meet the national targets of their country. Very few NCPCs have such local networks.

NCPCs have to secure and maintain direct links at least with the Ministries of Industries, the Ministries of Environment, and the Federation of the Chambers of Commerce in order to create a sustainable demand for CP and to secure financial independence. The other main stakeholders such as Universities, Technical Institutions, Ministries of Education, Banks, Research Institutions, and Trade Associations are essential partners who can provide a strong support base and also can help to enhance CP promotional activities based on the ability of the NCPC to inspire and motivate these institutions by creating appropriate awareness programmes.

Another important factor to be considered is the need to establish CP allied networks in the country in addition to the NCPCs to foster vertical and horizontal integration of different systems. The members of the network can function either as affiliated bodies or partners of the NCPCs or independently to address specific CP options based on their speciality and mandate. International networks of NCPCs would facilitate incorporation of CP nationally and globally.

The success of networking is dependent upon creation of feedback loops to monitor the progress and its effectiveness with all the stakeholder institutions and networks in order to sustain and enhance the activities of NCPCs. There is no current mechanism to ensure that such systems will be implemented because progress in monitoring of many variables is outside the control of NCPCs. Thus, it is important that an effective monitoring mechanism is established, which provides feedback loops connected to the main stakeholders.

### **6.4.3 Analysis of the local subsystem surrounding the internal management system of NCPC**

The ability of NCPCs to make progress and to achieve the expected results depends on various external factors some of which may be beyond the control of individual NCPCs. Assistance from and commitment of governmental institutions, private sector, and funding organisations are necessary to continue and speed up the progress which has to be built on the self initiatives of individual NCPCs. The political will coupled with political backing are also essential prerequisites to maintain sustainability of the CP activities in a country. Appropriate strategies have to be used by individual NCPCs to promote CP based on the socio economic status, level of industrial development, and the geographical area of the country concerned.

Therefore, it should not be expected from NCPCs for them to be financially independent within a specific time period such as five years. The external financial support needed to be given to the NCPCs to maintain sustainability of their activities has to be decided based on the performance of individual NCPCs in a given timeframe.

#### **6.4.3.1 Integration to national policy and legislation**

Government policy both economic and environmental and their priorities have a high impact on the performance of the service delivery of NCPCs. Outcome of the activities of the NCPCs would not be positive if the national governmental policies are not conducive to the application of SCP practices.

In some countries, CP has been integrated into the national laws (e.g. Czech Republic and China). The National Cleaner Production Program (NCPP) has been formally established on the basis of the Government resolution No. 165/2000 in the Czech Republic. At present, NCPC is part of CENIA (Czech Environmental Information Agency), which is a grant service organisation of the Ministry of Environment. China has issued the CP promotion law in 2002, which came to effect in 2003; this law covers all the industrial and service sectors. In Sri Lanka, a National Policy and a Strategy have been developed and approved by the Cabinet of Ministers for its implementation. Some countries have enacted separate Acts on air, water, and soil where there are requirements for industries to take preventive measures. The Government of Gujarat in India has instituted a CP policy for the State of Gujarat. Table 6.6 shows the availability of specific national policies related to CP National Policies related to CP.



**Table 6.6: Availability of National Policies related to CP**

National Policy on CP	No of NCPCs
Overall National Policy on CP	2
Overall National Policy on CP with legislation	2
National Policy for Industry sector*	1
Regional Policy in Industry sector	1

\*Irrespective of the availability of an overall or sector-based specific national policies on CP, all the NCPCs are engaged in CP activities in the industrial sector.

Adequate infrastructure facilities are necessary to translate policies into action without diluting the momentum of the stakeholders to initiate and continue CP activities horizontally and vertically within and between the systems. Mere policies will not be sufficient to CP promotional activities in the absence of mechanisms to adequately reflect ecosystem services (green accounting systems) in the market system. As CP demands preventive approaches legislation also has limitations to achieve expected outcome. Market based instruments (MBIs) are important tools that can be used to internalise the externalities to address market failures. Several countries use MBIs, which indirectly promotes industries to adopt cleaner production options (e.g. and the Cess (Tax) imposed on plastic products described in Chapter 5). Sri Lanka developed legislation to implement a load based licensing system to promote industries to reduce the pollution load moving beyond compliance to the national effluent standards. Several countries promote voluntary action and self-regulations using tools such as eco-labelling, voluntary agreements.<sup>41</sup>

There were no systematic approaches reported in the responses of NCPCs to integrate CP in the national educational systems. However, in several countries some universities have included pollution prevention and environmental technologies in the curricula (e.g. Sri Lanka). Some countries have established either CP cells or networks with few universities (e.g. Sri Lanka). China is a host country for the Basel Convention Regional Centre (BCRC). The Host institution is the Tsinghua University in China. Such regional centres can play a leading role to promote CP and SPC across the region if sufficient funds are allocated under the convention.

<sup>41</sup> There are 14 BCRCs functioning under the Basel Convention (4 in Africa and west Asia, 4 in Asia and Pacific, 2 in Central and eastern Europe and 4 in Latin America and the Caribbean region). BCRCs have also been involved in facilitating implementation of other MEAs such as the Stockholm Convention on POPs and Rotterdam convention on PIC ([www.basel.int](http://www.basel.int)).

Some countries have included specific, school awareness raising programmes through school pioneer brigades (Sri Lanka) to sensitise school children in environmental conservation measures for promoting SCP.

The outcome of the national policies depends on the government's priorities, which in turn depend on the local socio-economic-political conditions. Financial and technical capacity is an essential pre-requisite for many countries to implement CP practices that move beyond mere good housekeeping practices as the investment cost creates initial obstacles to adopt CP especially in the industries and service sectors. NCPCs, Environmental Ministries and Ministries of Industry and Trade can play a leading role to enhance the knowledge base of industries on the financial benefits of productivity improvements by saving material, energy and water in their costs of production.

#### **6.4.3.2 Financial and Technical capacity – Local/National**

##### **(A) Capacity of the Governmental Sector**

Out of 14 countries that provided answers to the survey, two countries, the NCPCs are operating with 100% funding from the Government.

While sufficient human and financial resources are necessary for NCPCs to create general awareness among their stakeholders to ensure continuous commitment to application of CP as an integral part of the road to sustainable development.

Also the technical and financial capacity of the government is crucial to absorb and to promote dissemination of SCP activities. It has to be noted that the political will plays a centrally important role in this process. Without political will it is difficult to sustain the commitment and support of the stakeholders for the implementation of CP and SCP activities throughout the country. In reality, without attractive short-term benefits, many governmental stakeholders will not act positively since they will have other priorities in the short-term, based on the government's needs. In the absence of sufficient financial and manpower resources to address the basic needs of the country the NCPC will not have the impacts that are desired and needed. Many NCPC Centres are unable to develop sustainable action plans due to lack of sustainable and predictable funding mechanisms because the governments have other priorities for their national budgets.

## **(B) Capacity of the Private Sector**

The private sector requires short-term benefits from their limited resources. Many industries are reluctant to invest in CP claiming that they comply with the national standards. However it should be noted that many improvements could be made to the present system without upfront funding that can be considered by the industry for their own benefits irrespective of the short-term benefits. Short-term benefits are also possible through improvements in productivity based upon improving management practices, which may not be visible. Technical capacity of the private and public sector plays a crucial role in application of SCP practices to understand the short-term and long-term benefits of CP.

On the other hand, the ability of NCPCs to inspire industry with attractive short-term benefits will help to increase the political will as the demand from industries for learning how to apply CP will improve the economic productivity of the country. External funding in the form of grants and soft loans are basic prerequisites to initially overcome the barriers of CP promotional activities. With the availability of such support, NCPCs are able to make progress in disseminating CP concepts, training and tools. Results of pilot projects show the deficiencies of trickling down CP approaches from top management to the middle level and lower levels, preventing application of CP within the industries themselves. Continuous monitoring, guidance and motivation coupled with law enforcement are necessary to promote application of CP in industry especially at the initial stages of the development process (see Chapter 5).

## **(C) Strategic financial resource allocation**

Responses to the survey revealed various types of resource mobilisation strategies that have been used by different countries. Financial inputs have been integrated to the type of activity performed. For example if government is the host institution to NCPC cost for hosting is covered in the government budgetary allocations. The project-based activities funded by various parties, both in the private and public sector, bear the costs of implementation. Sustainability of CP/SPC projects and programmes depend on the commitment of the private and public sector entities to continue and scale up the strategic partnerships across the country to which national policies with political will be of paramount importance.

## **(D) Strategic partnerships**

### **(i) Partnerships with private sector**

NCPCs should have strong links with the chambers of industries in providing technical services to the industry. NCPCs should build the capacity of the chambers and their networks to use their links with the industries to promote application of CP. The human resources available within the country should be made use of initially and the chambers can make use of their international links to bridge the gaps in technology transfer at affordable costs. The lobbying capacity of the chambers to communicate with banks can help to facilitate in assisting individual industries to mobilise funding for productivity improvements. It is also necessary to develop innovative funding mechanisms to stimulate small business enterprises in application of CP. There are substantial segment of extremely small business entrepreneurs who cannot reach and not qualified to the use the existing funding mechanisms.

Significant partnership programs have been conducted in Sri Lanka related to CP (see Chapter 5). However sufficient human resources are required to transform the SPC strategies into meaningful action in the production process throughout the life cycle. Absence or deficiencies of a single attribute can affect the system negatively and the investment for the remaining attributes would eventually be ineffective. At present, an inventory of the industries in the country is developed by the Central Environmental Authority by sector. Once the inventory is completed it will be possible to estimate the financial and human resource requirements needed for promotion of SPC in the industrial sector.

### **(ii) Partnerships with consumers as pressure groups/partners**

Despite of the general awareness programmes there were no specific information provided in relation to social sector development in the area of SCP. Promotion of the general public as consumers can also be used as CP promoters by creating a demand for environmentally friendly products and production processes. Eco-labelling is becoming a mandatory requirement, especially in international trade and with the increase of awareness on the harmful impacts to humans and to the environment the demand for unsafe products will decrease. The success of this approach is greatly dependent upon the purchasing capacity and level of awareness of individual consumers. Different models with appropriate marketing strategies with details of the environmental and health impacts can be developed based on the level of socio-economic development and cultural practices of the country. Market Based Instruments (MBIs) such as

environmental levies and green cesses, also can be used to create disincentives and incentives as appropriate discourage use of environmentally harmful products and to create a demand for environmentally friendly products. Revenue generated from the MBIs can be utilised to promote CP related activities and research & development for designing of ecologically sound products (Chapter 5 section 5.9.4).

#### **6.4.4 Analysis of the International Subsystem Surrounding the Local System and Internal Management System of NCPCs**

The global economy is characterised by increasing globalisation and therefore, external forces are arising that have a huge impact on national economies, social systems as well as on the environment. International and regional environmental policies, institutions and networks have a have a significant potential for playing a leading role in integrating SCP practises into the economic and social development processes. Many initiatives have been taken by Multilateral Environmental Treaties (METs) as well as by other, international and regional institutions and networks to promote CP and SCP at national, provincial and regional levels. This following section provides an analysis of some significant international and regional approaches and initiatives to promote CP and SCP.

##### **6.4.4.1 Cleaner Production Roundtables and Networks – an overview**

In addition to the NCPCs started by and operating within the UNIDO/UNEP Network, there are also NCPPs that operate outside of that network. Various donors on bi-lateral and multilateral basis have facilitated their initiatives and practices.

Preventive Environmental Protection Approaches in Europe (PREPARE (1999) is one such informal, independent European network that was established ([www.unido.org](http://www.unido.org)) based on the results of the Dutch Cleaner Production Project PRISMA that was done in 10 companies in The Netherlands. PREPARE is working to promote preventive environmental protection approaches in Europe with experts in the field of cleaner production and sustainable development.

The knowledge management networks such as the Journal of Cleaner Production (JCLP) and Journal of Industrial Ecology also contribute immensely to promote CP worldwide. In fact the Impact Factor (IF – an independent scientific effectiveness of the journal, evaluation indicator) of Elsevier's Journal of Cleaner Production (JCLP) has increased from the 2007 IF of 1.073 to the 2008 IF of 1.362, and 2009 IF of 1.867. This is an impressive improvement for

such an interdisciplinary journal. The number of downloads of individual documents of JCLP continues to increase rapidly, annually and also the number of new documents submitted is increasing rapidly. Prof. Huisingh, Editor-in-Chief of the JCLP confirmed that in 2010 he received more than 750 new documents in comparison with about 300 in 2008 and 250 in 2007. This is an indicator that increasing numbers of researchers are reporting on their CP and SCP research within the JCLP.

A capacity building exercise of the writers continues to progress between peer reviewers and authors to ensure high quality of the papers published in the JCLP. Impacts of the services of this type of low cost knowledge management networks are significant in light of practical difficulties faced by most of the regional CP networks for their operation and maintenance, due to their financial constraints.

Additionally, CP networks are functioning in different regions in the form of Round tables: The European Roundtable on Cleaner Production was initiated in 1994, The Asia-Pacific Roundtable on Cleaner Production was started in 1997,<sup>42</sup> The Latin American Roundtable was started in 1998, and the African Roundtable on Cleaner Production and SCP was started in 2000.

Many other initiatives have been taken worldwide to promote CP and other pollution prevention related activities nationally. Philippine Pollution Prevention Roundtable (P3R), (1997), Canadian Pollution Prevention Roundtable (1997), Roundtable of Americas for Cleaner Production (1998), Partnership agreement signed by the National Pollution Prevention Roundtable (NPPR) with the U.S.-Asia Environmental Partnership (US-AEP) in 1996 to support the creation of emerging roundtable organisations in eight Asian nations, including Indonesia, the Philippines, Thailand, Taiwan, Malaysia, South Korea, India, and Singapore.

The scope of some of the roundtables has been extended beyond CP to SCP subsequently. In 2007 a report was published jointly by UNEP and the European Environmental Agency (EEA) for consideration of the sixth Ministerial Conference “Environment for Europe” to support the development of SCP Policies and implementation activities in the countries of South East Europe (SEE) and Eastern Europe, the Caucasus and Central Asia (EECCA) (EEA Report no 3/2007).

It is clear that many CP roundtables have been transformed to SCP roundtables in line

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<sup>42</sup> The names of the European and Asia-Pacific Roundtables have been changed to reflect the SCP aspects

with recent the initiative taken by UNEP, known as the Marrakesh process. The Marrakech Process was initiated as a global process to support the elaboration of the 10 Year Framework Program (10YFP) on SCP, as called for by the WSSD Johannesburg Plan of Action (2002). Chapter III of Johannesburg Plan of Implementation, which relates to changing unsustainable production and consumption, calls upon governments and other stakeholders to develop a 10-year framework programme in support of regional and national initiatives on SCP. The first meeting of the development of 10YFP took place in Marrakech in Morocco in June 2003 and therefore, the process was called the “Marrakech Process”. Under this programme, regional SCP implementation networks have been launched in all UN regions: Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, North America and West Asia.

The Asia-Pacific Roundtable for CP (APRCP) was changed to the Asia-Pacific Roundtable for Sustainable Consumption and Production (APRSCP) in 2007.

Commitments and dedications of the personalities of the boards of managements have been able to continue the activities of these roundtables, to a certain level. However, continuation of these programmes has been hampered due to many obstacles. Some of these obstacles are:

- Absence of sustainable funding mechanisms to support operational activities, and to initiate new CP/SCP and related programs;
- Inadequate & sustainable linkages with national governmental institutions;
- Insufficient demand due to lack of supportive CP/SCP national policies;
- Weak information dissemination processes.

However, there is great potential for these networks to create environments conducive to the application of SCP, especially in light of the current multiple, global crises related to energy, water, food and finance.

#### **6.4.4.2 International Focus on Global Green Economic Growth: The Potential to Promote CP/SCP**

Various new initiatives have been taken by the international community by different ways to help to ensure that the outcomes are complementary to promotion of SPC. This section presents information about the initiatives taken by UNEP in 2009.

The theme of the 24<sup>th</sup> UNEP Governing Council/Global Environmental Ministers Forum (UNEPGC24/GEMF) held in February 2009 in Nairobi was “A Global Green New Deal”

towards a green economy as a strategy to address the present ecological and financial crises in a sustainable manner. The UNEP Governing Council/ Global Environmental Ministers Forum is the United Nations high-level environmental policy forum and brings the environmental ministers in the world together to review important and emerging environmental policy issues. It also provides broad policy advice and guidance to promote international cooperation in the field of environment. Delegates from 147 countries including 110 ministers and deputy ministers and 192 representatives of major groups of stakeholders took part in high-level consultations under this theme.

The President's summary of UNEPGC24/GEMF after the ministerial consultation includes important elements for a shared vision in promoting green economies.

The ministers recognised the fact that:

- Government alone cannot manage and fund the transition to a green economy, which includes sustainable production as well as sustainable consumption.
- The importance of significant additional investment and further incentives to scale up the existing green projects and initiatives from across all regions, reiterating the UNEP's call for investment of 1% of GDP<sup>43</sup> (approximately US\$ 750 billion) over the next two years to seed a significant greening of the global economy made at the 64th United Nations General Assembly (UNGA).
- The current economic crisis is a unique opportunity that can be used for fundamental restructuring of economies. We can encourage the transition to green energy, green growth and green jobs. There is a need to study further the concept of the green economy, in particular, as it relates to developing countries and countries with economies in transition.

It is evident that with the global economic recession, unemployment rates will rise. Increases in unemployment rates within the present economic systems signal the need to reorient the economic system into more sustainable patterns. Promotion of CP and SCP practices needs skilled human resources to provide technical and managerial services at all levels worldwide. More job opportunities will be available, especially, in the renewable energy, transportation

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<sup>43</sup> Global Green New Deal – Policy Brief, UNEP, 2009 March



and water management sectors if appropriate policies are developed and implemented and that appropriate investments are made.

Strategic knowledge management systems are necessary to promote sustainable consumption and sustainable lifestyles. User-friendly methodologies of footprint analysis and reporting systems, capacity building programmes for transfer of appropriate technologies and scaling up of the uses of traditional knowledge by taking into consideration the new scientific discoveries must be included in knowledge management systems.

#### **6.4.4.3 Multilateral Environment Agreements (MEAs) as CP Promoting Agents**

##### **(A) An Overview**

Application of CP/SCP is one of the ways forward to meet compliance with the multilateral environmental agreements and related policies. Out of the 35 countries in which NCPCs are functioning, 21 countries have ratified the Basel Convention, 25 countries have ratified the Stockholm Convention on POPs and 16 countries have ratified the Rotterdam Convention on PIC. All three conventions require parties to prevent and/or to minimise the generation of wastes and to prevent and/or to minimise the use of hazardous chemicals. All these countries have ratified the Montreal Protocol on Control of the depletion of the Ozone layer, which covers chemicals that deplete the ozone layer. The United Nations Framework Convention on Climate Change (UNFCCC) and The Kyoto Protocol call for reduction of carbon emissions with time targets. The Biodiversity Convention requires parties to reduce depletion of natural resources. In addition to these conventions, almost all the other conventions require parties to take measures on pollution control and/or natural resource management that need application of CP/SCP to help to ensure compliance.

Multilateral Environmental Treaties have been developed to take collaborative measures to handle regional and global environmental problems. Parties to the conventions are under obligation to implement the provisions of the conventions to address specific regional and global environmental problems and ensure global ecosystem stability. Application of Cleaner Production methods helps countries to comply with the provisions of MEAs.

## **(B) Analysis of the information derived from the Survey of the NCPCs**

Involvement of NCPCs in the implementation of MEAs varies among the NCPCs. Several NCPCs are involved in implementation of MEAs, particularly in CDM activities while contributions of other NCPCs are limited to promotion of application of CP in industries. Many of these NCPCs are involved in awareness creation activities of the UNFCCC, Kyoto Protocol, Montreal Protocol, Basel Convention and Stockholm Convention. Some NCPCs assist industries in transfer of technology in hazardous wastes and chemical management. One NCPC represents the national Coordinating committees of MEAs (Sri Lanka).

UNEP was supported by the Swedish International Development Cooperation Agency (SIDA) in a project, “Applying Cleaner Production to Multilateral Environmental Agreements” (ACME) with the objective to strengthen national capacities for implementing MEAs in India and Ukraine. The project was focused on the following conventions aiming at reducing greenhouse emissions and the use and release of Persistent Organic Pollutants and Hazardous Wastes in industry especially in India and Ukraine:

- The Kyoto Protocol;
- The Framework Convention on Climate Change (UNFCCC);
- The Basel Convention;
- The Stockholm Convention on POPs.

The following activities are included in the project;

- Review of best practices at the national and global level;
- Review of the national level needs for linking MEAs with preventive environmental strategies, such as CP;
- Prepare training modules on CP and MEAs based on these reviews;
- Deliver national training workshops in India and Ukraine.

The project participants responded to identify needs in India and Ukraine to assist industry, national focal points of MEAs, financing institutions, and CP experts to strengthen their ability to support the implementation of MEAs. The project agreement signed between UNEP and SIDA in October 2004 and commenced implementation in January 2005 (Ref. The Final Report of ACME Project – 2006).

The following outputs were delivered by the end of the project in September 2006.

- ACME training package: 750 CD-ROM and online at [www.unep.fr](http://www.unep.fr); under the title of ACME Training package”/ which has been intended as a reference for self studies and also as a training package on CP-MEA integration including the following publications; Global CP MEA status report;
- The Indian CP-MEA status report;
- The Ukraine CP-MEA status report;
- CP MEA case studies;
- Training workshops and outreach meetings.

The following key observations, made in this project, provide important insights that are applicable to many countries in the promotion of CP-MEA integration;

- Many MEAs have recognised the benefits of using the CP preventive approach as a key instrument in implementation of the different conventions. However, the capacity and knowledge of the concerned national MEA stakeholders to use and promote CP is limited or non-existing. For this reason the potential offered by CP is by and large untapped;
- The cooperation between CP expert institutions and MEA implementation bodies at the national and regional level is poor;
- The economic tools offered by MEAs (in particular the UNFCCC Kyoto Protocol’s flexible mechanism) are quite powerful in attracting the interest of industry, but are poorly supported by CP expert institutions and MEA implementing bodies. The by-and-large absence of interest from financial institutions in the ACME workshops reflects that there is a lack of understanding for the CP-MEA integration efforts;
- There is an absence of industry-focused case studies and demonstration projects on the practical approach and benefits of CP-MEA integration as applied to industrial facilities. While such case studies do exist (as in project ACME), they are usually not shared with other countries and are also not adequate for showcasing the potential for benefiting from current MEA implementation mechanisms.

(Ref: ACME - Final Report (2006)).

In the ACME final report it was reported that the ACME partners are developing proposals with the MEA Secretaries aiming at:

- Building capacities in national and regional MEA bodies to promote the use of the CP-MEA approach and in doing this, to jointly engage and coordinate CP expert institutions and MEA expert bodies;
- Strengthening the business case for MEA-CP implementation through in-plant pilot demonstration projects, combined with an outreach to, and involvement of, financial institutions.

Pressure and urgency for implementation of International Environmental Treaties, supply-chain demands for implementation Corporate Social Responsibility, public complaints and protests from interested groups against environmental pollution and negative health impacts of products and production processes can be used to help to create an environment that is conducive to CP/SCP promotion by creating win-win situations for all concerned. But this will not occur unless well-designed awareness programmes are designed and implemented either by the NCPCs or by other similar networks in collaboration with other relevant stakeholders. International environmental networks can bring in different stakeholder groups into a common global platform with linkages to regional and national platforms to provide access to and to promote CP/SCP activities worldwide.

#### **6.4.4.4 International CP Network: A Future Perspective**

##### **(A) Observations made at the 9th Annual Meeting of UNIDO/UNEP NCPCs/NCPPs**

At the 9th Annual Meeting of UNIDO/UNEP National Cleaner Production Programme, held in Austria in 2007, the potential for international CP networks and other regional CP networks to promote CP was discussed at length. The responses and comments made by the directors of NCPCs and the other stakeholders provided useful information and insights with regard to the potential of networking provided that the basic infrastructure facilities are available for creation and/or for extension of such networks, in order to ensure their effectiveness and sustainability.

However, it was observed that linkages of the CP Networks with other Multilateral Environmental Agreements (MEAs) related networks have to be further explored separately because the UNIDO/UNEP annual meeting is designed to focus on strengthening the capacities of the UNIDO/UNEP CP network. Nevertheless, the questions raised by UNIDO and the responses reflect the potential for networking with other regional centres based on competitive

advantages available in the regional network governing system that would emerge as a result of the opportunities offered to different membership categories to operate within the system.

The main issues discussed included:

- The objectives of the international CP Network;
- The outcomes, outputs and results expected;
- The membership;
- The differences between NCPCs and other partners;
- The linkages with UNIDO and UNEP.

While there were common views and opinions on certain issues of these subjects, diversified views and opinions were given especially, on the criteria of the networking. Initially some members were of the opinion that no private consulting firms should be allowed to be members of the network.

In October 2010, a Global Network for Resource Efficient and Cleaner Production (RECP-Net) was established by the UNIDO/UNEP NCPC programme. It has the following types of Members;

- A. Regular Members: not-for-profit organisations or initiatives with a proven track record in RECP service provision in developing and/or in transition countries;
- B. Associate Members: any organisation or initiative with a proven track record in RECP service provision in developing and/or in transition countries that is/are unable to become a regular Member(s);
- C. Observer Members: not-for-profit organisations or initiatives with an emerging track record in RECP service provision in developing and/or in transition countries.

### **(B) Regional NCPC networks**

With regard to regional networks, the following main issues were discussed:

- Whether regional networks are necessary and whether NCPCs should only be members of the international network;
- In case regional networks are established, what should their linkages be with the international network?

While there was a general acceptance on the need for regional networks, directors proposed certain conditions under which these networks are to be formed. These conditions reflect the preferences of the directors to maintain the cultural diversity and ownership while being part of the international network.

Proposed conditions to be considered in formation of regional networks included:

- The need to recognise the cultural differences of such networks;
- The necessity to continue to be part of the International CP network;
- The need to have their own dynamics and to be active at a more operational level;
- The need for the regional networks to maintain loose linkages to the international network.

Some participants stated that it is not mandatory to have regional networks.

It was felt by the members of the meeting that preparation of an inventory of the existing networks would be useful; it was emphasised that strong regional and national networks are valuable for a strong international network. Sections 6.4.4.5 and 6.4.4.6 further review possible approaches for such networks.

#### **6.4.4.5 Major Conclusions of the Independent Evaluation of UNIDO on the UNIDO/UNEP NCPC Programme**

In 2007 the UNIDO had an independent evaluation performed to provide conclusive evidence with regard to the current status, the potential, and the needs of the NCPCs and related initiatives in the UNIDO/UNEP Cleaner Production Programme. The findings of the survey were presented at the 9th Annual Meeting of UNIDO/UNEP NCPC programme for comments and the final report was published in May 2008.

The current status of the NCPCs/NCPP Program was summarised in the report as being in the ‘youth’ stage. To support this conclusion the report’s author stated the following evidence:

- NCPC/NCPPs have been established and are reportedly undertaking CP and CP-related activities;
- There is a richness of experience, and reasonable progress has been made in putting CP on the agenda, delivering professional training and implementation, in particular of low to medium technology options.

- There are pockets of excellent results, but also of poorer quality work, and the Programme has the potential to effectively capture and disseminate best practices through a strong partnership with the emerging network of CP support institutions.

The report highlighted the increased potential for application of CP due to worsening industrial pollution, resource scarcity, globalisation and resulting market pressure and other factors and however, it also acknowledged the large variations of the presence and significance of the rising trends of relevance among the different host countries. The report continued by stating that the increased relevance can be expected to lead to higher awareness and demand from the public and private sectors with regard to support for CP services. The remaining gap between the performance of industry in developing countries and global best practices is considerable, which also underlines the relevance and the potential of CP from a technical perspective.

Adaptation to the changing interests and demands from governments and the private sector was identified as the biggest challenge for the Programme. It highlights the urgent need of a consistent strategy for the programme that is impact-focused, delivers and values excellence and takes due account of the specific situation of host countries. The report's author further elaborated that the strategy should drive the institutionalisation, positioning and profiling of NCPCs/NCPPs into nationally appropriate niches with customised service and capacity profiles. It should effectively promote the sharing of leading practices within a competence based network of CP support institutions, including qualifying NCPCs/NCPPs and other CP service providers not established through the UNIDO-UNEP CP Programme. The funding, management and governance models should also be brought in line with the demands of a maturing Programme, including more programme and less project-by-project funding and a truly joint programme management by UNIDO and UNEP. NCPCs should demonstrate performance against the Programme's outcomes and impacts to continue their association with the Programme.

The report's author included the following twelve sets of recommendations to further expand the vision of a strengthened and re-energised Programme:

1. *Relevance:* the Programme should be continued to assist developing and transition economies to develop capacity to apply CP practices, technologies, methodologies and policies in support of their national socio-economic and environmental priorities;

2. *Impact:* the NCPCs/NCPPs should capitalise on their achievements and target their service delivery better to increase the impact of their services on the uptake of CP practices, technologies and policies, in particular during the phase of support through UNIDO-UNEP and donors;
3. *Design and Strategy:* the Programme should be guided by a succinct programme document, with a clear strategy, a justification of the intervention logic and the specific roles and contributions from UNIDO, UNEP and local and international stakeholders;
4. *Focus (Contents) :* the Programme should re-establish its primary focus on CP and articulate a dual strategy for its further development to enable specialisation (in policy and/or technology) and diversification (socially driven and/or environmentally driven) of NCPSs/NCPPs as they and their national stakeholders see fit in their respective national contexts;
5. *Networking:* the Programme should formulate a clear networking strategy with tangible and realistic outcomes, outputs and activities, which could be realised by supporting a membership based network that would be open to qualifying institutions, including NCPCs and established by the UNIDO-UNEP CP Programme as well as eligible other CP service providers;
6. *Funding Model:* the Programme should adopt a dual funding model at the Programme and national levels: (1) country-based block funding to support NCPCs in their establishment phase; and (2) programme funding for (i) competitive grants to multiple eligible NCPCs and possibly qualifying other CP service providers for project based specialisation and/or diversification; and (ii) networking initiatives;
7. *Central Model:* the Programme should articulate institutional objectives and scenarios for a NCPC so that institutionalisation of the NCPC can be monitored and provisions be created to accommodate both the public interest and private benefit functions of the NCPC services over time;
8. *NCPC Services:* the Programme should support the NCPCs/NCPPs to undertake periodic assessments of the national status of CP, to define and review their strategic niche with service portfolios that are most appropriate and effective in their respective national contexts;



9. *Management and Monitoring*: the Programme should adopt a result-based management model at Programme and national levels and develop a comprehensive system to monitor performance in capacity building, institutional development and results and impacts from CP service delivery. It should also monitor that agreed project structures, governance arrangements and contributions from host countries and institutions are being achieved;
10. *Administration*: the Programme management should streamline programme administration and shift, to the extent feasible, financial responsibility and accountability to the NCPCs/ NCPPs and/or national stakeholders;
11. *Governance and Ownership*: the Programme and the NCPCs should adopt transparent and accountable governance structures at the Programme and national levels, preferably with small boards with participation of private sector, government and civil society, that assume accountability for the success of the Programme and the NCPCs;
12. *Excellence*: the Programme should establish a culture of experimentation and continuous improvement in CP service delivery. Sufficient programme funding should be made available for that purpose.

The report's author stated that these main recommendations provide an integrated framework for developing and managing the UNIDO-UNEP CP Programme for growth and quality of the NCPCs/NCPPs and related CP initiatives. It is a broad guideline for change that will require stepwise implementation.

#### **6.4.4.6 Summary and conclusions:**

Despite of the ambitious initiatives and efforts of strengthening international and national CP networks, it was observed by the author that more demand driven approaches are necessary to secure and strengthen effective international CP networks. Priorities of national governments are still different as ecologically and ethically sound economic development is a necessary condition for social development. Therefore, other sources of funding are necessary to maintain an effective international network. The present global economic crises also have a negative impact on predictable fund raising for such networks in a sustainable manner.

Therefore, low cost networking mechanisms would be useful as a short-term strategy that can be strengthened further by linking to other, existing networks for value addition. If the international community, especially the industrialised countries, allocate a certain percentage of their stimulus packages to promote green economic activities, such an approach could help to stimulate creation of green jobs and eventually to stimulate sustainable production practices through international networking.

## **6.5 Other International External Forces on the Service Delivery of NCPCs**

### **6.5.1 Observations made at the 17th Session of the UN Commission of Sustainable Development (CSD) held in May 2009, in New York.**

The United Nations Commission on Sustainable Development (CSD) process is considered as an important opportunity to strengthen corporation with other UN agencies such as UNIDO, UNDESA (CSD Secretariat) and Regional Economic Commissions of the five UN regions and facilitate countries to implement sustainable development practices. CSD was established by the UN General Assembly in December 1992 to ensure effective follow-up of the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit held in June 1992 in Rio de Janeiro, Brazil.<sup>44</sup>

The CSD meets annually in New York, in two-year cycles, with each cycle focusing on clusters of specific thematic and cross-sectoral issues, outlined in its new multi-year program of work (2003-2007) adopted at CSD 11 in 2003. Each cycle is comprised of a review year and a policy year. The CSD has opened its sessions to broad participation from both governmental and non-governmental actors. As a functional commission of the UN Economic and Social Council (ECOSOC), CSD has 53 member states. About one third of the members are elected on a yearly basis.

The author attended the 17<sup>th</sup> Session of CSD, which was convened from 4-15 May 2009, at UN Headquarters in New York. The 17<sup>th</sup> Session focused on the thematic cluster of agriculture, rural development, drought, desertification and Africa. CSD16, in May 2008, has conducted a review of barriers and constraints in implementation, as well as lessons learned and best practices, in relation to the thematic cluster. CSD17 negotiated policy recommendations based

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<sup>44</sup> The CSD is responsible for reviewing progress in the implementation of Agenda 21 and the Rio Declaration on the Environment and Development adopted at the UNCED; as well as providing policy guidance to follow up on the Johannesburg Plan of Implementation (JPOI) adopted in the Johannesburg Earth Summit, known as Rio+10, held in 2002 in South Africa at the local, national, regional and international levels.

on CSD16's review of the issues and a draft Chair's negotiating text.

Even though delegates were expected to identify meaningful policy options to the six issues of the thematic cluster considered at CSD17 by strengthening the process of sustainable development across the globe, the final text does not reflect the level of commitments required both from developed and developing countries to adequately address global SCP issues even after a lengthy negotiating process. This situation signalled to the global community the urgent need for paradigm shifts of the present strategies used as the means of implementation towards global sustainable development. The session conclusions called for new and innovative strategies based on the universal sustainable development governance structure.

The role of the CSD and its ability to build a bridge among different domains on the sustainable development agenda was questionable in the absence of an international environmental governance structure. The need for a comprehensive international environmental governance structure was expressed during the intensive battles over the negotiating texts even when reaffirming existing commitments. While the G-77/China,<sup>45</sup> strived for new ground in terms of international financial support, pointing out that agriculture and rural development lie at the heart of the goal of eradicating poverty, the developed countries were reluctant to go beyond previously agreed commitments, stressing that the CSD is not a pledging conference (Earth Negotiations Bulletin (May 2009)).

It is important to note that the negotiations took place against the backdrop of fluctuating food and energy prices followed by the global economic recession. All these crises are interrelated and without international collaboration to address the conflicting issues related to equitable development and SCP throughout the globe, temporary stimulus packages will never be able to address the present global multiple crises. Instead it will spread further to all countries, creating political unrest across the globe.

The following text presented in the report of CSD17 on the SCP provides the way forward according to the CSD17:

Fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development. Such actions include:

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<sup>45</sup> The G77 is the largest intergovernmental organization of developing states in the UN that provides a forum to articulate and promote their collective interests and to enhance the joint negotiating capacity at international fora. The G77 was established in 1994 by 77 developing countries. At present it has 134 countries.

- (a) Promoting sustainable consumption and production patterns, taking actions, including working through the Marrakech process, with developed countries taking the lead, with all countries benefiting from the process and taking into account the Rio Principles including, *inter alia*, the principle of common but differentiated responsibilities and respective capabilities;
- (b) Encouraging and promoting the development of a ten-year framework of programmes in support of regional and national initiatives, to accelerate the shift towards sustainable consumption and production, to promote social and economic development within the carrying capacity of ecosystems by addressing and where appropriate, delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resources degradation, pollution and waste, for deliberation at the 18th and 19th sessions of CSD. In this regard, all countries should take action; with developed countries taking the lead, taking into account the development needs and capabilities of developing countries through mobilisation, from all sources, of financial and technical assistance and capacity building for developing countries;
- (c) Supporting sustainable agricultural production including alternative methods of farming;
- (d) Encouraging science-based approaches, such as life cycle analyses, which can help promote more sustainable production practices and offer consumers more sustainable consumption choices;
- (e) Promoting education, awareness raising and information, as these can change consumers' behaviour and thus function as a means towards more sustainable lifestyles.

In addition the group agreed upon text on the following three categorical areas:

- a) Enhance availability and effective use of finance for sustainable development;
- b) Support the World Trading System recognising the major role trade plays in achieving sustainable development;
- c) “Enhance and Promote capacity- building efforts and promote transfer of technology to developing countries provides elements that can be used to bridge several gaps in promoting SCP in developing countries.

The commitment for implementation of these provisions by countries is however, questionable, as these provisions were included in the text proposed by the Chair on the last evening of the CSD as a solution to the unresolved issues to which delegates were unable to reach consensus. Even though there were concerns on many unresolved issues, delegates adopted the text proposed by Chair by acclamation during the closing plenary as it was considered to be the best text that could be agreed upon at that time.

Common decision-making will not be a sufficient condition even though it is a necessary pre-requisite for policy making. Creating an environment conducive for effective collaboration is of vital importance to ensure implementation of the common decisions made together. The *‘minimum set of conditions’* proposed by the author in the theoretical model for effective collaboration of different stakeholders was designed to a basic prerequisite to effective collaboration on SPC.

### **6.5.2 International Collaboration for Ecosystem Stability and the International Environmental Governance (IEG)**

At the UNEP 25th GC/GEMF held during February 16 to 20, 2009 in Nairobi, Kenya, it was noted that the current environmental governing system either cannot meet – or has problems in meeting – the environmental challenges that we face today. Reform should be built on broadening the mandate of international environmental governance to include sustainable development at its core; reforms should strengthen the integration of environment into the broader development agenda and the ability of countries to meet both their environmental and development objectives (UNEPGCSS.XI/10).

The issue of establishing a global environmental governing system was a concern of the global community over the past several years and at the 25th Session of the Governing Council/ Global Environmental Ministers Forum of the United Nations Environment Programme (UNEP), held in February 2009 in Kenya, the first theme discussed was “Globalisation and the Environment - Global crises: national chaos?”, a topic related to global environmental governance. The consultations provided an opportunity to global environmental ministers to discuss the way forward to meet multiple environmental and development challenges at the national level and to capitalise on opportunities that might arise and how national and international environmental governance, including trade and financing mechanisms, might better support such endeavours. At this forum, after extensive deliberations, a decision was made to establish a regionally representative consultative group of Ministers or High-level representatives on International Environmental Governance.

The author attended this forum as a member of the delegation from Sri Lanka. The observations made therein were used as inputs for this research.

The Consultative Group was comprised of representatives of two to four governments from each UN region, while remaining open to participation by any other interested government(s). However it has to be emphasised that due to financial constraints, many developing countries will not be able to participate at these meetings. Nevertheless consideration of the issue of the need for a new International Environmental Governance System can be sighted as a positive and timely intervention in light of the present multiple global crises in terms of financial, economic, environmental and social dimensions.

It is important to note that the World Economic Forum has identified that Global Governance is a Key to Global Stability and Sustainability for the first time in its Global Risk Report (2009).

The Global Environmental Governance – Perspectives on the Current Debate (2007) focus on improving international environmental governance and some of the Chapters include and build on ideas developed in earlier proposals: a World Environment Organisation, upgrading UNEP into a specialised Agency (UNEO); transformation of the Climate Regime by 2012; clustering the secretariats of the hundreds of Multilateral environmental Agreements, an Environmental court, and the proposal of Trusteeship Council into an organ for Global Environmental Governance (Global Environmental Governance – Perspectives on the Current Debate (2007).

After creation of UNEP in 1972 by the UN general Assembly, calls for improving IEG have emerged within and outside the UN system. The background paper of the Executive Director of UNEP addressed many of these initiatives starting from the Nairobi Declaration of February 7, 1997 on the role and mandate of UNEP and Malmo Declaration of May 31, 2000. The 2009 Joint Inspection Report, in reviewing the environmental governance system, observed that the terms environmental governance and sustainable development governance are often used interchangeably in the UN system, and that as programmatic labels, they include similar sets of issues and actions. There is a need to further enhance the integration of environmental governance with social and economic governance and thus to strengthen sustainable development (Note by the Executive Director of UNEP for the First Consultative Group of Ministers or High level Representatives June 2009).

The basic principle of the new governance structure is that “Form should follow functions”. The note prepared by the Executive Director of UNEP for the first consultative meeting provides insights to understand where the core governance challenges lie to develop the options for reform.

It is important to note that the most critical areas that have been identified by the note of the Executive Director of UNEP to view the future perspectives and trends of SCP issues as these attempts shows the potential of SCP activities if such governance structure can be established by the international community.

The six critical areas identified in the report are:

- 1) Keeping the world environmental situation under review and mobilising scientific expertise in doing so – towards a strong, credible and coherent science base;
- 2) International agenda setting and cooperation in addressing the environmental dimension of sustainable development–towards a global authoritative and responsive voice for sustainability;
- 3) Concerted and coherent actions within the multilateral system where compliance and effectiveness are regularly reviewed–towards coherence within the United Nations system between the many conventions and agencies dealing with the environment, especially the multilateral environmental agreements;
- 4) Financing environmental initiatives-towards sufficient, predictable and coherent funding for achieving sustainability;
- 5) Assisting countries in implementing their international obligations at the national level and achieving their environmental goals, targets and objectives-towards a responsive and cohesive approach to meeting country needs;
- 6) Developing policies, joint international actions and best practices for sustainable development facilitating the transition towards a global green economy.

It is obvious that a science-based monitoring system to evaluate the status of the environment is an essential prerequisite to implementing international, regional and national policy development. However it can be noted that the existing governing mechanisms have failed to secure commitments of the global community to reverse the trends of present unsustainable consumption and production patterns.

Extensive deliberations are going on in the global community on the possible scenarios that could be agreed upon on the issue of climate change. The issues are directly related to SCP. Effectiveness of service delivery of environmental service providers such as NCPs worldwide would directly depend on the ability of the global community to address IEG issues more seriously.

### **6.5.3 Climate Change and Environmental Governance – Opportunities and Challenges to the Global Community**

Climate change and related environmental, socio-economic issues can be sighted as a classic example for the need for global environmental governance to maintain the ecosystem stability. Climate change presents an unprecedented challenge to global and local communities demanding progressive policy regimes and taking immediate action that will achieve reduction of the greenhouse gas emissions which cause global warming and thereby climate change.

According to the International Panel of Climate Change, it is necessary to keep the global temperature increase below 20 centigrade in the 21st century to avoid dangerous impacts due to climate change with a 50% probability. This will require industrialised countries to cut emissions as much as 30% below 1990 levels by 2020 and 80% by 2050. Most vulnerable countries demand that societies reduce the 20 targets to 1.50 in order for them to be within safety levels.

Achieving these targets has become a challenge given the existing unsustainable production and consumption patterns, fossil fuel based energy systems and related infrastructure facilities were developed for the achievement of economic development and not for environmental sustainability.

The following global actions reflect three important milestones passed by the global community to address the climate change issue:

1. Adoption of the UN Framework Convention on Climate Change in 1992. The objective is to take global action to address the issue of climate change based on the principle of “common but differentiated responsibility”;



2. Adoption of the Kyoto Protocol in 1997, at the 3<sup>rd</sup> meeting of the conference of the parties, with legally binding targets for the industrialised countries known as annex I parties, to mitigate green house gas emissions;<sup>46</sup>
3. Adoption of the Bali Action Plan (BAP) at the 13th conference (2007) of the parties to the UNFCCC and 3<sup>rd</sup> meeting to the protocol held in Bali, Indonesia with a view to focus on the long term issues of climate change; mitigation, adaptation, finance, and technology and capacity building.

COP15 was held in Copenhagen Dec. 7 -19, 2009. The author attended the conference. The outcome and the experience gained from the negotiating process provided the author a remarkable opportunity to better understand the positions of the global community and their commitment to move toward SCP patterns locally and globally as the outcome expected was heavily linked to the issues related to scientific, legal, political, economic and social.

Despite the extensive, two-year long negotiations, global leaders failed to establish a fair, ambitious and equitable agreement in Copenhagen, for setting a road map to avoid dangerous climate change based on the scientific evidence. The negotiating process in Copenhagen had far from good governance practices. The most unfortunate feature of COP15 was the undemocratic way of conducting the negotiating process by the president of COP15 and a few powerful countries which ignored the years of preparation under the agreed two track approach thereby, deviating from the normal ethics of the UN system. The outcome of this undemocratic process was an Accord titled “Copenhagen Accord” designed by this minority group, keeping away all the other countries, as the way forward<sup>47</sup> to address the climate problem, as a result of which COP15 only took note without adoption it in its entirety.

The “Accord” contains 12 paragraphs with much diluted-down, open-ended, texts that ignore the progress made during the two-year negotiating process. The “Copenhagen Accord” was initiated by a minority of powerful global leaders at the beginning of the conference and was forced onto the other parties through a few countries called *‘friends of the chair’*.

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<sup>46</sup> Kyoto Protocol calls for 5.2% of emission reductions below 1990 emission levels during 2008-2012 (the first commitment period) in aggregate. To achieve this target developed countries have been assigned to abide by different targets. However USA, the highest GHG emitter did not ratify the Protocol.

<sup>47</sup> The Accord was forwarded to the parties on 19th., one day after the scheduled closing date of the conference.

The minority of powerful countries was able to force the other countries to accept the “Accord” by offering US\$ 30 billion for the period 2010-2012 and 100 billion US\$ a year by 2020 to address the needs of the developing countries. There were no legally binding emission reduction targets agreed upon by the industrialised countries in the “Accord”. Instead of that a window was opened for further negotiations.

The problem is that the countries will be able to negotiate and safeguard their self-interests. Will the atmosphere negotiate with us?

According to IPCC’s Carbon Budget, the environmentally permissible carbon quota per person for 2009 is 2170 kg. The world average is 4700 kg that is twice the permissible level. That means low emitting countries cannot emit more for their economic development because the permissible ecological space has already been exploited by industrialised countries without considering the limitations of environmental space, which belongs to all. Therefore, developing countries claim that there is an ethical responsibility for the industrialised countries to seriously consider compensating the overexploitation of the carbon space without demanding undue conditions. Many of the developing countries are especially vulnerable to climate change as they do not have adequate resources to be able to adapt to the impacts. In the process of addressing the climate change problem collaboratively, the developing countries expect to be compensated for the environmental debt that is owed them. This is the ethical responsibility of the developed countries that the global community looks forward to.

It is also a fact that all the countries in the world have to take action to address the climate change issue both developed and developing countries, based on the principle of common but differentiated responsibility. Developing countries could develop and implement national policies promoting SPC in their economic development process to keep their foot prints at a minimum level if incremental costs could be covered by the industrialised countries.

The sources of emissions of the developing countries are mostly due to unsustainable production, which contributes the economic development, and poverty alleviation (social development), which are the other two major pillars of sustainable development. The sources of emissions of Annex I countries are mostly due to unsustainable consumption, which of course is based upon unsustainable production of unsustainable products and poor processes. Cleaner technologies are necessary but not sufficient to transform the current unsustainable production practices in a sustainable manner. Developed countries are in a better position to develop cleaner technologies and to provide the know-how to developing countries to move

away from the pattern of development used by them which caused the present problems. Collaboration is an essential element of the way forward to meet these objectives.

In order to make effective collaboration possible, it is necessary for all the stakeholders to thoroughly understand the extent to which the natural ecosystem can be sustainably utilised for human use and the strategic approaches needed to achieve optimum results to keep the consumption and production patterns within the limits of the carrying capacity of the ecosystem.

The outcome of COP 15 clearly shows the lack of leadership and commitment of the international community to move to SCP in their development process. More instruments, tools, strategies, procedures and ethical commitment are necessary to make the global community unite to address the global environmental problems since the present strategy of keeping the opposition happy by offering financial resources will not solve the global environmental problems, which may even lead to the extinction of human beings.

According to the pledges submitted by parties associated with the Copenhagen accord which represents larger emitters the aggregate reduction were between 12 to 18% as against the requirement of 25 – 40% by 2020. The financial pledges also were mostly a mix of existing ODA as against new and additional resources mentioned in the accord itself. (WRI February 2010). With the global human population continuing to increase by approximately 70,000,000 per year, the situation will continue to get worse.

The per capita CO<sub>2</sub> emission Sri Lanka is 669 kg and Sri Lanka needs to expand her energy production capacity in the coming years to meet the socio-economic requirements. Also Sri Lanka needs new and additional financial resources to reverse the trends of business as usual scenarios practiced by industrialised countries. Population growth of Sri Lanka has been 1.1%/yr<sup>48</sup> since 2004. All these global and local trends are to be considered as external forces in developing the SPC model for Sri Lanka.

## **6.6 Responses to the Structured Interview of some of the Major Stakeholders**

Interviews were conducted individually with selected major stakeholders of CP in Sri Lanka to get their comments on the system model developed (figure 6.2) connected to the service delivery of NCPCs with a view to improve the quality of the findings of the survey.

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<sup>48</sup> This is the lowest among South Asian countries

1. The Director of NCPC together with the Deputy and the Assistant Director
2. The Chief Executive of the Industrial Technology Institute (ITI) which is functioning under the Ministry of Science and Technology
3. The Deputy Director General of Environmental Protection of the Central Environmental Authority (CEA) which is functioning under the Ministry of Environment
4. The Director of the Energy Management Division of the National Engineering Research and Development (NERD) Centre which is functioning under the Ministry of Science and Technology
5. Additional Secretary, Ministry of Industries and Commerce

The system model developed considering the service delivery of NCPC as the unit of analysis (Figure 6.2) was presented to the stakeholders for their critical comments.

### **6.6.1 A summary of the comments received from the interviewees**

This section presents: the general comments of these six stakeholders who were interviewed on the problems related to promotion of CP and their proposed approaches to improve the service delivery of NCPC. Additionally, specific comments and conclusions are presented.

All these stakeholders generally accepted that much more work must be done on scaling up CP/SCP activities in the country. In addition to that the Director of the Sri Lankan NCPC is of the view that the NCPC should be established by an Act. of Parliament as an independent organisation. However there were different views on this issue by other stakeholders. Some stakeholders were of the view that the NCPC should be linked to CEA through an organisation functioning under the ministry of environment where industries can be promoted CP application linking to the CEA's law enforcement system. Another alternative proposal was to link the NCPC to the Ministry of Science and Technology.

### 6.6.1.1 General Comments

#### (A) The Problem

- According to the proposal submitted to UNIDO to establish the NCPC in Sri Lanka it was expected that there would be sufficient demand in the country for CP related activities and after an initial period of approximately five years the NCPC would become self-sufficient from UNIDO's financial support.
- It was strongly recommended that the NCPC should be managed by the private sector for it to be dynamic, market driven and proactive to make it a viable venture. The Sri Lankan NCPC was therefore, established under the Federation of Chambers of Industry as a separate entity with initial start-up capital of US\$1,428,772 for five years (Ref. Integrated Cleaner Production into Industrial Development November 20021) from the Government of Norway through UNIDO.
- The Sri Lankan NCPC has not been able to become self-sufficient despite their tireless efforts even after six years of operation. Furthermore, the majority of its income is derived from projects financed by NGOs and other funding agencies and not directly from the industry.
- This implies that either there is no demand for the NCPC's CP activities as envisaged in the proposal or the industry is not ready to pay for the CP advice they receive, as they feel that the types of CP options that the NCPC officials may propose will not improve their bottom line. Or there are financial difficulties for investment and the NCPC does not have the capacity to favourably impress industrial leaders to make investments for going beyond compliance. Or it is partly due to lack of governmental enforcement of the existing regulations.

#### (B) Suggested conditions necessary to improve the service delivery of the Sri Lankan NCPC:

- A holistic National SPC vision has been developed and is supported by the national government's national policy;
- A national strategy for SCP and a timetable for implementation of the policy including a legal framework, and a marketing and media strategy, have been developed and are officially supported via policy and via budgetary support;

- Processes and procedures for implementation, monitoring and making ongoing changes to the SCP are in operation;
- Indicators to monitor the progress toward achieving SCP and related social-environmental improvements have been selected and are being used;
- Publication of the results and making changes in the goals, educational and training programmes have been developed and are being used to engage and to empower increasing numbers of citizens on SCP and related sustainable development lifestyles.

#### **6.6.1.2 Specific Comments:**

- Private sector initiated ventures will survive as long as donor funds are coming in; they will dry up when such support is discontinued. One clear example was CleaNet set up in 1999 by the Chambers of Commerce in Sri Lanka with World Bank financial support and the support by the Industrial Technology Institute (ITI). The objective of CleaNet was to serve as a clearinghouse to promote implementation of CP options among industrial enterprises. A web service centre for the manufacturing sector supporting pollution prevention and a phone information service to firms without Internet access were the two components of the project. The initial promise of this project was that the operation would become self-sustaining within 2-3 years, but this did not happen and CleaNet was closed when the funding stopped. Many small and some medium-sized industries did not have access to Internet. This implies that CleaNet has not been able to build confidence and retain the focus of the target group as a value added approach for them. Or else, there may be other user-friendly avenues available with the target group to access for information.
- Industrial Technology Institute (ITI), National Engineering Research and Development (NERD) Centre, Industrial Services Board (ISB) and some Universities, which are already doing CP/SCP related work should be given the mandate to promote CP/SCP in the country. However, a mechanism should be developed to attract competent technical personnel with attractive remunerations and strengthen the capacities of these institutions further.
- The NCPC is there to create awareness among the industries and business of the importance of CP/SCP and how they can improve their bottom lines. Once the CP/SCP concepts are promoted adequately, the institutions like ITI, ISB, NERD and the

Universities, which are already assisting industries, and offering various solutions to their environmental issues, can increasingly help to meet the CP/SCP related demands from the industry and society-at large.

- CP/SCP solutions for industry should be part and parcel of the industries other environmental problems-pollution/emission control, waste disposal etc. CP/SCP alone is not that attractive for the local industries, as it is not going to bring them significant benefits. CP/SCP options like repairing leaking taps, minimising energy waste etc., are rudimental for many industries and their problems are much more than that. They require a complete overhaul of their technology so that they can reduce water consumption and energy consumption. But such alternative technologies need heavy investment and we do not give such financial support to promote such ESTs in this country.
- An integrated solution is necessary to promote CP/SCP Sri-Lanka-wide. NCPC can do the promotional work and may be walk through audits with simple CP/SCP solutions while ITI, NERD, ISB and Universities can look after the technological aspects offering consultancies and undertaking contracts to help industries to implement CP/SCP solutions with High tech interventions. Policy instruments should be brought in by the Government to make switching to CP/SCP mode financially attractive- pricing policies for water, energy, waste disposal etc. and importantly funding mechanisms to support heavy technological investment. Another aspect that needs attention is the networking of local institutions with relevant institutions abroad to effectively transfer knowledge and know how in ESTs instead of local institutions reinventing the wheel.
- When these elements are in place, automatically the demand for relevant degree and PG degree programs will increase for the universities to concentrate on producing the necessary workforce to support Sri Lankan-wide implementation of CP/SCP.

## 6.7 Conclusions

In light of the multiple challenges that the global community is facing today, no single country, organisation or network is able to address the challenges in isolation. Apart from the existing problems new and additional problems are emerging daily. Absence of concerted efforts as a global team to address the problems timely aggravated the crisis situation. Many

initiatives have been taken in the recent past by the international environmental, economic and social development related institutions both by UN and outside, to address this problem by promoting SPC in various forms and approaches. However ever increasing population and unsustainable lifestyles offsets these limited positive ad-hoc approaches. Lack of leadership and collaboration is one of the key root causes for this situation.

This crises situation calls for more rigorous knowledge management approaches at all levels around the world for the global community to better understand the need for such leadership and collaboration. This needs sound monitoring and reporting systems of the negative impacts of the present trends of unsustainable production and consumption as against the limited environmental space available as well as the positive initiatives that can be taken together.<sup>49</sup> It is necessary to keep the world leaders, policy makers, scientific community, business community and the civil society at large to ensure sustainable and equitable sharing of the limited resources available for human existence to the maximum extent possible. An International Environmental Governance (IEG) structure should be established with a shared vision and the ongoing programs such as UNIDO/NCPC program, MEAs, other regional centres and more importantly the low cost knowledge management systems such as IJCP should be scaled up to disseminate information worldwide with practical and appropriate solutions to get over the problems especially in the developing countries.

The SPC model for Sri Lanka has to be developed taking these trends into consideration.

In the context of Sri Lanka, the observations and findings gathered from this case study and the experiences gained by the author show that the NCPC, as a single organisation with limited capacities and limited access to resources is NOT able to deliver all of the CP/SCP services to cover the entire country. However the NCPC can play a leading role to stimulate the CP/SCP process throughout the country by networking and co-working with the other CP/SCP related organisations. A sustainable and predictable funding mechanism is an essential prerequisite for both UNIDO and for the NCPC network to ensure effectiveness of the outcome of the NCPC program.

It is necessary to identify and support responsible agents to sensitise/promote/make aware of CPs/ESTs/SPs etc. Focal Points of MEAs, NCPC, and Professional Bodies/NGOs can be

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<sup>49</sup> The global investment of sustainable energy from 2004 – 2007 accounts for: US\$33.2 billion in 2004, 58.5 in 2005, 92.6 in 2006, and 148.4 in 2007. Global Market for organic food 15.2 US\$ billion, 20.9 in 2001, 33.2 in 2003, 25.5 in 2005 and 46.1 in 2007 (Green Economy Investment – UNEP [www.unep.org/greenconomy](http://www.unep.org/greenconomy))



the responsible agents for this purpose.

The Industrial Technology Institute (ITI), The National Engineering Research Centre (NERDC), The Industrial Development Board (IDB), Universities, Industrial Services Board (ISB), Technical Colleges and international networks can be among the responsible agents for Developing/Adapting/Adopting/and Transferring Green Technologies and for the provision of technological and non-technological services to help their societies make the transition to SD.

However, it was noted that the capacity of these service providers is not currently adequate for transfer of technology for the effective application of SPC in the country. The experiences gained by some significant pollution prevention programs referred to in Chapter 5 section 5.5 reveals the need to consider more policy options, innovative institutional and market-based mechanisms and capacity building programmes for the existing and emerging service providers to integrate SPC practices in the country. Private sector and professional institutions should also be encouraged to provide professional services on CP/SCP.

A sound monitoring and reporting system should be developed based on performance indicators at different levels, initially with a mix of external and local funding. The mechanism should be developed to gradually phase-out the external funding and to achieve self-financing based on the polluter pays principle.

Absence of efficient monitoring and reporting systems has been sighted as a significant barrier to ensuring sustainability of the existing CP/SCP related programs.

Experience gained under the SWITCH – Asia programme that was started in 2009 on SCP shows clearly the need to focus more on multifaceted approaches to stimulate SMEs in SCP practices. The SWITCH – Asia programme was initiated by the Ceylon Chamber of Commerce to promote SCP in SMEs in the Food & Beverage sector with financial assistance from the European Commission.

The main objectives of this project are to work on capacity building on SCP in local organisations (e.g. Ceylon Chamber of Commerce- CCC, ITB, Industrial Services Board - ISB, Industrial Development Board - IDB etc.) on one hand and on the other hand to support individual enterprises in application of SPC, and to build a knowledge base through a large number of success stories that will be disseminated effectively to create further replication.

However despite of many significant CP initiatives taken since 1993 (Chapter 5), and the existence of a national CP policy (2005) and a NCPC (2002), the SWITCH Asia project experiences challenges mainly due to:

- Lack of understanding of enterprises of the concept of CP;
- Lack of data available to analyse inefficiencies because of inadequate internal monitoring systems;
- Lack of awareness of entrepreneurs of the growing interest of buyers (companies as part of supply chain but also consumers) for more green products;
- Financial constraints to invest in feasible options;
- Insufficient financial data to assess the SMEs.
- Lack of skilled human resources available on CP/SCP application

As part of the project, programmes were developed to overcome those barriers via customised awareness programmes and tailored support to individual enterprises.

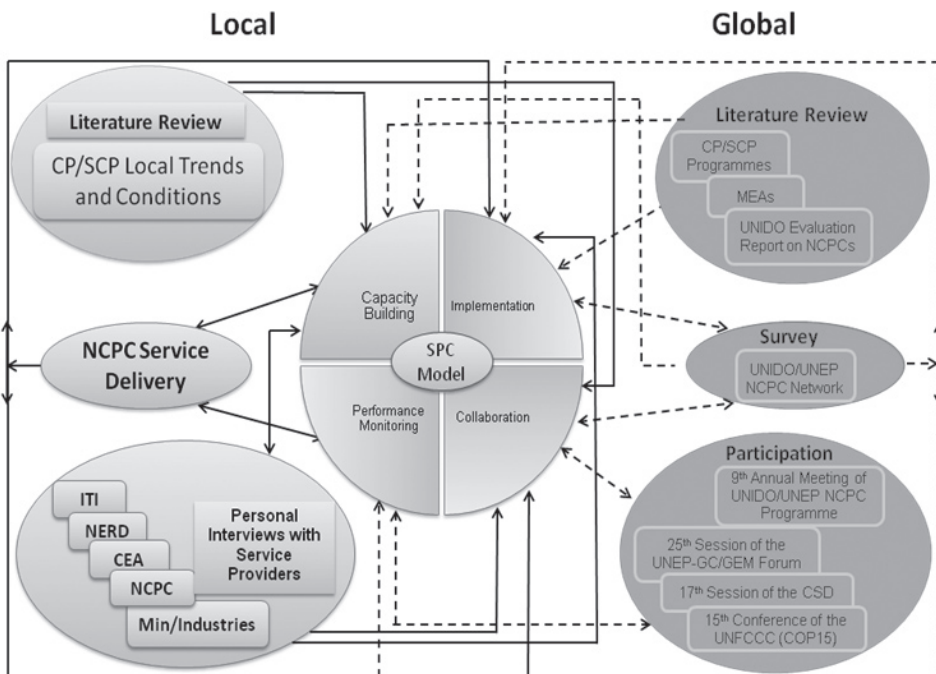
However, the author documented that more collaborative action is necessary with policy makers, green technology suppliers and financial institutions to create an enabling environment to fulfil the objectives of the project. It is envisaged that the National Council for Sustainable Development established in 2009 under the chairmanship of the president of Sri Lanka will help to fulfil the minimum conditions for collaboration of the major stakeholders to function under different mandates within Sri Lanka's SPC programme.

The proposed SPC model was developed to consider all these practical aspects to make the model practically implementable. Fig. 6.3 presents a list of the multiple sources of data used in case study one and their linkages to the main components of the SPC model.

It is important to note that the author was able to utilise multiple sources of data in case study one without limiting to the survey of the UNIDO/UNEP NCPC Network, which used a questionnaire for data collection. The UNIDO/UNEP network is also significant as it is the largest UN network, which was designed to promote application of CP exclusively in developing countries and in countries in economies in transition. Analyzing the adequacy/ability of such a network to promote CP globally and locally is significant especially as there is a NCPC established and functioning in Sri Lanka.

The multiple sources of data, when taken together, formed a larger sample to evaluate the developing country perspective of application of SPC which is a rare opportunity that a researcher can benefit from. This is the uniqueness of this research. That is the ability to take evidence as an observer as well as, as a participant at international fora where the international community (both developed and developing country representatives) negotiated to address global environmental challenges. The real life context of decision-making at the international level on the issue of sustainable development was therefore, included to a greater extent to identify the strategies for the SPC model for Sri Lanka considering the developing country perspective in relation to global change.

The findings of Case study one will be useful in challenging the traditional prejudices against the case study method that it should be limited to a specific instance (example, specimen: say company, manager, national strategy) or a larger group (population of companies, managers, national strategies) and a case study is done when it is not feasible and meaningful to study a population, or a larger sample. Responding to a common concern about case studies that they provide little basis for scientific generalisation, Yin (2009) emphasised that, “case studies, like



**Fig. 6.3 Multiple sources of data used in case study one and their linkages to the main components of the SPC model**

experiments, are generalisable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment does not represent a “sample,” and in doing a case study, the goal is to expand and generalise theories (analytical generalisations) and not to enumerate frequencies (statistical generalisations)’. Findings of Case study one can be generalised to the future too, based on the changing responses of the global community to address the multiple environmental challenges. Yin (2009) also specified that case studies can be part of a mixed study and further specified that either a case study within a survey or a survey within a case study is possible in social research.

## CHAPTER 7

### CASE STUDY TWO

**Examine the strengths, challenges and opportunities for application of SPC practices through personal responses of a group of leading environmental policy makers to support regional representatives at an international forum**

#### 7.1 Introduction

Chapter 7 presents information related to Case study two that was designed to provide insights of international leader's perspectives on SPC with special emphasis on policy aspects. It also supports and complements the observations of the validity of the recommendations of Case study one which was focused on implementation aspects of SPC, and of the validity of the theoretical framework proposed in the Chapter 3 of this dissertation and thereby support development of strategies for the SPC model linking local and global perspectives. Yin (2009) specified that trying to use a two case design is a worthy objective, compared to doing a single case study. Theoretical perspectives of the sampling logic and the validity of such consolidation was presented in sections 1.4 and 3.2 in detail and this chapter presents the background, methodology, analysis, and the conclusions & recommendations of case study two.

Case study two is based upon the results of a survey conducted by the author in 2008 to examine the views of an international environmental leader's policy group on the need and potential for application of SPC practices locally and globally. The members of the group were very senior governmental officials of selected countries who were nominated to identify synergies among the following multilateral environmental conventions: The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), The Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention on POPs) and The Rotterdam Convention on Prior Informed Consent (Rotterdam Convention on PIC).<sup>50</sup>

The members were nominated among the parties (countries) to the respective conventions (the larger group) by the parties to represent them from the five UN regions (Africa, Asia and

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<sup>50</sup> Basel Convention is the most comprehensive global agreement on hazardous wastes and other wastes. It was adopted in March 1989 and entered into force in May 1992 ([www.basel.int](http://www.basel.int)), Stockholm Convention on POPs was adopted in May 2001 and entered into force in May 2005 ([www.pops.int](http://www.pops.int)). Rotterdam Convention on PIC was adopted in September 1998 and entered into force in February 2004 ([www.pic.int](http://www.pic.int)). The three conventions are heavily interlinked and promote environmental friendly production and consumption with special emphasis on preventive measures.

the Pacific, Central and Eastern Europe, Latin America and the Caribbean, Western Europe and others). Therefore, these representatives can be considered as have a potential to promote SPC policy development at local and international level. The objective of the survey was to get different views on SPC from this set of senior policy makers who represented different UN regions of the world to identify synergies of three conventions which are heavily linked to SPC to improve the effectiveness of their implementation in long term. Therefore, these members had the capacity to promote SPC nationally as well as internationally as they were selected not only by their individual courtiers to represent the individual countries but also to represent the cluster of countries in the different UN regions.

The author was one of the members who represented the Asia-Pacific Region; and consequently, the author was able to use this forum to perform an independent survey, which has been developed into Case Study Two of this dissertation.

Section 7.1 introduces Chapter 7.

Section 7.2 presents the methodology of the Case Study Two.

Section 7.3 covers the design of fourteen commonly used statements related to SPC based upon which this case study research was conducted in the form of a survey. The objective of the survey was to obtain and to evaluate the personal opinions of the senior governmental officers on these statements about and of their opinions on different ways to apply SPC in practice, locally and worldwide.

Section 7.4 presents the fourteen statements that include: Nine General Statements commonly used on SCP (7.4.1), and Four Statements (7.4.2) specific to the theoretical framework developed by the author, which are elaborated upon in Chapter Three.

Within the survey, five options were given for the respondents considering the like-mindedness of the forum. These options were: *'fully agree'*, *'agree'*, *'partially agree'*, *'partially disagree'* or *'disagree'* to each of the statements.

Sections 7.5 and 7.6 cover the analysis and interpretation of the implications of the responses.

## 7.2 The Methodology for Case Study Two

In Case Study Two, survey methodology was used to examine the strengths, weaknesses, opportunities and challenges of application of SPC practices based upon insights from members of the international environmental leader's policy group. These policy makers were government officers who had been nominated to represent the five UN Regions<sup>51</sup> on one of the three multilateral environmental conventions referred to in a foregoing paragraph. The representatives were charged with the responsibility of identifying synergies among the conventions and for developing a program to enhance coordination and cooperation to improve effectiveness of the implementation of the conventions, which are extensively interconnected. Three representatives for each convention were nominated to represent each of the five UN Regions; therefore, there were a total of 45 participants in that forum. The author represented the Asia-Pacific region under the Stockholm Convention on POPs.

The author used this forum to obtain personal responses from the forum participants with regard to application of SPC nationally and worldwide in light of the fact of the change agent roles that they can play domestically and internationally to promote SPC, as the objective of these three conventions is environmentally sound waste/chemicals management. The assumption was that the views of members of such environmental advocacy groups would reflect their organisations' opinions about the potential of the application of SCP in the decision making processes nationally and globally. The forum met three times to perform its work; the author distributed the questionnaire at the third meeting where 39 members were present. Twenty-two (22) members completed the questionnaire at the meeting despite their busy schedules. Five other members agreed to send their responses later, but were unable to do so.

The questionnaire was used to obtain the personal reflections of the forum participants on different commonly used statements related to the application of SPC locally and globally. The statements were designed to gain insights from people from different countries related to SPC policies and strategies, which could be used to develop and/or to improve the strategies to promote SPC in Sri Lanka. Results of analyses of the responses were used to validate the set of criteria of the proposed theoretical framework presented in Chapter 3.

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<sup>51</sup> Africa, Asia and the Pacific, Central and Eastern Europe, Group of Latin America and Caribbean, Western Europe and others

## 7.3 Design of the statements of the questionnaire

### 7.3.1 General

The statements of the questionnaire were developed based on the following two propositions that underlie the three research questions of this dissertation presented in section 1.3 of Chapter 1 and in section 3.1 of Chapter 3.

#### The two propositions:

##### Proposition 1

- In the light of globalisation and related market mechanisms, no single country would be able to address the global environmental challenges and related national impacts in isolation.

##### Proposition 2

- Even though the concepts of CP and SCP have been formally adopted at the UNCED in 1992,<sup>52</sup> implementation is far less rapid than was expected and that is urgently needed.

Case Study Two was used to address research questions 2 and 3 as it was designed to improve mutual understanding of the perceptions of different countries on application of SPC worldwide. As the respondents were members of the delegations at the negotiating tables, representing their countries in various MEAs, such mutual understanding is important to be considered in the development of the SPC model for Sri Lanka.

Fourteen commonly used statements were developed to obtain insights from the participants of the forum. Nine of them were general statements related to SPC policies, roles of the general public and the business community to promote SPC, and the level of awareness of governmental officials on SPC in different countries. These statements were formulated based on the divergent issues raised at international/national conferences and discussions in general as views of individual parties or individuals irrespective of the author's personal view. Both the production and consumption side were taken into account. The last five statements were directly related to the theoretical framework presented in Chapter 3. The responses were used to validate it.

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<sup>52</sup> Chapter 4 and 20 of the Agenda 21 adopted at UNCED exclusively refer SPC and CP. CP programme was launched by UNEP in 1989 and the first seminar on CP was held in Canterbury in 1990.



### 7.3.2 General Statements

1. The Business Community can successfully implement SPC practices even in the absence of national policies relating to SPC if they are empowered with relevant knowledge and skills.
2. SPC practices can be successfully implemented at the grassroots/community level, even in the absence of national policies relating to SPC if communities are empowered with relevant knowledge and skills.
3. SCP practices cannot be successfully implemented without empowerment of the communities at the grassroots level, even when national policies relating to SPC are present in the country.
4. SCP practices cannot be successfully implemented if SCP principles are not incorporated into the national policies.
5. Policy makers in your country are well aware of the principles of SCP.
6. Policy makers in the environmental sector in your country are well aware of the principles of SPC.
7. Developing countries should be allowed to develop their economies before embarking on application of SPC practices
8. Developed countries should take the lead in application of SPC practices as they have used the natural resource base extensively for their development and they are in a better position to bear the initial incremental costs required.
9. Current efforts of MEAs are not adequate to promote SPC globally.

### 7.3.3 Statements specific to the theoretical framework

10. Inadequate ‘Mutual Understanding’ of the stakeholders on the linkages and interdependence of the economic, social and environmental issues is the major obstacle for application of SPC practices.
11. Lack of ‘*Mutual Trust*’ among the stakeholders in economic, social and environmental sectors is the major obstacle for application of SCP practices.
12. Lack of incentives is the major obstacle for application of SPC practices.
13. Lack of financial resources is the major obstacle for application of SPC practices.
14. Lack of technical capacity is the major obstacle for application of SPC practices.

### **7.3.4 The five choices offered for responses**

In the questionnaire, provision was made to obtain responses of the members of the forum under five different categories for each statement. The objective was to obtain insight into the similarities and differences in opinions of respondents from different countries on these issues pertaining to implementation of SPC. Five options were given for the respondents.

#### **The five response options included:**

1. Fully Agree;
2. Agree;
3. Partially Agree;
4. Partially Disagree;
5. Disagree.

Provisions were made for the respondents offering options to either “Partially Agree (3rd option)” or “Partially Disagree (4th option)” for the statements to capture diversified views of their responses. An option for “Fully Disagree” was thus omitted to facilitate retaining 3rd and 4th options together. The assumption was that responses for 3rd and 4th options would be more useful for an in-depth analysis of the responses than leaving the option to “Fully Disagree as the 5th option” for a like-minded group used for the survey. The responses received to options 3 and 4 are presented in the Table 7.1; they confirm the validity of this assumption because respondents have substantially utilised 3rd and 4th options to reflect their opinion than that for the option 5.

### **7.4 Analysis of the responses**

This section presents an overview of the responses, which are grouped as percentages under each category (Table 7.1), and are presented graphically in Figures 7.1 and 7.2. The objective was to obtain insights into the diversities of views and zones of agreements/disagreements to the statements.

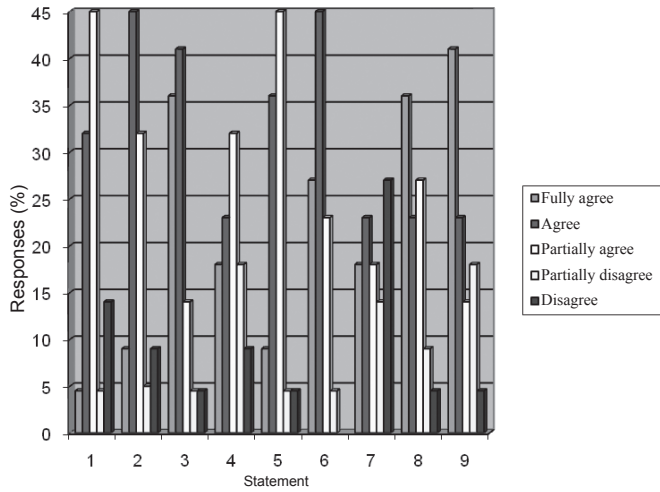
**Table 7.1: The responses of the members to the questionnaire on implementation of SCP in their country or region**

Statement	Response (%)				
	Fully Agree	Agree	Partially Agree	Partially Disagree	Disagree
SPC practices can be successfully implemented by the Business Community even in the absence of national policies relating to SPC if they are empowered with relevant knowledge and skills.	4.5	32	45	4.5	14
SCP practices cannot be successfully implemented without empowerment of the communities at the grassroots level even when national policies relating to SPC are present in the country.	9	45	32	5	9
SCP practices cannot be successfully implemented without empowerment of the communities at the grassroots level even when national policies relating to SPC are present in the country	36	41	14	4.5	4.5
SCP practices cannot be successfully implemented if SCP principles are not incorporated into the national policies.	18	23	32	18	9
Policy makers in your country are well aware of the principles of SPC.	9	36	45	4.5	4.5
Policy makers in the environmental sector in your country are well aware of the principles of SPC.	27	45	23	4.5	

Statement	Response (%)				
	Fully Agree	Agree	Partially Agree	Partially Disagree	Disagree
Developing countries should be allowed to develop their economies before embarking on application of SPC practices.	18	23	18	14	27
Developed countries should take the lead in application of SPC practices as they have used the natural resource base extensively for their development and they are in a better position to bear the initial incremental costs required.	36	23	27	9	4.5
Current efforts of MEAs are not adequate to promote SPC globally.	41	23	14	18	4.5
Inadequate 'Mutual Understanding' of the stakeholders on the linkages and interdependence of the economic, social and environmental issues is the major obstacle for application of SPC practices.	33	33	28	6	
Lack of 'Mutual Trust' among the stakeholders in economic, social and environmental sectors is the major obstacle for application of SCP practices.	39	28	11	17	6
Lack of 'Incentives' is the major obstacle for application of SPC practices.	44	28	22		
Lack of 'Financial resources' is the major obstacle for application of SPC practices.	44	17	17	17	6

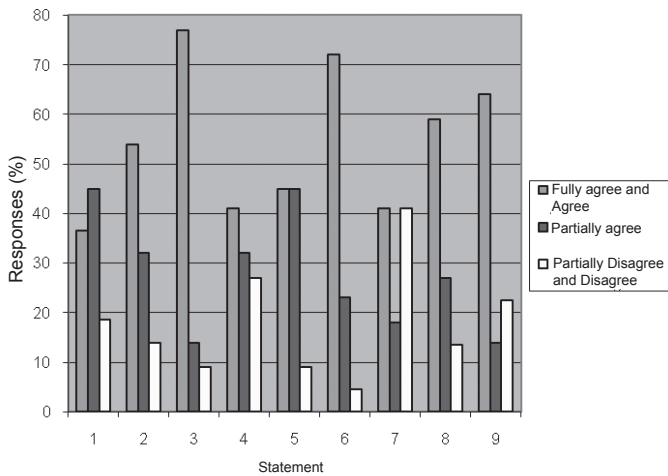
Statement	Response (%)				
	Fully Agree	Agree	Partially Agree	Partially Disagree	Disagree
Lack of 'Technical capacity' is the major obstacle for application of SPC practices.	44	11	33	6	6

Figure 7.1 shows an overview of the responses to the first nine statements with all 5-response categories. When the first nine statements are taken together, it is seen that between 30% - 45% responses to statements 1, 2, 4, and 5 are under the category of “Partially Agree” whereas the corresponding responses under “partially disagree” for the similar statements fall 4.5, 5, 18 and 4.5 (Table 7.1). At the same time more than 30% responses to statements 1,2,3,5, and 6 are in the category of “Agree.” In relation to statement number 4, when the two categories “Fully Agree” and “Agree” are added together, the percentage is 44%.



**Figure 7.1: An overview of the responses (%) to the first nine theoretical statements with all 5-response categories.**

Figure 7.2 shows an overview of the responses to the first nine statements with 3 categories developed by consolidating “Fully Agree” & “Agree” and “Partially Disagree” & “Disagree.” It was noted that when the categories “Agree” & “Fully Agree” and “Partially Disagree” & “Disagree” are added together, a higher zone of agreement (40%-77%) is seen reflecting common positions (the bottom line) of the group.



**Figure 7.2: An overview of the responses (%) to the first nine statements with 3 categories consolidating “fully agree” & “agree” and “partially disagree” & “disagree”.**

Notwithstanding the above observation, the diversity of the responses of the group is also significant because the group was considered to be a like-minded group that was gathered to address common issues at the international level. However the differences were relatively narrow.

The following sections present in-depth analyses of the responses for each statement.

## **7.5 Discussion of the Possible Meaning of the Responses to the General Statements**

This section discusses and interprets the responses of the members of the forum to the general statements in the SCP questionnaire.

### **7.5.1 Potential of communities to promote SPC at the grassroots level.**

The responses to statements 1, 2, 3, and 4, when taken together, clearly show agreement of the respondents that there is greater potential of the community to successfully promote SPC at the grassroots level if they are empowered with relevant knowledge and skills. They feel that this is even more important than the roles of the business community and the existence of national policies on SPC (Figure 7.3).

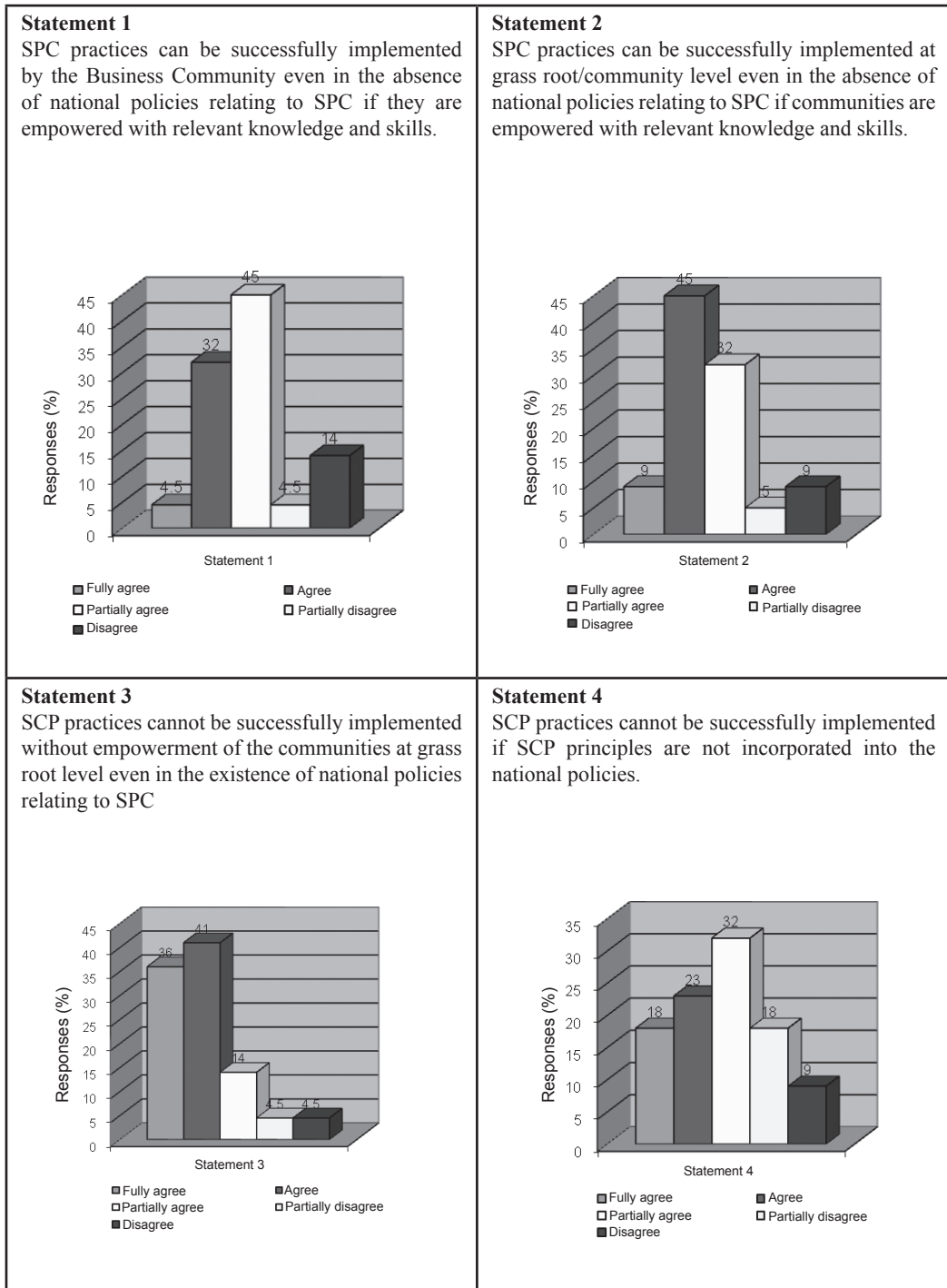


Figure 7.3: Responses to statements 1, 2, 3 and 4



Forty-five percent (45%) “Agreed” and 9% “Fully Agreed” that “*SPC practices can be successfully implemented at the grassroots/community level even in the absence of national policies relating to SPC if communities are empowered with relevant knowledge and skills (Statement 2).*” The total of these three of 86% is very significant. Communities act as producers as well as consumers covering both demand and supply side management.

Also, 41 % “Agreed” and 36% Fully Agreed” that “*SCP practices cannot be successfully implemented without empowerment of the communities at the grassroots level even with national policies related to SPC (Statement 3).*”

This shows the potential power of the community as consumers to make changes to reverse the unsustainable practices, based on their knowledge on the positive and negative impacts of the “business as usual” practices. However, it has to be noted that the expected results of the community response would greatly depend on the socio-economic situation of the country concerned. The choice of the consumer mostly depends on the purchasing power. The argument is that the consumer may tend to purchase the cheaper products even if they are aware of the negative environmental impacts based on their purchasing behaviours. National positions on consumer demand for environmentally friendly products also vary based on local lifestyles backed by cultural characteristics.

In a country like Sri Lanka, it may be relatively easier to make behavioural changes provided that environmentally friendly production technologies and consumer products are made available at affordable prices. In the absence of mechanisms to fully reflect the true environmental costs of production in the current market system, consumer pressure to implement SPC will depend on their awareness, empowerment and upon their purchasing power. This conclusion further emphasises the need of policies that reflect the true environmental and social costs in the market price of the goods and services. At the same time, the need for economic development to improve the purchasing capacity is also equally important to achieve sustainable development of a country.

However, on the other hand, it has to be highlighted that many achievements can be made in countries like Sri Lanka even within the current system since wastage is considered culturally to be misbehaviour. When a product can no longer be used for the originally intended purpose, it was used for some other purpose. Sri Lanka also has a proud history of natural resources management and their sustainable use. It is important to highlight that the principles behind these practices are remarkably similar to the modern concepts of conservation and sustainable

use, which are promoted under modern environmental advocacy. These practices were, in fact, ingrained as ethical principles in the very fabric of ancient Sri Lankan society, supported by state policy, religion and traditional knowledge. This potential can again be made use of today to empower communities to identify and to intelligently support the production and marketing strategies to help consumers to make prudent choices to promote SPC based upon effective dissemination of information and knowledge of the long-term positive impacts of SPC practices.

### **7.5.2 Potential for developing a shared vision of the global community on SPC**

A valuable understanding of the need for policy makers to move away from the development strategies used by the industrialised countries for their economic development was evidenced by the responses to Theoretical Statement 7 (Developing countries should be allowed to develop their economies before embarking on application of SPC practices) by assigning 27% Disagreement. However it is equally significant to note that 18% Fully Agreed 23% Agreed and 18% Partially Agreed to this statement. The total of these three of 59% is quite substantial.

This perception is a highly critical and sensitive issue in the international environmental negotiating tables, which often create heated debates between industrialised and developing countries. The issue has become most critical and sensitive due to inadequate mutual understanding and trust among the parties. The general argument is that while developing countries accept the need for SPC developed countries should take the lead to develop and transfer technology as they have substantial technical and financial capacities to do so. It is also important to provide assistance to scale-up and widely build upon the traditional best practices with improved quality based on new scientific discoveries. Without better trust, understanding and adequate technical and financial assistance to meet the incremental costs in reversing the trends of business as usual practices followed by industrialised countries for their development, it is much less likely that developing countries will be able to make the necessary changes. The issues related to trade, transfer of technology, intellectual property rights and mode of financial assistance are critical elements that often create misunderstandings and mistrust among all parties.

In this context, it is useful to consider the responses to Statement 8, at the same time i.e. “the need for developed countries to take the lead in application of SPC practices.” This statement was strongly supported, with 36% of the respondents answering, “Fully Agreed” and 23%

answering “Agreed.” Also it is important to note that 27% per cent Partially Agreed for a total of 86%. At the same, time only 4.5% Disagreed with this statement. The author interprets this to mean that the respondents agreed that industrialised countries have used the natural resource base extensively for their development and consequently, they are in a better position to bear the initial incremental costs required for making the transition from unsustainable to SCP.

In other words, if the categories of “fully agree” & “agree” are combined and “partially agree” & “disagree” are presented separately, the percentage of agreement shows the way forward to promote SCP by taking common but differentiated responsibility. In fact the principle of “Common but Differentiated Responsibility (CBDR)” has been recognised and included in most of the MEAs. It is also relevant for SCP in developing countries.

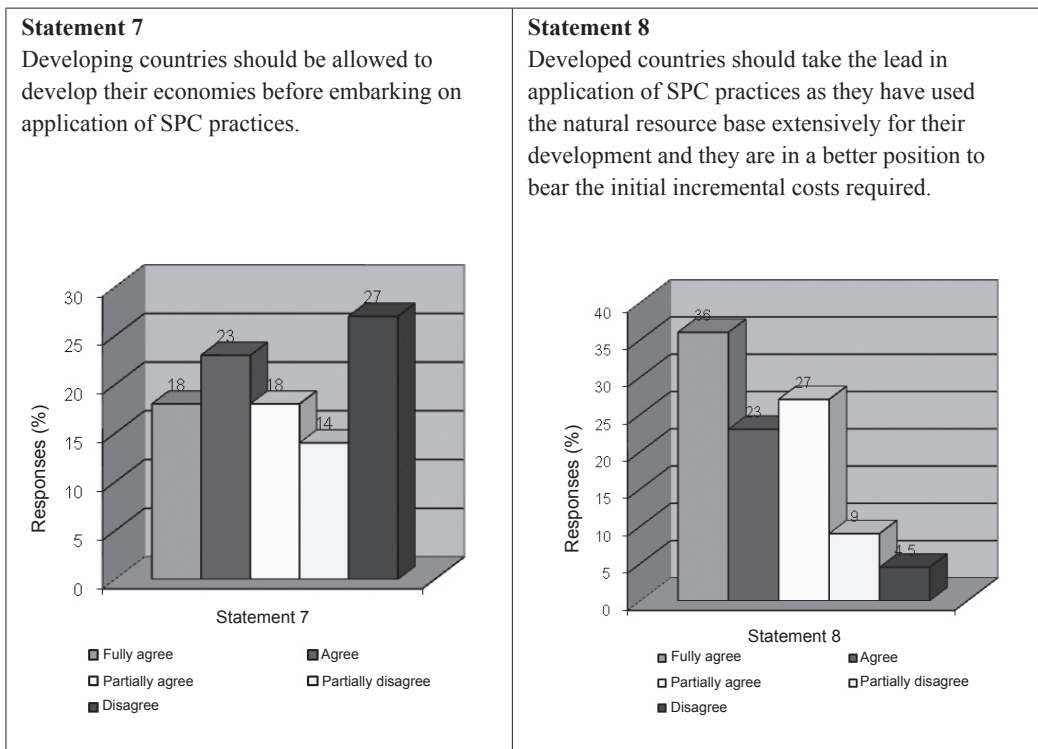
**Table 7.2: Responses to statements 7 and 8 on application of SPC**

Theoretical Statement	Response (%)		
	Fully agree/ Agree	Partially Agree	Partially disagree/ Disagree
Developing countries should be allowed to develop their economies before embarking on application of SPC practices.	41	18	41
Developed countries should take the lead in application of SPC practices as they have used the natural resource base extensively for their development and they are in a better position to bear the initial incremental costs required.	59	27	13.5

Responses to statement 7 clearly show the divergent views on the application of SPC in developing countries. According to the observations made in different environmental conventions, the author learned that developing countries could develop more commitment to SPC if financial resources and appropriate technologies at affordable prices are provided through effective global mechanisms related to multiple MEAs and other international instruments following good governance practices. (It is argued that in some Northern

industrialised countries, CP was started with very little financial support and no high tech. Northern industrialised countries were under pressure from the general public because severe environmental calamities occurred first in these countries because the industrialists and governmental leaders had almost totally ignored the environmental aspects in their industrial/ economic development paths. Consequently, disposal of wastes was increased as part of the implementation of stringent environmental regulations imposed by their governments in reaction to the public pressure.

In Sri Lanka, it is necessary to blend the traditional knowledge with new scientific discoveries for our current and future work toward sustainable development. Therefore, for Sri Lanka it is important for them to obtain capacity building assistance to develop appropriate technologies and products. It may also be necessary to import some carefully selected cleaner production technologies to help Sri Lanka to accelerate the return to more sustainable lifestyles.



**Figure 7.4: Graphical presentation of the responses for statements 7 and 8**

This issue affects different countries in different ways, based on their socio-economic conditions and lifestyles. Under-consumption as well as over-consumption often inhibits policy makers from changing their ‘business-as-usual’ practices to those that are in line with SPC practices because of due to high initial incremental costs. Inadequacies of the market system to capture environmental costs aggravate this situation. The common position of most of the members of the group was that the issue of SPC has to be addressed based on the positions of individual countries.

In order to agree to a shared vision and more importantly a shared responsibility to implement the provisions of the shared vision an in-depth awareness and knowledge on the principles of SPC is necessary not only for the environmental policy makers of the country but also for the policy makers of economic and social sectors. Responses to the statements 5 and 6 show the different levels of understanding of the SPC principles by policy makers in the environmental sectors and other sectors which reveals the necessarily of strategic knowledge management systems on SPC worldwide.

It is important to note that the issue of SPC is becoming a centre of focus at various fora other than MEAs, such as at the Commission of Sustainable Development under the Economic and Social Council of the UN, UNEP Global Environmental Ministers Forum, and within the United Nations General Assembly under different themes such as the green economy, global green new deal and environmental governance. Various governmental, non-governmental and private sector representatives attended these meetings. Therefore, when responses to the statements 5,6,7,8 and 1 are taken together it can be concluded that more awareness and knowledge management are necessary to improve understanding of the potential long-term positive outcomes of the SPC in all the countries. This will make it more feasible for developed countries, which are in a better position, to take the lead.

### 7.5.3 Potential of national policies to help to promote SPC

The graphical representations of statements 3, 4, 5 and 6 are presented and discussed in Figure 7.5.

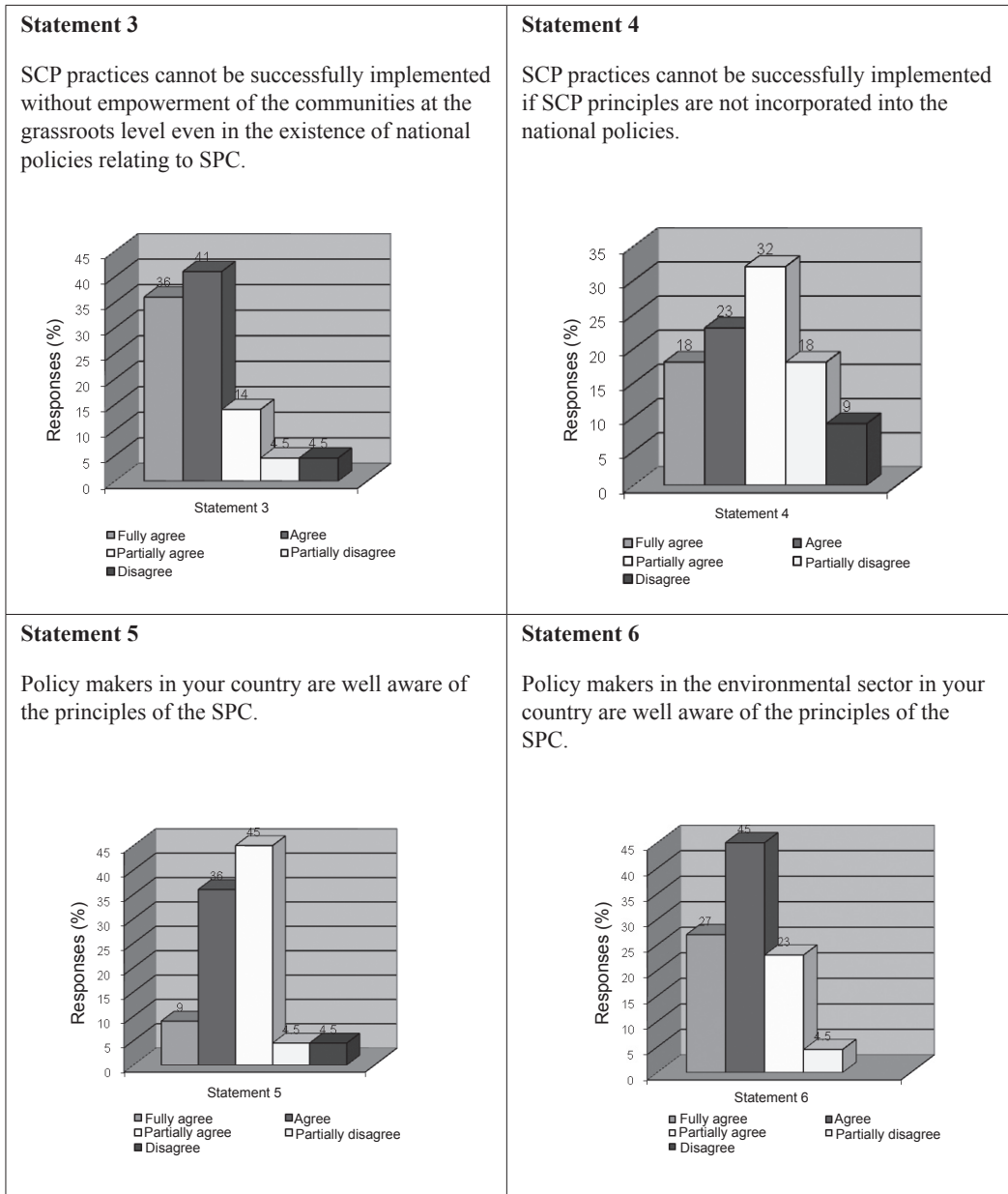


Figure 7.5: Graphical presentation of the responses for the statements 3, 4, 5, and 6

The role of national SCP policies was found to be significant in promoting SCP. When statements 3, 4, 5 and 6 are considered together, inadequacies of policies together with inadequacies of the awareness related to the principles of SCP in individual countries are highly significant. Only 45% “Fully Agreed” or “Agreed” to statement 5 (Policy makers in their countries are well aware of the principles of the SCP (SPC)). Forty-five percent (45%) Partially Agreed to this statement. On the other hand if the members who answered Partially Agreed (45%) can be promoted for application of SPC by different strategies such as improved mutual understanding, building trust and provision of incentives as appropriate, significant improvements can be made for development and implementation of policies conducive to application of SPC as an overwhelming support is seen when the three categories are added together (90%).

This shows that more concerted efforts are necessary to establish a sound knowledge base within countries for the policy makers to act together with the other stakeholders in order to establish an environment that is supportive of implementation of SPC locally, nationally and globally.

**Table 7.3: Responses to the statements 3, 4, 5, and 6**

Theoretical Statement	Response (%)		
	Fully agree/ Agree	Partially Agree	Partially disagree/ disagree
SCP practices cannot be successfully implemented without empowerment of the communities at grass root level even in the existence of national policies relating to SPC.	77	14	9
SCP practices cannot be successfully implemented if SCP principles are not incorporated into the national policies.	41	32	27
Policy makers in your country are well aware of the principles of the SPC.	45	45	9
Policy makers in the environmental sector in your country are well aware of the principles of the SPC.	72	23	4.5

It is clear from these responses that awareness of the policy makers in the environmental sector was reported to be very high, 72%. However, 23% and 4.5% of the responses were

“Partially Agree” and “Partially Disagree.” This also supports the need for more awareness raising efforts on the importance of SPC, even within the environmental sector of the governments. If the responses for “Fully Agree”, “Agree” and “Partially Agree” are added together, a substantial support is seen for this statement. The responses for statements 5 and 6 provide insights into the level of the different inputs necessary to build confidence and secure commitments of these stakeholders in implementing SPC Nationally and globally.

#### 7.5.4 The potential of the business community to promote SPC

The potential of the business community to promote SPC was reported to be high if they are empowered with relevant knowledge and skills. However, strong agreement was obtained under the categories of “Partially Agree” and “Agree,” with 45% and 32%, respectively. It is also significant that 14% Disagreed to statement 1 and 45 % Fully Agreed.

The respondents generally recognised the importance of incorporation of SPC practices into the national policies. When the responses to statements one and four are taken together, it is evident that national policies are very necessary to support the business community in application of SPC practices.

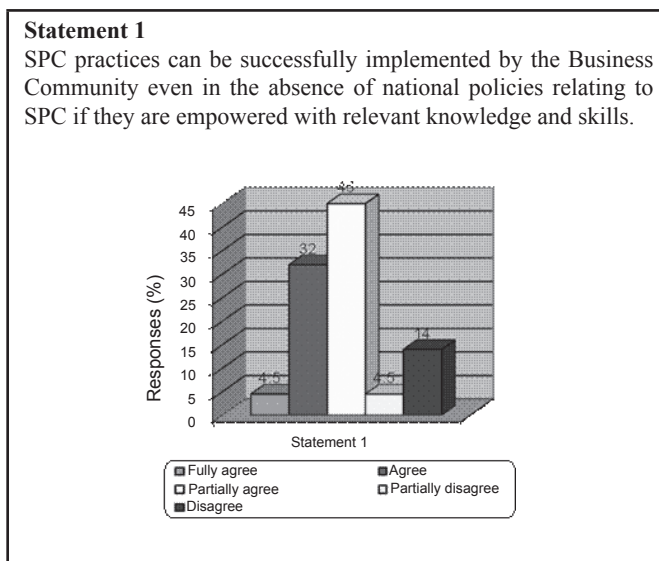


Figure 7.6: Graphical presentation of the responses for theoretical statement 1



However it is significant to note that 36.5% of the responses were either “fully agree” or “agree” whereas 45% selected partially agree and 18.5% selected either partially disagree or disagree.

**Table 7.4: Responses to the theoretical statement 1**

Theoretical Statement	Response (%)		
	Fully Agree/ Agree	Partially Agree	Partially Disagree/ Disagree
SPC practices can be successfully implemented by the Business Community even in the absence of national policies relating to SPC if they are empowered with relevant knowledge and skills.	36.5	45	18.5

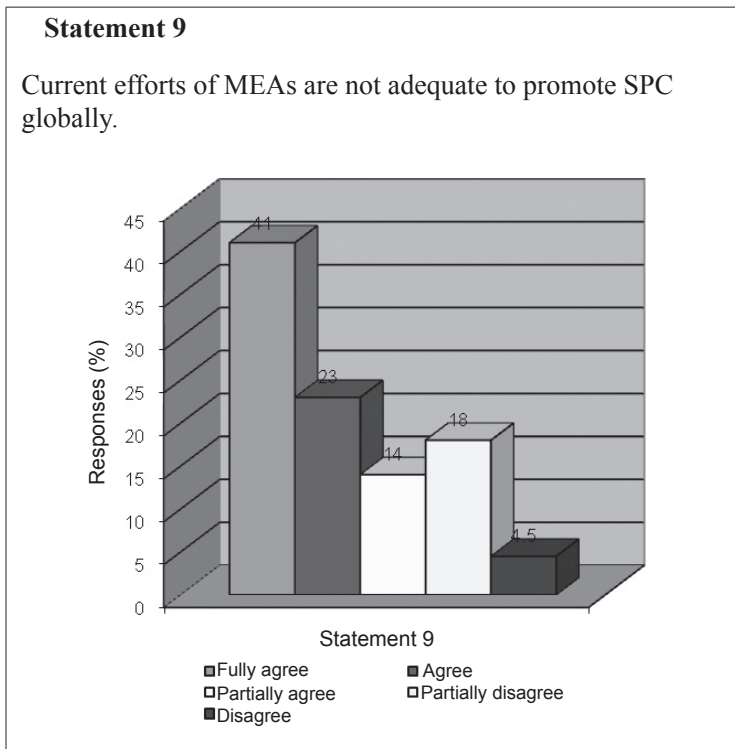
The responses to this statement further reveal the perceived inadequacies of the CP/SCP networks to sufficiently promote the business community to lead and build confidence of the policy makers of their capacity to make changes of the current practices in the path of sustainable development gaining win-win situations if infrastructure facilities are provided at affordable prices. Most of the countries industrial sectors are considered to be the engines of economic growth.

### 7.5.5 The Potential of MEAs to promote SPC

It is important to observe the low confidence the members of the forum had on the current potential for promoting SPC worldwide. The highest level of agreement to theoretical statement 9 shows the need to strengthen the capacity of the MEAs to fulfil their objectives. Most of the MEAs address environmental issues that have many common elements. This section provides some insights into how coordinators and enforcers of MEAs them could collectively strengthen the effectiveness of implementation of them by linking their efforts with promotion of SPC concepts. It is necessary to promote co-working of many stakeholder institutions on: capacity building,<sup>53</sup> technology transfer, research and development in many industrial sectors (Note: Please see below my comments and suggestions).

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<sup>53</sup> Capacity building includes building capacity of governments, the business sector, educational, technical and research institutions and of the community at large on the importance of promoting SPC for the effective implantation of these MEAs and also using MEAs for the effective promotion of application of SPC which are or should increasingly be viewed as two sides of the same coin.



**Figure 7.7: Graphical presentation of the responses for theoretical statement 9**

This conclusion also supports the observations and conclusions presented in Chapter 6, under Case Study one on, “Other international external forces on the service delivery of NCPCs.” Most of the multilateral environmental conventions are functioning poorly in most countries due to severe economic and human resource constraints because the attention and facilitation of donors for these conventions are limited even though these conventions have direct relationship on SPC (e.g., The Basel Convention). At the same time, some conventions have acquired significant global attention so that the conferences of these conventions are similar to the UN General Assembly in terms of the participation of the heads of States and Governments

SPC is the most desirable long-term strategy for the successful implementation of all the MEAs in general. Table 7.5 presents some selected MEAs categorised under different environmental sectors (Atmosphere, Biodiversity, Marine & Coastal, Land and Chemicals), which have a direct bearing on SPC for their successful implementation.

**Table 7.5: Selected MEAs, which have a direct link to SPC for their effective implementation.**

Convention	Objective
<b>Category: Atmosphere</b>	
<b>Vienna Convention for the Protection of the Ozone Layer (1985)</b>	Protection of the Ozone Layer through international cooperation in the areas of scientific research, monitoring and provide information exchange.
<b>Montreal Protocol on Substances That Deplete the Ozone Layer (1987)</b>	Reduction and the eventual elimination of the consumption and production of anthropogenic Ozone Depleting Substances
<b>United Nations Framework Convention on Climate Change (UNFCCC – 1992)</b>	Stabilisation of greenhouse gas (GHG) (Carbon dioxide- CO <sub>2</sub> , Methane – CH <sub>4</sub> , Nitrous Oxide – N <sub>2</sub> O, PerFluoro Carbon PFCs, HydroFluoro Carbons-HFCs, SulphurhexaFluoride- SF <sub>6</sub> ) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic systems.
<b>Kyoto Protocol (1997)</b>	The Annex 1 Parties (Developed Countries) to reduce their collective emissions of greenhouse gases by at least 5% of the 1990 level by the period 2008 – 2010.
<b>Category: Biodiversity</b>	
<b>Convention on Fishing and Conservation of the living resources of the high seas (1958)</b>	Solve the problems involved in the conservation of the living resources of the high seas through international co-operation considering that through the development of modern techniques some of these resources are in danger of being over-exploited.
<b>The Ramsar Convention on Wetlands (1971)</b>	Stem the progressive encroachment on and loss of wetlands now and in the future, recognising the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value

Convention	Objective
<p><b>Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES – 1973)</b></p>	<p>Protect certain endangered species from being over-exploited by adopting a system of import/export permits, for regarding the procedure.</p>
<p><b>Agreement on the network of Aquaculture Centres in Asia and the Pacific (1988)</b></p>	<p>Solve the problems involved in the conservation of the living resources of the high seas through international co-operation considering that through the development of modern techniques some of these resources are in danger of being over-exploited.</p>
<p><b>Convention on Biological Diversity (CBD – 1992)</b></p>	<p>Conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including appropriate access to genetic resources and by appropriate transfer of relevant technologies and appropriate funding</p>
<p><b>Agreement for the implementation of the provisions of the United Nations Convention of the Law of Seas relating to the conservation and management of straddling fish stocks and migratory fish stocks (1995)</b></p>	<p>Ensure long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks through effective implementation of the relevant provisions of the United Nations Convention on the Law of the Sea</p>
<p><b>Cartagena Protocol on Bio-Safety (2000)</b></p>	<p>Contribute to ensuring and adequate level of protection in the field of the safe transfer, handling and use of living modified organism resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specially focusing on transboundary movements.</p>

Convention	Objective
<b>Category: Marine &amp; Coastal</b>	
<b>Convention on the Continental Shelf (1958)</b>	Define and delimit the rights of States to explore and exploit the natural resources of the continental shelf.
<b>United Nations Convention on the Law of Seas (1982)</b>	Protect the economic, environmental, and national security concerns of coastal states. Strengthen the state sovereignty over the enforcement of environmental regulations up to 200 miles offshore (called the Exclusive Economic Zone – EEZ). To protect the marine environment, promote the maintenance of international peace and security, protect the freedom of navigation on the high seas as well as the right of innocent passage, including non-wartime activities of military ships.
<b>Category: Land</b>	
<b>United Nations Convention to Combat Desertification (UNCCD – 1994)</b>	Combat desertification and to mitigate the effects of drought in countries experiencing serious droughts and/or desertification with the final aim being to prevent land degradation in the hyper arid, arid, and semi arid, dry sub humid areas in the countries that are parties of the Convention.

Convention	Objective
<b>Category: Chemicals</b>	
<b>Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989)</b>	Minimise the generation of hazardous waste in terms of quantity & hazardousness, to dispose of hazardous waste as close to the source of generation as possible and to reduce the movement of hazardous waste
<b>Rotterdam Convention (1998)</b>	Promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm; to contribute to the environmentally sound use of those hazardous chemicals, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties
<b>Stockholm Convention on Persistence Organic Pollutants (POPs – 2001)</b>	Protect human health and the environment from persistent organic pollutants

The multifaceted objectives of these conventions, when taken together, require the global community to adhere to SPC in various ways in order for them to work to achieve their objectives. These conventions require: *“Reduction and the eventual elimination of the consumption and production of harmful substances/products”*, *“Address problems related to modern techniques which lead overexploitation of resources”*, *“Address problems related to trade which lead overexploitation of resources and extinction of endangered species”*, *“Address problems related to unsustainable production, handling and consumption natural resources including biodiversity”*, *“Address problems related to disposal of wastes and emissions”*, *“Conservation of natural resources such as water, land, air”*, and addressing many other problems interrelated and interlinked level.

Promotion of SPC, even at micro level, can help in promotion of implementation of these conventions in terms of efficient resource management and prevention of pollution. On the other hand, facilitation of implementation of these conventions at the macro and meso level can simultaneously help to promote SPC. While the implementation mechanisms of these conventions could develop synergies of different MEAs and could assist parties for effective implementation of the MEAs by capacity building and technology transfer, other international institutions such as UNIDO can assist the business community to integrate SPC into their business practices. Multifaceted, cost effective programs at various levels<sup>54</sup> for “Educating-the-Educators” and “Training-the-Trainers” will provide opportunities for many developing countries to build capacity to promote SPC so that they can become independent from external funding in streamlining their development practices in line with sustainable development. Community outreach programmes are equally important. The responses to the theoretical questions of the survey supports this conclusion in general and the responses to questions 10, 11, 12, 13 and 14, in particular, reveal further that joint and integrated promotion of the MEAs and SPC can help societies to make real progress toward more sustainable societies via improved collaborative action.

The responses to the questionnaires provide further evidence of the need for more collaborative action to co-promote SPC locally, regionally and globally in coordination with implementing of MEAs; this is especially important since the respondents were representatives of all five UN regions. In order to do this, a key element is that global leaders and their societal

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<sup>54</sup> University level post graduate courses, short term certificate courses, teacher training courses at university and technical college level, training courses for chambers of commerce etc., and many more based on the country situation.

members must be serious about making the essential paradigm changes from the unsustainable production and consumption patterns that we are currently dominant.

Promotion of SPC requires collaboration of different stakeholders that have different mandates and interests. The experience gained at the Climate Change Conference held in Copenhagen (COP15) in December 2009 clearly showed the difficulties for different stakeholders to arrive at common positions if the parties are not ready to collaborate with each other.

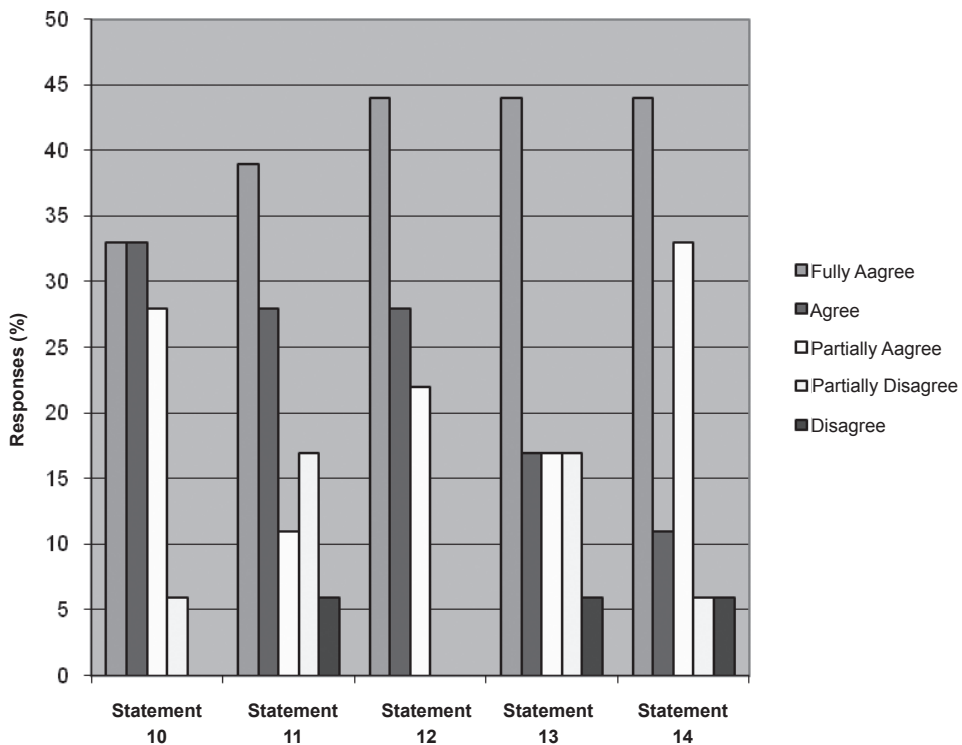
Therefore, considering the diversities of the responses of a like-minded group from the forum, to the questionnaire, it is clear that at least the minimum set of conditions proposed in this dissertation are necessary to create an environment that is truly conducive for collaboration of the different stakeholders to promote SPC globally.

## **7.6 Validation of the theoretical framework for the promotion of SCP in Sri Lanka**

Analysis of the responses to statements 10, 11, 12, 13 and 14 provide input to the analysis of the potential value of “the minimum set of criteria required for collaboration of different stakeholders in the promotion of SPC” as proposed by the author in the theoretical framework presented in Chapter 2. Those criteria are stated to be: mutual understanding, trust, incentives and facilitation (technical and financial).

Figure 7.8 shows the graphical representation of the responses to the statements (see table 7.1) directly related to the proposed theoretical framework.





**Figure 7.8: Graphical presentation of the responses to the statements directly related to the proposed theoretical framework**

It is observed that 44% “Fully Agreed” to statements 12, 13 and 14. Only 6% Disagree. However when the “Fully Agree” and “Agree” are added together, “mutual understanding” of the stakeholders (66%) and the “trust” (67%) between stakeholders were reported to be highly significant for helping countries to implement SPC. (Also refer to Table 7.6).

**Table 7.6: Responses to the statements directly related to the proposed theoretical framework**

Theoretical Statement	Percentage (%) of Responses		
	Fully Agree/ Agree	Partially Agree	Partially Disagree/ Disagree
10. Inadequate mutual understanding of the stakeholders on the linkages and interdependence of the economic, social and environmental issues is the major obstacle for application of SPC practices.	66	28	6
11. Lack of Mutual Trust among the stakeholders in economic, social and environmental sectors is the major obstacle for application of SCP practices.	67	11	23
12. Lack of incentives is the major obstacle for application of SPC practices.	72	22	??
13. Lack of financial resources is the major obstacle for application of SPC practices.	61	17	23
14. Lack of technical capacity is the major obstacle for application of SPC practices.	55	33	12

The recent unpredictable nature of the climate change negotiations can be sighted as a classic example for the need for more collaborative approaches to promote SPC to address the problems, which threaten the lives and livelihoods of millions of people. The open ended nature of the conclusions of the Climate Conference (COP15) in December 2009 despite years of preparatory work, and subsequent climate negotiations provide evidence for the need for more concerted efforts to increase “mutual understanding” and to build “trust” among the countries to agree to an meaningful shared vision and an effective implementation mechanism to mitigate GHG emissions to address the climate change problem. Even though “Building Trust” was the centre of focus in the post COP15 climate negotiations, the attempts were confined to words and not to deeds and the negotiations were sidetracked mainly due to lack of mutual understanding and trust among, within and between countries and regions. Consequently, trust was further eroded.

Even after COP15, the parties failed to agree upon ambitious mitigation targets to stabilise greenhouse gases at acceptable limits based on scientific evidence. The recent climate talks held in Bonn from 31st May to 11th June 2010 failed to achieve a common position on long-term action to address the climate problem.

Mitigation of GHG emissions needs SPC at all levels. While the pledges of developed countries put forward on the negotiating table (17-25%) for emission reduction by 2020 are much lower than what is required (25-40%), the loopholes exist in calculating the GHG emissions such as use of “surplus allowances” & “other market mechanisms” to trade off pledges, and “weak land use based accounting rules” offset the actual status of these emission reduction targets from what the atmosphere will require. This ambiguity creates further misunderstandings, which lead to mistrust claiming greater transparency on the calculations of the proportion of emissions that can be reduced domestically by these countries.

The outcome of the COP 16, which was held in Cancun, Mexico, was limited to merely bringing the mitigation actions of the industrialized countries and the developing countries formally less than one process, mostly in accordance with the Copenhagen Accord. There were no legally binding outcomes and no final decisions on the Kyoto Protocol.

That the Protocol was kept open may be because closing the loop of the Kyoto Protocol altogether at the Cancun meeting would have serious negative impacts on the CDM process. There were positive outcomes on the establishment of the Green Climate Fund, the Technology Mechanism and the Cancun Adaptation Framework. However the governance systems related to these outcomes were also not defined or established.

There was a paradigm change in the trend of the negotiating process and it is premature to make conclusions on the UN governance system under UNFCCC regime in the absence of clarity on the validity of the two final decisions adopted at the plenary on the Kyoto Protocol (AWGKP) and UNFCCC (LCA) with strong objections of Bolivia. Bolivia’s claim among many was that the decision represented a step backward by postponing, indefinitely, a decision under the Kyoto Protocol, but it opened the doors to a regime, which will be flexible and voluntary for a pledge and review approach and not a system where all Annex I parties will fulfill a set target.

The Earth Negotiating bulletin reported the process of the outcome such that ‘When the Cancun Agreements were adopted early on Saturday morning, there was a visible, cumulative sigh of relief. The Agreements, reflecting five years of work, leave many important details open, but garnered support from all but one of the Convention’s 194 parties’.

The Third World Network (TWN) ([www.twinside.org.sg](http://www.twinside.org.sg)) reported that ‘The decision was acclaimed by many for reviewing the spirit of multilateralism in the climate change system, because another collapse after the disastrous failure of the Copenhagen talks a year ago, would have knocked another hole in the reputation of the UNFCCC’.

TWN further reported that ‘The Cancun meeting, in fact, made it more likely for the developed countries to shift from the Kyoto Protocol and its binding regime of emission reduction commitments, to a voluntary system in which each country makes pledges on how much it will reduce its emissions.

However, the open-ended provisions of the final decision will create tremendous disagreements in future negotiations if the Parties cannot negotiate with mutual understanding and trust of the parties who joined the consensus decision in the spirit of regaining multilateralism in the climate change system.

Developing countries also have a common but differentiated responsibility to reduce GHG emissions to address climate change problem. Failure of the global community to take timely action in addressing the climate change problem will eventually lead to catastrophic disasters to the ecosystems, which could lead to extinction of many species including large portions of the human population. There is an urgent need for sincere commitment from developing countries to move away from the development pattern followed by developed countries and to move instead towards SPC practices considering climate change is a global problem, which requires the involvement of all countries. The challenge for the developing countries is their dire need for rapid economic development to improve the standard of living of their communities, which is ingrained as one of the three pillars of sustainable development. It is in that context “incentives” and “facilitation” are embedded with “mutual understanding” and “trust” among the minimum set of conditions that are required to help to ensure collaboration of different stakeholders to achieve SCP.

## **7.7 Conclusion**

The responses to the questionnaire in this case study show the significant potential and power of the community to act as catalytic agents to promote SPC at national and global levels more than that of the business community and the policy makers if they are empowered with relevant knowledge and skills. This will stimulate the chain of events necessary to integrate SPC into the development process stemming from securing political will and the development of national policies, and the national and global collaboration. The diversity of the responses

to the questionnaire of the survey provides an insight into the different levels and kinds of interventions that will be required to stimulate and to accelerate the momentum to promote SPC nationally and globally.

It is therefore, clear that, different models of cost effective knowledge management systems are necessary to promote grassroots/communities, business communities and policy makers that can be used and build upon the existing mechanisms initially and then to move beyond these mechanisms by filling the gaps. The UN organisations, Universities, Research institutions, Scientific communities and Scientists have to play crucial roles at this critical point to provide and exchange credible information including indicators to establish global governance principles that reflect the rules of utilisation of global ecosystem services based on equity both for humans and for the environment so as to help to ensure development in harmony with the nature.

Comprehensive and strategic Knowledge Management Systems are necessary to stimulate the development of shared visions, at all levels, to help to improve mutual understanding of the problems of different stakeholders at different phases in the journey toward sustainable development. The cost of investment to build, transfer and disseminate such knowledge management systems with a mix of demand and supply driven approaches as appropriate<sup>55</sup> across the world will tremendously reduce the costs of investments, which would be needed if we did not make progress toward SPC.

MEAs can be used as an effective framework by the international community to help to reduce environmental degradation and pollution<sup>56</sup> by taking into account the Rio principles<sup>56</sup> and the Agenda 21.<sup>57</sup> Despite the numerous MEAs and Declarations that have been developed

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<sup>55</sup> The responses to the questionnaire provide an overview of the proportion and the priority to be given to knowledge management models at the national and international levels.

<sup>56</sup> Rio Declaration on Environment and Development was adopted in June 1992 at the UN Conference on Environment and Development (UNCED) with the goal of establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people. It recognized the integral and interdependent nature of the Earth and the importance of working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system. It promotes activities focused upon 27 principles.

<sup>57</sup> Agenda 21 is a program of action adopted at the UNCED in 1992. It sets out a framework of political recommendations designed to protect the environment and encourage nations to move towards achieving sustainable development in 21st century.

and agreed to, the global environment today is at increasing risk. Effective implementation of the MEAs requires the global community to adhere to SPC practices in the long run, thereby, meeting of the objectives of the MEAs will be easier as well.

Policy makers, the business community, and the general public are the key players in this process. There are many ecological problems that we face today in addition to climate change even though climate change has become the centre of focus of the global community. Collaborative global action is an essential prerequisite to ensure achieving the needed outcome of all these global initiatives. The full implementation of all existing MEAs will be an important contribution to ensuring sustainable use of all forms of resources and reduction of wastes/pollution, which is part of the desired outcome of SPC.

UNEP is organising the World Summit on Sustainable Development in 2012 in Rio to commemorate the 20th anniversary of the 1992 conference. Agenda 21 adopted in 1992 at the Rio Earth Summit recognised, “economic growth, social development and poverty eradication” as overriding priorities in developing countries, which are essential to sustainability. It highlighted that, “The provision to developing countries of financial and technical resources needed to implement Agenda 21 will benefit all humanity; the long-term cost of inaction could be much greater.” The authors of Agenda 21, recognised that “international cooperation for sustainable development should complement the efforts of developing countries. For this, substantial new and additional financial resources, including grants or concessional financing at predictable levels, will be required.” At the Earth Summit, developed countries reaffirmed their commitment to reach, as soon as possible, the United Nations’ target of 0.7 per cent of Gross National Product (GNP) annually for official development assistance (ODA); some nation’s leaders agreed to reach that target by the year 2000 (Section IV, Chapter 33 of Agenda 21)”. However financial assistance provided thus far is far below the expectations and needs.

In light of the multiple global crises, leaders of all countries need to address their internal security such as energy, food, finance etc. that would prevent implementation of shared vision/s agreed upon through various MEAs. Even though the implementation of the Montreal Protocol has been sighted as a best practice there are serious objections by industrial countries to use the same model in respect of other conventions. The Basel Convention has no sustainable and predictable funding mechanism for its effective implementation. The regional training centres established under the Basel Convention could be used to promote SPC if sufficient funds were available. In respect to conventions other than the Montreal Protocol, effective implementation has been hampered by inadequate capacities, especially in the developing

countries. Availability of funding alone is not sufficient even though it is a necessity. Capacity to utilise funding for the intended purposes is an equally important aspect to be considered in this process. The objective should to move away from the unsustainable economic development path followed during the industrial revolution. It is in this context that financial and technical assistance is necessary to meet the incremental costs to make progress toward SCP





## **CHAPTER 8**

### **THE SUSTAINABLE PRODUCTION AND CONSUMPTION MODEL FOR SRI LANKA**

#### **8.1 Introduction**

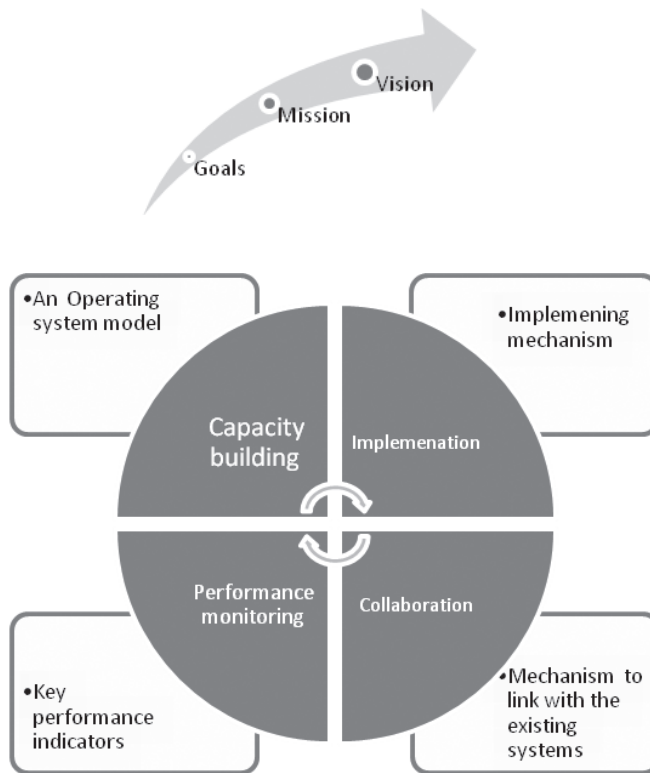
This Chapter provides a model for SCP for Sri Lanka developed based on the analysis of the literature, the research data and findings presented in the previous chapters, and personal observations. The Chapter presents the SPC model for Sri Lanka considering the developing country perspective in relation to global change. The model contains five components, which should be considered together for successful implementation of Sri Lanka's SPC programme. The form and structure of each component are described in the following sections. Section 8.2 outlines the five components of the model.

#### **8.2 Components of the model**

The SPC model of Sri Lanka contains the following five components:

- The Vision, Mission, and Goals;
- An operating system model with key external forces both from the production and consumption sides that were transformed into the major implementation strategies of the model;
- Key performance indicators;
- An implementation mechanism of the model with a sectoral coordination structure;
- A coordination mechanism for the implementation of the model with linkages to the existing mechanisms to ensure sustainable implementation of the model.

A desirable system for behavioural changes of the society is also proposed to highlight the need for the development and implementation of an effective monitoring system to monitor the progress of societal implementation of the model; additionally an integrated approach to reporting and public education on SCP are included. Fig. 8.1 presents the components of the SPC model.



**Figure: 8.1 Components of the Sustainable Production and Consumption model for Sri Lanka**

### 8.3 The Vision, Mission and Goals of the SPC Model

**Vision** : Ecologically sustained healthy and prosperous Sri Lanka

**Mission** : Ensure application of sustainable production and consumption in every socio-economic endeavours in Sri Lanka

#### **Goals:**

1. To improve the sustainability of socio-economic development, which is ecologically sound by integrating SPC concepts and practices, thereby moving away from the development model followed by industrialised countries;

2. To promote equitable socio-economic development throughout the country by improving access to information and environmentally friendlier technologies, which integrate new and traditional knowledge in harmonious ways;
3. To promote environmentally friendlier and more sustainable industrial development with special emphasis on helping SMEs;
4. To promote ecologically friendlier lifestyles, which promote a middle path to discourage extreme affluence and to prevent abject poverty.

## **8.4 Key external forces of the operating system of the model**

### **8.4.1 Introduction**

This section presents the key external forces of the operating system of the model both from the production and consumption sides that were transformed into the major implementation strategies of the SPC model for Sri Lanka.

Findings of the Case Study One clearly show the need for a model, which consists of a mutually responsive, minimum set of conditions for the effective implementation of SCP practices in Sri Lanka. A single institution will not be able to produce the expected results. It is, therefore, necessary to create an environment conducive to promote producers and consumers to make necessary technological, managerial and behavioural changes to ensure sustainable practices in production and consumption. Contributions from the Sri Lankan NCPC and the UNIDO/UNEP NCPC network to achieve this goal, forms a significant component of the system to which, the inputs of many other institutions will be essential for effective implementation of the model.

### **8.4.2 Key external forces from the production side**

On the production side, the following five components were identified as key external forces based on the findings of Case Studies One and Two. They include the following key external forces necessary to stimulate producers to produce sustainable products and to help sustain their programmes in SPC:

- **Supportive public policy and environmental regulations, recognition,** rewards and penalties with regard to implementation of SCP in Sri Lanka;
- **Responsive agents** to sensitise, to promote and to make the population fully aware of CPs/ESTs/SCP;
- **Responsive, qualified and capable agents** to develop/adapt/adopt/transfer Green Technologies and to provide technological and non-technical services to promote implementation of SCP;
- **Responsive and committed funding agents, Angel funds (ibid as bullet before), and prudent investments** to support the development and implementation of SCP in Sri Lanka;
- **Suppliers of green human resources** to promote and support the implementation of SCP. Green human resources imply skilled human resources with adequate capacity to integrate SPC in the economic and social developmental programs at all levels.

Based upon these external forces, appropriate strategies and actions to ensure successful implementation of the SPC model must be developed. It is expected that clear public policies and environmental regulations coupled with recognition, rewards and penalties, where appropriate, can help to stimulate producers to use greener technologies to produce greener products. Responsive agents who are and can be mandated to fulfil these expectations as service providers (Table 8.1) are necessary to sensitise/promote and to increase awareness among the entire population of Sri Lanka about the benefits and approaches of CPs/ESTs/SCP.

These agents should be responsive to the output, outcome and impacts of their service delivery without limiting it to narrowly focused mandates, which may be seen as necessary and assigned to them initially. The system must be dynamic. Responsive agents should fine-tune and upgrade their mandates and strategies of service delivery from time-to-time, based on the positive or negative outcomes and impacts to continue to strive for making continuous progress toward SCP, within the system. This can be done by sound, user-friendly monitoring and reporting systems.

Responsive technology providers can help to build the confidence of producers to develop and produce environmentally better products using CP processes and procedures. The products

produced and utilised by customers will have smaller ecological footprints throughout their entire life cycles. Responsive funding agents are necessary to assist producers to develop greener and more sustainable production facilities based upon their affordable and prudent investments. Such investment can be provided from various sources such as: government funds, public-private partnerships, donor assistance and bi-lateral and multilateral corporation including revolving fund mechanisms. Limited co-funding may be obtained by using an Environmental Conservation Levy (Section 5.9.4 of Chapter 5). Use of the Conservation Levy for revenue generation however, depends upon consistency of national policies and political will.

Details of the implementation strategies are presented in Section 8.5.

### 8.4.3 Key external forces of the consumption side

On the consumption side, the following four external forces were identified based on the findings of Case Studies One and Two, as the general conditions to help to ensure behavioral changes of consumers toward SCP.

- **Service providers** who work to ensure sensitisation/promotion/dissemination of SCP and related green concepts among the public by providing information to all pertaining to prudent product and practice choices;
- **Fiscal measure developers and impalements** to foster efficiency among consumers in resource and energy intensive sectors;
- **Environmental regulations**, which promote practices for moving beyond compliance of existing standards so as to improve resource and energy efficiency and to reduce pollution levels. Incentives and rewards for environmentally prudent choices and penalties for resource intensive choices;
- **Ecosystem health** is maintained so that it continues to provide ecosystem services such as water regulation, climate regulation (clean air), waste treatment, provision of food, provision of medicinal plants, provision of raw material, provision of recreation etc. for the health and wellbeing of the people.

These external forces were transformed into strategic interventions of the SPC model in Sri Lanka.

In Case Study Two, the responses to the statements clearly show the greater potential of the community to successfully promote SPC at the grassroots level if they are empowered with relevant knowledge and skills. Respondents felt that this is even more important than the roles of the business community and the existence of national policies on SPC (Figure 7.2). Periodic monitoring and reporting of the quality of the ecosystems services throughout the communities along with knowledge management programmes can build confidence of the community on the need for conservation and sustainable management of their ecosystems. The results of Case Study One revealed the need for fiscal measures and environmental regulations to provide an environment that is conducive for implementation of SPC. These requirements were confirmed by local Sri Lankan stakeholders who were interviewed to obtain their insights of the local conditions and requirements for achieving success in the SCP. (See sections 6.6 and 6.7).

Dissemination of knowledge and exchange of information on positive impacts of SCP practices is necessary to maintain the desired healthy ecosystems. Positive impacts of healthier ecosystems on economic and social development will lead to stimulation of SCP as such ecosystem services can provide resources without health and environmental impacts to the surrounding communities.

Sound ecosystem quality monitoring systems must be developed and used to provide data on current levels and trends of resource depletion/enhancement and environmental pollution. Currently, in Sri Lanka, limited data are available on the ecosystem services of specific ecosystems such as the Sinharaja Rainforest and the carbon sequestration capacity of the forest cover, in general.

The Central Environmental Authority and the National Water Supply and Drainage Board monitor the water quality of Kalani River flowing to the sea across the western province at twelve sensitive locations periodically under the clean river program initiated and coordinated by MoE for the last five years. CEA and Water Board share the responsibility of collection and analysis of data twice a month and report to MoE. MoE consolidates these data and inform the respective local authorities to display data at the water quality information boards established at twelve sensitive locations for information of the local communities. Local authorities are supposed to take action to keep the water quality at acceptable standards. Issues related to water quality that cannot be solved at the local authority level are to be reported to MoE for necessary action at national level. Water Supply Board is planning to repeat this system at few other sensitive locations where the water intakes are located. Success of this

type of monitoring systems will greatly depend on the capacity of the local authorities and the community to understand the root causes of water quality problems and possible action that can be taken at local authority level to address the problems in collaboration other stakeholders at national level.

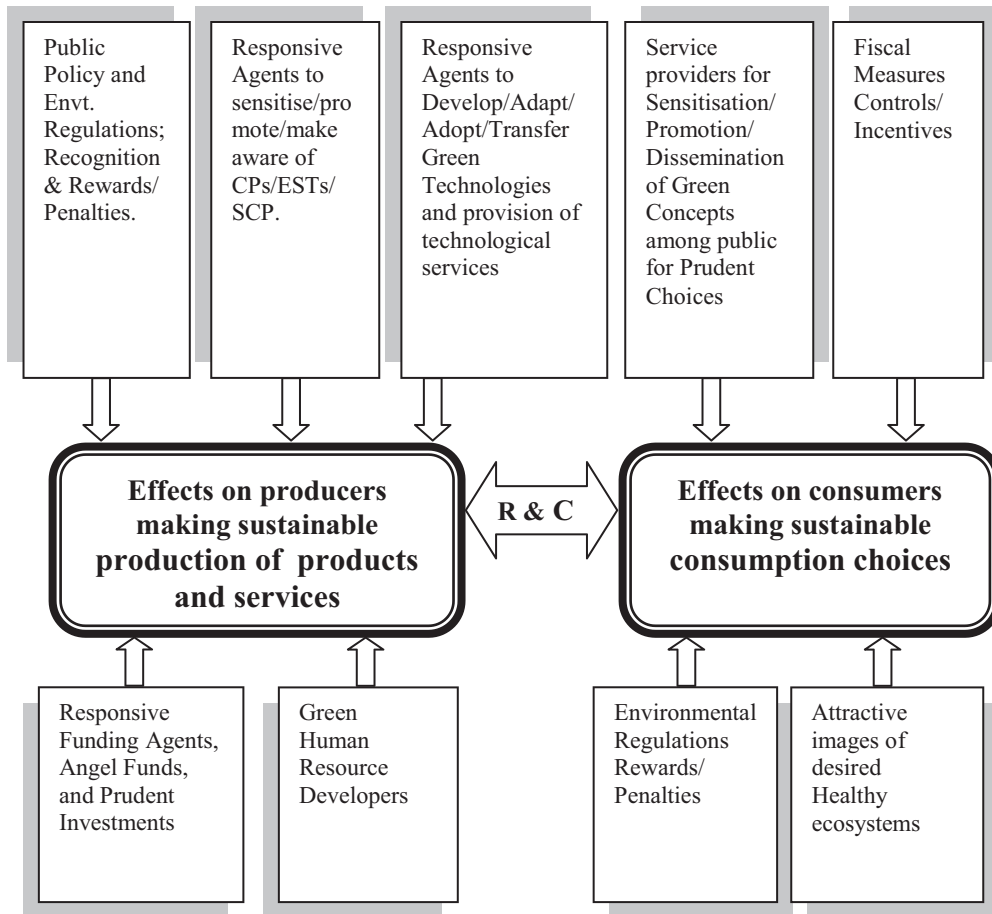
A user-friendly network of systematic data collection and reporting systems should be established to monitor the progress of the proposed SPC model across the country. Establishment of such a system will require skilled personnel and substantial initial investment. The government will not be able to bear the total initial investment. Donor funding is necessary to cover part of the investment while government would be able provide co-funding based upon revenue collected based on the polluter/user pays principle. If the revenue collected is used for the desired purpose, with community empowerment, communities will be able to be part of the solution rather than being part of the problem. Good governance practices of the political leaders following the principle of common but differentiated responsibilities based on purchasing capacities can make profound changes within the communities to make healthy ecosystems. Of course rules and regulations are necessary prerequisites to ensure compliance in maintaining such reliable monitoring and reporting systems.

At present, the Ministry of Environment is exploring the possibility of establishing an island-wide data collection system with the assistance of the Department of Census and Statistics in respect of certain ecosystem services and census of pollution. Substantial capacity building programmes are necessary to establish, operate and maintain such a system.

Periodic publication of the status of the ecosystems can help political, academic and NGO leaders to identify the interventions necessary to fine-tune the external forces to continue or to accelerate the changes in the direction of SCP and thus, to a more sustainable Sri Lanka. The details of implementation activities are further discussed in section 8.5.

### **8.5 Operating system of the key external forces of the model**

The author developed an operating system of the SPC model with key external forces that are proposed for the Sri Lankan SPC model. (See Figure 8.2). Nine key external forces, five from the production side and four from the consumption side were incorporated into the model.



- R & C – Responsiveness and Collaboration for SPC
- CP – Cleaner Production
- EST – Environmentally sound technology
- SP – Sustainable Production

**Figure 8.2: Operating system model with key external forces of the SPC Model for Sri Lanka**

Absence of or deficiencies in one of these nine external forces will have negative impacts on achieving the desired outcomes. To the degree that the external forces are negative or positive, the effects on the production and consumption would be negative or positive, thereby, affecting the responsiveness and collaboration needed to achieve the desirable outcome. Sustainability of production and consumption will be high with positive effects and low with negative



effects having negative or positive impacts on ecosystems. The model helps in understanding, identifying, specifying and prioritising the forces and actions to be addressed via appropriate policy or procedural changes, within the context of a sound monitoring mechanism.

Eventually the effects, negative or positive on production and consumption will weaken or strengthen the responsiveness and collaboration to make production and consumption sustainable. A sound monitoring and periodic reporting system to policy makers, developers, investors, enforcements officers, researchers and community at large is an essential element to understand and make the causal linkage work.

International and regional Technical Corporation is necessary to establish such a system with initial investment. Meanwhile the local university network with leading research institutions will be engaged to perform research, education and training in priority areas with governmental funding available. In fact there already some projects that are in progress in collaboration with some Sri Lankan universities (e.g. Wetland Conservation). As these activities are project based, there is no continuation of these initiatives by the service providers once the funds are utilised. The government should provide leadership to establish a sustainable mechanism of monitoring and reporting of ecosystem services to help policy makers to strategically intervene and prevent further degradation of ecosystems that are vital for human existence.

The model can be used with any ecosystem to assess the imbalance of the systems. This will help in the identification of the factors and agencies that are contributing to the instability; that should then help in identifying and implementing appropriate corrective measures or required policy changes.

Environmental regulations coupled with fiscal measures such as incentives, rewards and controls coupled with penalties are equally important to reverse the unsustainable production and consumption practices. Regulations must be developed and implemented to discourage resource intensive and wasteful production and consumption practices and to encourage life cycle management of consumables.<sup>58</sup> The Central Environmental Authority is planning to introduce a licensing system to the industries where industrialists have to pay for their licences based on their pollution load. Action must be taken to amend the National Environmental Act to implement this system. This will help to improve the supply and demand sides of management of resource consumption and pollution.

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<sup>58</sup> In Sri Lanka, some legislative attempts have been made to restrict the manufacture and usage of polythene products, especially those that are less than 20 microns thick because it tends to block drains.

It is also expected that extended producer responsibility (EPR) and social responsibility (SR) throughout the lifecycle of the products and services will be ensured by the nine attributes contained in the model. Sri Lanka has experience in implementing EPR for mobile phones. Mobile phones that can no longer be used are collected voluntarily by mobile phone service providers and are exported for recycling. Used phone collection boxes are available at mobile phone service centres and other locations where the general public is invited to deposit their used phones. It is expected that similar programmes will be implemented for used computers and other electrical and electronic products. The revenue collected from the environmental conservation levy is used to manage used mobile phones.

Access<sup>59</sup> imposed on imports of plastics (Chapter 5) and a plastic waste management programme was developed to promote behavioural changes necessary among the consumers to ensure the proper collection, recycling or disposal of plastic waste in a manner, which will not be harmful to the environment.

Similarly, in order to realise the expected results, it is necessary to balance the demand and supply through monitoring and reviewing the progress of the policies and programs developed based on the nine attributes and by modifying the policies and programs until the production and consumption patterns are in par with the carrying capacity of the ecosystem. Periodic monitoring of the quality of the ecosystems will provide information on the status of the ecosystem stability that can be used to identify policy failures and market failures. It is necessary to also ensure periodic policy dialogues with the scientific community as part of the implementation of the SPC model to identify market and policy failures, which need short term, medium term and long-term interventions.

In Sri Lanka, the national policies are available to promote SPC.<sup>60</sup> However, the deficiencies of: appropriate legislation, regulatory enforcement capacity of existing legislation, availability of appropriate production technologies at affordable prices, skilled human resources coupled with market failures that do not reflect true environmental costs, are strong negative external forces against promotion and implementation of SPC practices in Sri Lanka.

The difficulties experienced in seeking to implement the recently initiated (2009) SWITCH – Asia programme by the Ceylon Chamber of Commerce to promote SCP in SMEs in the

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<sup>59</sup> The Access (a shortened form of assess) is generally a tax. It is a term formally applied to local taxation, in which sense it is still used as an official term in many countries.

<sup>60</sup> Chapter 5 extensively discussed the adequacy of the policies and legislation.

Food & Beverage sector is a classic example, which underscores the need to ensure an enabling environment through an integrated approach that has policy, institutional, technical and financial interventions in place simultaneously to promote SPC.

There is a potential to utilise an Environment Conservation Levy to support an integrated approach to promote SPC in the country (see section 5.9.4). However, as stated in the analysis of the financial models in Chapters 5 and 6 and in accordance with the knowledge and experience gathered by the author, it was emphasised that more sustainable and predictable financial mechanisms are required to cover the incremental costs to make an effective transition to SPC practices in the country especially in light of the present global marketing and trading systems. Intellectual Property Rights are a sensitive issue that must be addressed with better understanding of the limited environmental space left for improving human development in developing countries. Changes are also needed to help them to obtain green technologies at affordable prices so they can change to them and not continue following business as usual practises. Collaborative research with other countries of the region and also with other regions of the world could help to integrated traditional knowledge with new scientific discoveries to more effectively address SCP issues related to global climate change.<sup>61</sup>

If sufficient financial and technical resources were available Sri Lanka, would be able to reduce the trends of existing unsustainable production and consumption practices and reverse the trends in manufacturing industry, agriculture and tourism sector by 2020. It has been estimated that 30% of the carbon dioxide (CO<sub>2</sub>) emission reduction is possible in the energy sector by shifting to low cost energy generation plans<sup>62</sup> installed by 2020, if financial and technical assistance are provided to install more environmental friendly options. It is also expected that in the energy sector, demand side management can improve the energy consumption efficiencies by using various market-based instruments, some of them are addressed in the following sections.

Appropriate policies and timely actions for implementation will have to be in place to facilitate proper functioning of the market system leading to SCP. This will be possible to a certain extent by networking universities, research institutions, professional organisations and

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<sup>61</sup> The Asia and Pacific Network (APN) is one such forum whose mission is to enable investigation of changes in the Earth's life support systems as it occurs in the Asia Pacific Region ([www.apn-gcr.org](http://www.apn-gcr.org))

<sup>62</sup> Coal power options have been proposed as a cost effective option due to financial constraints. The present CO<sub>2</sub> emission levels of the country are negligible (669 Kg/capita). Sri Lanka needs ecologically and economically sound development to eradicate poverty and malnutrition in the country. This is a vital component of SCP.

chambers of commerce and industries. Facilitating seminars and symposia on policy dialogues annually or bi-annually with possible linkages with related regional centres will provide opportunities to secure unbiased public opinion that can be used to review the adequacy of the SCP policies and strategies.

Further research is necessary to evaluate the extent of mutual dependency of each component of the model to maximise the effectiveness of the model with timely and appropriate decision-making.

Details of implementation of these strategies are presented in section 8.8 under the implementation and coordination mechanism.

The National Sustainable Development Council was established in 2009, under the chairmanship of the President of Sri Lanka. It is responsible for coordinating the implementation of the proposed SPC model with sound monitoring and reporting systems.

However, achieving a satisfactory outcome will only be possible based on the ability of the international community to develop and implement a shared vision on SPC in a collaborative manner, which needs commitments from all countries. However a moderate outcome can be expected with appropriate policy changes and capacity building within Sri Lanka. Priority should be given to develop a knowledge-based society throughout the country. This will be achievable in a relatively short time with low cost knowledge management options because it already has a high literacy rate.

## **8.6 Performance indicators of the key implementation strategies of the model**

The monitoring mechanism of the Operating System Model of SPC will include output, outcome and impact based indicators with time targets (short, medium and long term) based on the existing situation of the country with a shared vision of SPC. Short-term means less than three years, medium term means from three to five years, long-term means more than five years. Generally monitoring of impact indicators takes more time.

## Key performance indicators (KPIs)

### 8.6.1 Key performance indicators for the Production side

Table 8.1 presents the key performance indicators for the production side. Sri Lanka has the capacity to deliver services to fulfil some of the output indicators. However the present capacity is not adequate to implement the SPC model effectively as discussed in Chapters 5 and 6.

**Table 8.1 Key performance indicators for the production side**

Key output indicators	Key outcome indicators	Key impact indicators
<ul style="list-style-type: none"> <li>a) The availability of public policy and environmental regulations conducive to promote and implement SPC (Number, type and sectors covered);</li> <li>b) The number and the type of incentive schemes developed to recognise and reward the SPC implementers;</li> <li>c) The number and the scope of penalty schemes, which are used to enforce compliance and to penalise non-compliance;</li> <li>d) The number of responsive agents available to sensitise/promote/make citizens aware of SPC (number, sectors, and the geographical coverage);</li> <li>e) The number of responsive agents capable of developing/adapting/adopting/transferring Green Technologies and providing technological service (number, sectors and their geographical coverage);</li> <li>f) Availability of responsive funding agents, angel funds, and prudent investments (number of funding mechanisms, sectors, geographical coverage);</li> <li>g) Availability of Green Human Resource Developers (number, sector and geographical coverage).</li> </ul>	<ul style="list-style-type: none"> <li>a) The number and type of industries, other economic sectors and service sector organisations applying/not applying SPC and their level of application;</li> <li>b) Investments in SPC;</li> <li>c) The number of supply chain management practices established, type and sectors;</li> <li>d) The number of CSR schemes in operation, types and sectors;</li> <li>e) The rate of resource consumption by sectors and types;</li> <li>f) The number of environmental complaints;</li> <li>g) The rate of waste generation;</li> <li>h) The rate of hazardous waste generation;</li> <li>i) The rate of recycling;</li> <li>j) The rate of emission reduction, type and sectors;</li> <li>k) The sink capacities, types and areas;</li> <li>l) The potential of provision of natural resources for economic development, types and areas;</li> <li>m) The economic gains, sectors, types and geographical coverage.</li> </ul>	<ul style="list-style-type: none"> <li>a) The status of the environment (national, regional and local level);</li> <li>b) The air, water and land quality;</li> <li>c) The environmentally related health impacts;</li> <li>d) The economic development (sector based developments);</li> <li>e) The social development (income, expenditure, social security schemes).</li> </ul>

### 8.6.2 Key performance indicators for the consumption side

Table 8.2 presents the key performance indicators for the consumption side. A sound monitoring and reporting programmes are necessary to periodically evaluate the performance of the SPC model as against these indicators.

**Table 8.2 Key performance indicators for the consumption side**

Key output indicators	Key outcome indicators	Key impact indicators
a) The number of service providers for Sensitisation/Promotion/ Dissemination of Green Concepts among public and its geographical coverage; b) The number of fiscal measures and controls taken to encourage sustainable consumption practices and number of consumption practices addressed; c) The number of fiscal measures and controls taken to discourage unsustainable consumption practices and number of practices addressed; d) The number of environmental regulations developed and number of issues addressed; e) The number of rewarding schemes and penalties imposed; f) The number of environmental quality/ecosystem services monitoring systems established and operational and its geographical coverage; g) The number of reporting systems established and operational and its geographical coverage.	a) The demand for environmental friendly products, related sectors and types; b) The rate of waste generation; c) The rate of hazardous waste generation; d) The rate of domestic water consumption per family; e) The rate of domestic energy consumption per family; f) The rate of recycling of waste; g) The investments for environmentally friendly products; h) The reduction of emissions and pollution levels – related sectors and types.	a) The status of environment (national, regional and local level); b) The air, water and land quality; c) The environmentally related health impacts; d) The economic development (sector based developments); e) The social development (income, expenditure, social security schemes).

Provision of sufficient financial, skilled human resources and equipment is a basic prerequisite to establish and sustain sound monitoring and reporting systems for the SPC model (section 8.4).

The system is dynamic. It must be able to effectively and flexibly respond to society's evolving needs and concerns. The proposed knowledge system will help to facilitate Sri Lankan dialogue within the country and with other countries in order to empower the people, governmental agencies and corporations to support the transition to SCP. Fundraising will be a gradual process.

What is important is that the interaction process will not be shut down. The country cannot afford it.

Sri Lanka has experience in monitoring environmental quality in vulnerable areas. The Vehicle Emission Testing Programme (VET) program introduced in 2008 can be sighted as an example. In order to control the air pollution caused by fuel emissions from vehicles, the vehicle emission testing system was introduced by the Ministry of Environment and Natural Resources. One of the main objectives was to maintain the air quality of the country. It is based on 'polluter pays' principle to cover the cost of pollution.

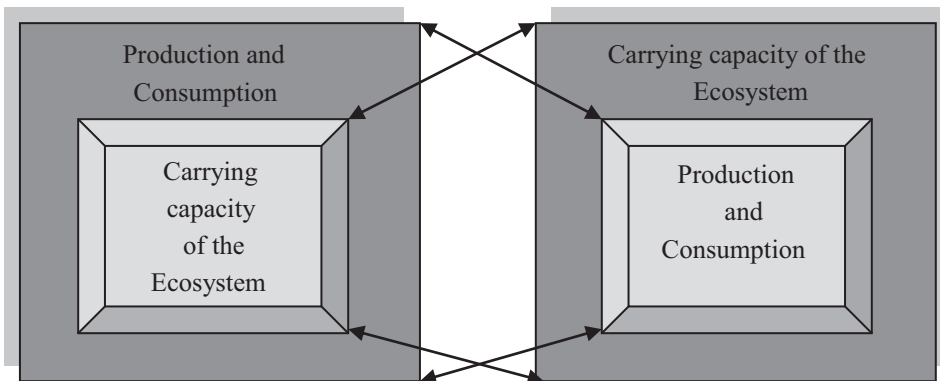
The Vehicle Emission Testing (VET) was launched on 15h July 2008 and was implemented in the Western Province on 17 November 2008. At present it has been implemented in all provinces except in North and East. There are several fixed and mobile stations operated under the authorisation of Commissioner of Motor Traffic to carry out vehicular emission testing. By the end of 2009, 1,212,970 vehicles had been tested.

As a result of the implementation of the VET programme, a significant decline of suspended particulate matter was observed in the Colombo City Region. The average PM-10( $\mu\text{g}/\text{m}^3$ ) in 2007 was 72, in 2008 was 68 and in 2009 it was down to 64.

Special attention is to be given to develop policies for SMEs to enhance their performance by application of SPC. Ministry of Environment together with the Board of Investment and the Chamber of Commerce is planning to introduce an environmental performance reporting system to measure performance beyond compliance including SPC. One of the performance indicators for medium and large industries is to evaluate their ability to assist those SMEs who are in their supply chain. Technical facilities for capacity building will be provided by the Chambers of Commerce though the SWITCH Asia programme. The Chambers of Commerce is already in the process of building the capacity of selected SMEs in the food and beverage sector.

### 8.7 The desired system for supporting the necessary behavioural changes of the society to result in SPC and to contribute to a more sustainable Sri Lanka

Fig. 8.3 presents the pathway for the desired outcome of the proposed SPC model for Sri Lanka. The behavioural patterns of the consumers and producers directly impact upon the ecosystem’s stability. Negative impacts due to anthropogenic activities such as climate change and related health impacts lead to social problems that can result in social reactions that compel producers and consumers to follow SPC practices so as to ensure ecosystem stability. Development of indicators to monitor the progress of the policies and programs, periodical assessment of the status of the evolving changes in the health of the ecosystems and effective dissemination of information among the general public are necessary to provide the right directions to modify the policies, programs and means of implementation of the proposed SPC model as appropriate. International cooperation is essential to strengthen the capacity of the country in effective implementation of the SPC model because the effectiveness of the international environmental governance system will have a significant impact on the ecosystems of Sri Lanka.



**Figure 8.3: Desired operating system for behavioural changes of the society**

In the past human activities in the country was well within the carrying capacities of the ecosystems. However in the recent past with the increase in population in the country and external forces due to globalisation, there is an increasing trend of human activities exceeding the carrying capacities of certain ecosystems with possibilities of further degradation.

While responding to the external forces due to globalisation through national policies and strategies as much as possible, it is necessary to continue the country policy to minimise the trend of population growth aiming at zero growth as presented in section 5.3 in Chapter 5.



It is therefore necessary to establish an effective implementation mechanism for the SPC model to ensure the effective adoption of the model and to ensure that the production and consumption practices are operating within the carrying capacity of the ecosystem. The implementation mechanism must be capable of ensuring effective adoption, enforcement and monitoring of the effectiveness of the model.

Initially it is necessary to identify the vulnerable ecosystems based on the available data and information. Sri Lanka has been able to restore a polluted lagoon located in Colombo (Lunawa Lagoon). This lagoon had been polluted due to effluent discharges from the nearby industries and domestic sources. Also there are projects for forest conservation with community participation empowering them to use the buffer zone for their livelihoods while assisting in conservation of the forest.

The Ministry of the Environment is in the process of establishing a network to carry out a pollution census considering major pollutants. The massive cost involved for this purpose is a challenge for the implementation of such an initiative; external assistance is necessary to fulfil this objective.

Another feedback approach is the publication of sustainable human development indicators at the provincial level. These indicators will cover the socio-economic aspects as well as pollution levels such as the carbon footprint, resource extraction and sink capacities by province. An extensive capacity building program at the provincial level is necessary for this purpose. Many provinces have developed environmental profiles under the Environment Action One Project implemented by the Ministry of Environment in 1999. However updating of these profiles has not been done due to financial and technical difficulties.

The provincial level administration should be encouraged to use available human and other resources in the province such as universities to establish databases initially by bearing the initial costs. Operation and maintenance costs could be partly born by charging a user fee of the data and information. However in the meantime sustainable resource mobilisation strategies should be developed in each province for the implementation of the SPC model in collaboration with the national government.

The following functions are necessary to help to ensure effective adoption of the model:

- Development of SPC program facilitation policy;
- Implementation of the SPC program;

- Monitoring of the progress of implementation against a set of realistic indicators;
- Evaluation of the progress, review policy options and take appropriate actions to address the problematic issues and filling the gaps.

## 8.8 Implementation mechanism of the model

The proposed implementation mechanism consists of the following three systems:

- Development and implementation of a system with lead agencies responsible for the implementation of the nine conditions listed in the SPC model (Table 8.1);
- Development and implementation of a coordination mechanism for the implementation of SPC model (Fig. 8.4);
- Build upon and use the linkages of the coordination mechanism of the SPC with the existing national coordination mechanism for sustainable development (Fig 8.5).

### 8.8.1 Implementation system within and among the lead agencies responsible for the implementation of the nine conditions (Key External Forces) stipulated in the SPC model

The lead agencies were identified by using the research findings, observations and personal experience for the implementation of key external forces to promote producers and consumers to follow SPC practices in Sri Lanka. Effective collaboration of these agencies is essential to help to implement short-term and long-term strategies to facilitate implementation of SPC.

**Table 8.3 The lead agencies responsible for the implementation of the nine conditions (Key External Forces) stipulated in the SPC model**

	Key External Forces	Lead Agencies/Service providers
Sustainable Production	Public Policy and Environmental Regulations, Recognition & Rewards/Penalties	National/Provincial and Local level Enforcement Authorities; Chambers, Productivity Organisations
	Responsive Agents to sensitise/promote/make aware of CPs/ESTs/SPs etc.	Focal Points of MEAs, NCPC, Chambers of Industries, Professional Bodies/NGOs, Universities

Sustainable Production	Responsive Agents for Develop/ Adapt/Adopt/Transfer Green Technologies and provision of technological service	Industrial Technology Institute (ITI), National Engineering Research Centre (NERDC), Industrial Development Board (IDB), Universities, Industrial Services Board (ISB), International networks
	Responsive Funding Agents, Angel Funds, Prudent Investments	Ministry of Finance/Central Bank/ Other Banks/ Environmental Funds
	Suppliers of Green Human Resources	Universities/Technical colleges/Schools/ NCPC/ ITI/Professional organisations
Sustainable Consumption	Service providers for Sensitisation/ Promotion/ Dissemination of Green Concepts among public and Prudent Choices	Focal Points of MEAs, NCPC, Professional Institutions, NGOs, Consumer Protection Authority, Local level networks (IT and S&T networks etc.)
	Fiscal Measures - Controls/ Incentives	National, Provincial and Local level Financial Institutions
	Environmental Regulations Rewards/Penalties	National/Provincial and Local level Enforcement Authority
	Desired Healthy ecosystems	Ministry of Environment, Research Institutions, Professional Bodies, NGOs (Publications of the status of the quality of ecosystem)

### 8.8.2 Coordinating mechanism for the adoption/implementation of the SPC model

Initially, the Ministry of Environment will have the leading role to ensure political and public corporation and collaboration to implement the SPC model; they will need to keep in mind the necessity of both demand and supply driven approaches to ensure its effective implementation. It is important to note that as Sri Lanka has already established a National Council for Sustainable Development (Chapter 5 section 5.8.9) that is chaired by the President of the country in 2009, building on the existing system will be more appropriate to move forward and strengthen the nine attributes (external forces) identified in the SPC model. Periodic modification of the policies and programs will be necessary until and after the desired market system conducive to SPC is in place. Ecological footprint analyses along with the assessment of bio- capacity can provide valuable inputs pertaining to needed modifications connected to each attribute.

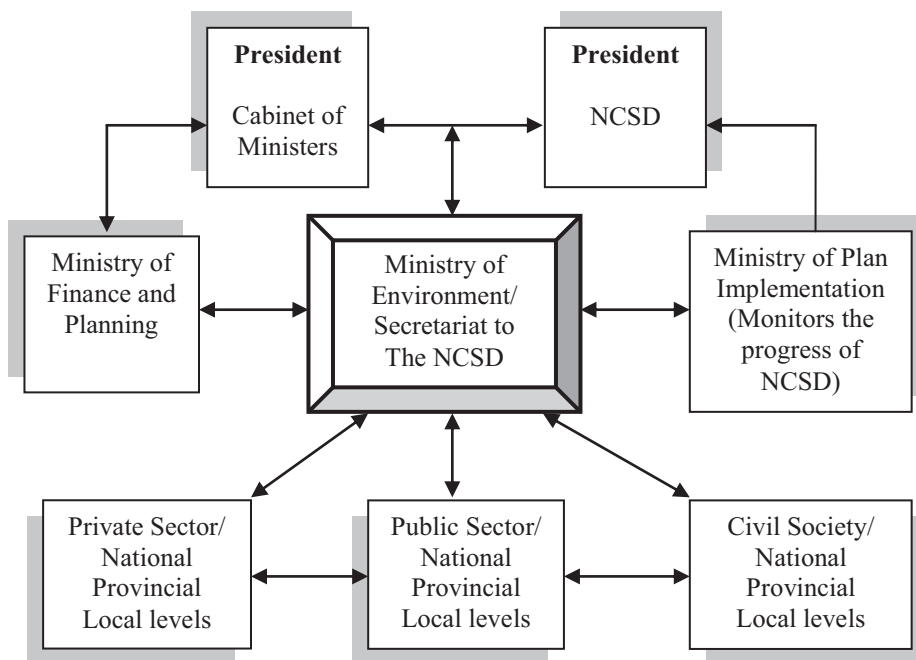
### 8.8.2.1 The National Council for Sustainable Development and the Haritha (Green) Lanka Program

In 2009, Sri Lanka established National Council for Sustainable Development under the chairmanship of the President of the country. Ministers of Twenty-two (22) leading Ministries serve as members of the council. An advisory committee has been set up with the secretaries of these ministries to provide advice to the council as well as to coordinate with the other ministries and institutions to develop and implement strategies to integrate the sustainable development strategies into their policies and programmes. A national action plan was also developed under the following ten missions:

- **Clean Air** - Every Where;
- Saving the **Fauna, Flora and Ecosystems**;
- Meeting the Challenges of **Climate Change**;
- Wise use of the **Coastal belt and the Sea**;
- Responsible use of the **Land Resources**;
- Doing away with the Dumps (**Waste management**);
- **Water** for All and Always;
- **Green Cities** for Health and Prosperity;
- Greening the **Industries**;
- **Knowledge** for Right Choices.

It is important to note the principle behind these ten thrust areas is to promote green economy within the framework of sustainable and equitable development (e.g. Clean Air – Every Where, Water for all and always). Positive outcomes of one area are complementary for the positive outcomes of others and thus SPC eventually will be the driving force for the effective implementation of the plan.

The Ministry of Environment acts as the convener of the council and provides secretarial facilities. The Ministry of Plan Implementation (the ministry which is responsible for monitoring the progress of the activities of ministries) has been charged with the responsibility of monitoring of the National Action Plan. Fig 8.4 shows the framework of the coordination mechanism of the NCSD, which is currently in operation. The detailed mechanism is presented in Chapter 5.



**Figure 8.4: The framework of the coordination mechanism for the implementation of the NCS model**

### 8.8.2.2 Coordination mechanism of the SPC model

Since the Ministry of Environment has the mandate to provide the secretariat facilities for the National Council for Sustainable Development, it could facilitate, coordinate and assist in policy and programme development to integrate the nine attributes (external forces, minimum conditions) of the SPC model for strengthening the sustainable development process in Sri Lanka. Close collaboration with the Ministry of Plan Implementation is also necessary as it has the mandate to monitor progress in implementing the NCS.

The mechanism for the implementation of the SPC model was developed with the roles allocated to major stakeholders responsible for implementing the nine minimum conditions. The coordination mechanism was developed and is included in the implementation mechanism for coordination and effective collaboration of those stakeholders in actualisation of the SPC model. It is also necessary to link with the provincial councils and local authorities to implement the SPC model across the country. Fig 8.5 shows the sectoral coordinating mechanism of the SPC model, which was developed; in line with the ten thrust areas identified under the Haritha (Green) Lanka national program.

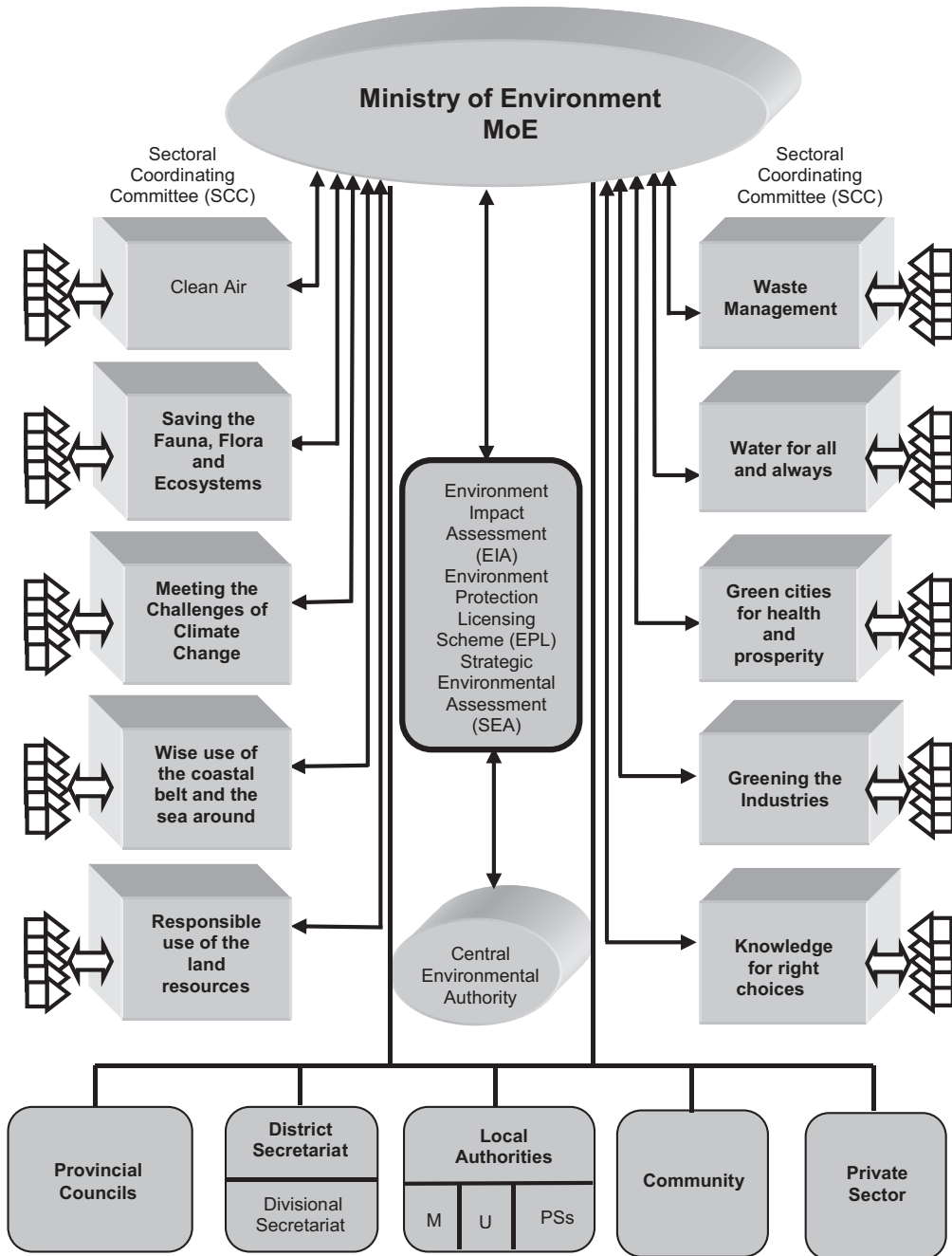


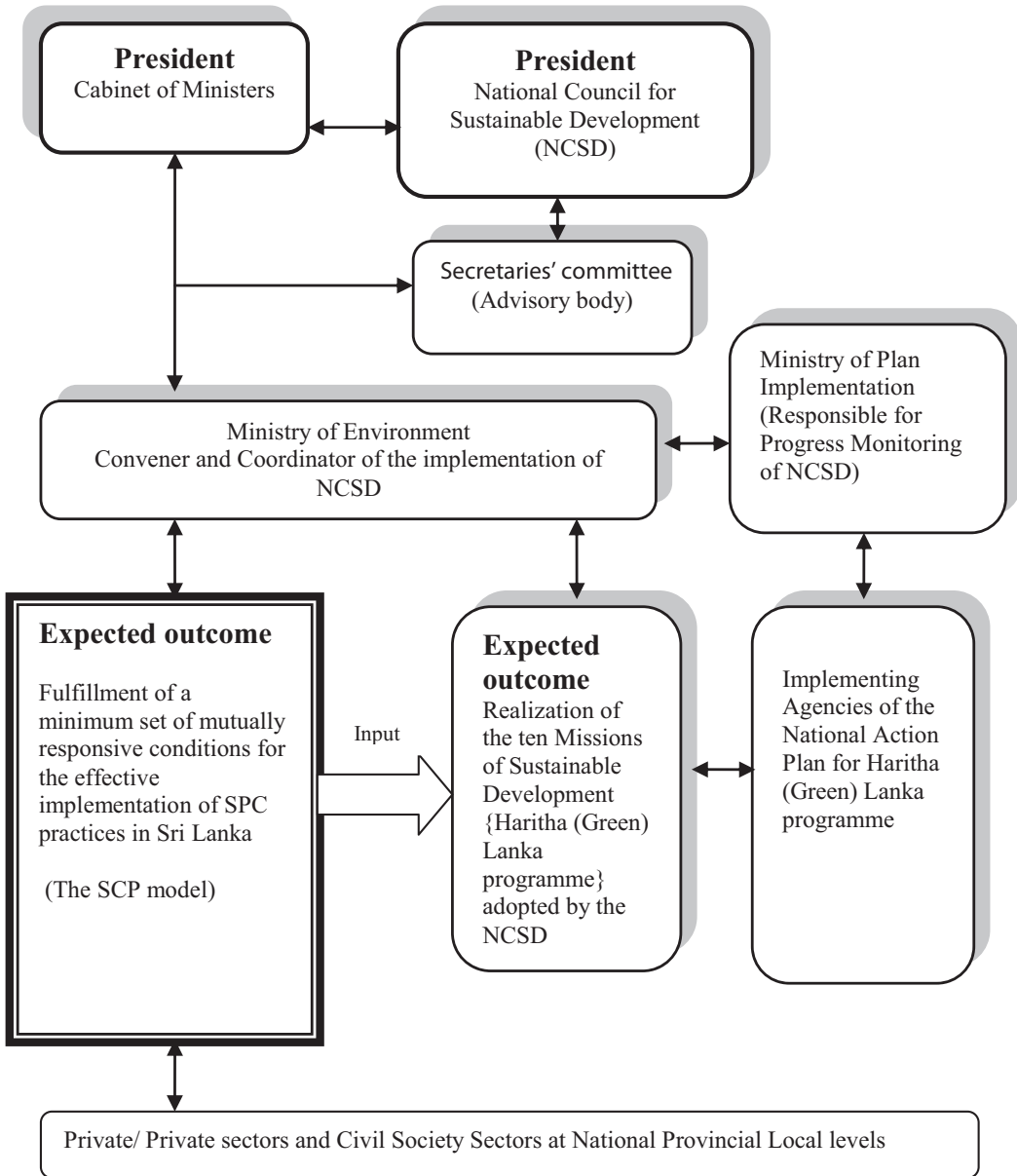
Figure 8.5: Sectoral Coordinating Mechanism of the SPC National Programme

It is obvious that effective collaboration of the stakeholders is the key for successful and effective implementation of the SPC model. The existing mechanism available for the implementation of the National Council of Sustainable development could be used to facilitate implementation of the SPC model. The details of implementation are presented in section 6.10.8. It is expected that the theoretical model developed in this dissertation with its minimum set of conditions necessary for effective collaboration of stakeholders can be used to maximise collaboration of the stakeholders in implementation of the model. It is necessary to develop linkages of the implementation mechanism of the SPC model with the existing political responsibilities and authority relationships in order to strengthen the affectivity, efficiency and sustainability of the implementation of the SPC programme. The following section provides a plan for linking the proposed coordination mechanism with the existing national coordination mechanism to facilitate sustainable development the Sri Lanka.

### **8.9 Linkages of the coordination mechanism of the SPC model with the existing national coordination mechanism**

The SPC model implementation procedure was developed to avoid duplication and to strengthen the capacity for implementation of the sustainable development strategies of Sri Lanka. It is expected that the implementation of the proposed SPC model will be the pathway to realise the ten missions developed under the NCSD. Figure 8.4 presents the model with diagrammatic linkages of the two implementation mechanisms.

It is essential that progress of the implementation of the national SPC model will be effectively and systematically monitored via stakeholders according to the diagram presented in Fig. 8.6, with the overarching objective of making changes, when and where necessary to ensure that the government and markets partner to achieve the desired balance between SPC practices and sustainable functioning of the ecosystem. Such a balance is essential input for making progress on the ten Missions adopted by the National Council for Sustainable development for Sri Lanka.



(Boxes with Shadow reflects the existing structure)

**Figure 8.6: Coordination mechanism with the existing national coordination mechanism for sustainable development**



Today the global human community continues its journey toward an unpredictable future. The multiple global crises and the increasingly rapid changes of the global socio-economic and political conditions are interlinked with the decreases in per capita environmental space. Even though many initiatives have been taken by various institutions and groups on SPC activities, continuous unsustainable lifestyles and ever increasing population growth, offset the positive outcomes of these initiatives. Rigorous knowledge management strategies are essential to motivate global communities to adhere to a middle path sustaining the carrying capacity of the global ecosystems for the sustainability of all living beings.

The issue is inseparable from each nation's economic growth plans, and as such many countries have their own concerns on the benefits and losses, which will be incurred as a result of responses to the global changes. This results in competition and conflicts among many countries and may result in many countries or other stakeholders moving away from collaborative decision-making. Sri Lanka has to address this issue by clearly envisioning and responding to the risks and vulnerabilities in an unequal world.

### **8.10 Conclusions**

The model of SPC for Sri Lanka contains five components. All components should be taken together for effective implementation of a SPC programme in the country. These components establish the framework of the SPC model, which includes:

- a) The vision, mission and goals of the model;
- b) The key external forces of the operating system of the model both from the production and consumption sides that have been transformed into the major implementation strategies of the SPC model (figure. 8.1) as the minimum conditions to be fulfilled;
- c) A comprehensive set of indicators to facilitate monitoring and reporting of the progress of the model;
- d) A comprehensive sectoral coordinating mechanism for the implementation of the SPC National Programme;
- e) A coordination mechanism to link the SPC program to the existing mechanism to help to secure the political will at the highest level for implementation of the model.

This framework was designed to accommodate possible changes of priorities/thrust areas due to political changes with the changes of governments and continue the SPC programme irrespective of these changes. There may be changes in priority areas and the titles and names of the programmes and coordinating committees in the future. However, the substance of the SPC program should remain as it is until the minimum conditions stipulated in figure 8.1 are fulfilled to make progress in both production and consumption sides of SCP. The key performance indicators are also valid for monitoring and reporting the progress of any development activity for the next twenty years and beyond.

## CHAPTER 9

# VERIFICATION OF THE CONDITIONS OF THE THEORETICAL FRAMEWORK ON COLLABORATION

### 9.1 Background

Chapter 9 presents the results of the process of verification of the Theoretical Framework developed by the author to ensure collaboration in three different problem domains<sup>63</sup>, as outlined in sections 1.4, 2.1, and 2.8. Success of implementation of the SPC model for Sri Lanka will be dependent upon the will and the ability of the different stakeholders to take common decisions and to effectively and consistently implement those decisions i.e. the elements of collaboration. The proposed minimum conditions presented in the framework can be used to create a supportive environment for collaboration among different stakeholders for successful implementation of the SPC model.

Once the minimum conditions for collaboration are fulfilled, gradual improvements will emerge within the system itself naturally when the different stakeholders agree to a shared vision on SPC and commit themselves to proceed with the fulfilment of the shared vision together. The minimum conditions proposed are the conditions necessary to stimulate the process and move forward to achieve a satisfactory outcome of the implementation process in the problem domain involving diverse systems.

As clarified in Chapter 8, in light of globalisation, no single country is able to conduct its business in isolation. Collaboration beyond national borders is essential.

Today, the global community continues to march towards an unpredictable future. Globalisation has made all countries and regions inextricably interlinked and dependant on each other in managing limited natural resources. Continuation of unsustainable production and consumption patterns along with significantly limited commitments to reverse the adverse environmental degradation trends by the global community with increasing trends of human population and the limited environmental space available for human development perpetuated grave imbalances of economic development and created conflicts, arguments, heated debates, misunderstandings and mistrust among, between and within regions and countries.

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<sup>63</sup> Internal Management system of NCPC, the local/national system surrounding the service delivery of NCPCs and the international system surrounding the local system.

The present multiple, global crises have aggravated unprecedented challenges for the countries in addressing their domestic (human and physical resources management) issues under the pressures of emerging, uncontrollable external forces. The financial crises that emerged in 2008 in the industrialised countries have created tension around the world irrespective of individual countries' responsibility for causing the problem. Failure of the global community to address these problems within the limited resources available, in a sustainable manner, clearly shows the dire need for short term and long-term collaborative action by the entire global community with deeper mutual understanding of the concerns of the stakeholders.

Based on the findings of this research, the author verified the validity of the minimum set of conditions proposed in the Theoretical Framework (Table 2.1) leading to collaboration of stakeholders within the three system boundaries of the service delivery of NCPCs namely:

- The internal management system of the NCPCs;
- The Local (national) system; and
- The International system.

(Figures 6.1 and 6.2.)

While all four proposed conditions are essential to ensure collaboration, prioritisation is necessary for immediate and short-term action in order to optimise the allocation of resources, including time, to stimulate and promote SPC practises under each system.

## **9.2 The Theoretical Framework for collaboration**

The findings of the analyses of two Case Studies reveal that 'Mutual understanding', and 'Trust' among stakeholders along with 'Incentives' and 'Facilitation', are necessary minimum preconditions as proposed by the Theoretical Framework to facilitate collaboration of the different stakeholders acting in complex and diverse systems. The detailed analysis of the observations is presented in the following sections. Table 2.1 presents the Theoretical Framework with the 'minimum set of conditions' necessary to help to ensure effective collaboration in a given complex situation.

It has to be noted that the level of contribution of each condition will vary with the nature of the problem, the expected outcome, and the types of stakeholders (drivers and actors) that are especially relevant contributing in one way or the other to the particular problem domain.

Among the four conditions, the more appropriate conditions have been prioritised under the three systems considered in the analysis (Fig. 6.1) to ensure optimum utilisation of available resources in a more effective and efficient manner.

The following three sections verify the forces, which pull the partners away from each other or push them towards each other within the three systems considered in the framework of analysis.

### **9.3 Verification of the pulling/pushing forces within the internal management system of the NCPCs**

Based on the results of the survey, major challenges of the internal management system of the NCPCs are:

- Producing adequate results to continue as a collaborator with shortfalls of financial inputs;
- Producing satisfactory results while facing uneven technical capacity.

Therefore, the absence of “*incentives*” and “*facilitation*” are significant forces that pull stakeholders away from each other in seeking to implement joint decisions.

The like-mindedness, high degree of commitment and the strong personal mandate to promote CP/SPC with a shared vision are pushing forces of stakeholders towards each other resulting in “*mutual understanding*” and “*trust*”. These are necessary conditions for collaboration but they are not sufficient.

Based on the strengths of the forces, therefore, the contributions of “*incentives*” and “*facilitation*” are greater than the forces of “*mutual understanding*” and “*trust*,” to lead to effective collaboration and to produce satisfactory results (section 6.6.2).

With increased “*incentives*” and “*facilitation*”, NCPCs will be able to enhance their capacity for more effective and efficient service delivery. Most of the NCPCs neither mentioned their long-term plans in response to the survey questionnaire nor did they elaborate upon their future financial plans.

The NCPC of Sri Lanka depends hundred percent upon donor funding for its functioning. Most of the projects have been conducted without performance monitoring, mainly due to financial constrains and limited, skilled human resources. Improved financial and technical

facilitation will help NCPCs to develop more realistic long-term plans and to build confidence of the industries with continuous support. It will also help to create a demand for CP among industrialists.

#### **9.4 Verification of the pulling/pushing forces within the local (national) system**

In the local system, unlike the internal management system of NCPCs, there are different stakeholders with different mandates, objectives and visions that can lead to positive and/or negative impacts on the service delivery of NCPCs and SPC. These stakeholders include: Producers, Consumers, State Institutions, Service Providers (Technical & Financial), Trade Associations, Environmental Advocacy Institutions/Groups, Trade Advocacy Institutions/Groups, Political drivers and actors, NGOs, CBOs etc.

The following possible outcomes can be expected in the absence of collaboration among the relevant stakeholders:

- Uneven results;
- Distorted results;
- Inadequate results;
- Unsatisfactory results.

Under these circumstances in a diversified system, “*mutual understanding*” and “*trust*” among the different players would add more value than that of the internal management system of NCPCs by pushing them towards each other to create an environment, which is conducive for collaboration to achieve satisfactory SCP results.

However, at the same time, the contributions of “*incentives*” and “*facilitation*” would be more important to lead to collaboration and to produce more satisfactory outcomes. “*Incentives*” coupled with “*technical and financial facilitation*” would promote producers to bridge the gaps of higher investments that are required for integrating SPC practices into their processes, products and services. For example the Board of Investment and the Ministry of Industries would focus on rapid economic development through investments with least rules and conditions imposed on the investors and by offering a package of incentives such as tax rebates, easy access to lands, importing machinery and equipment; such efforts could help to promote integrations of SPC.

“*Mutual understanding*” and “trust” are necessary among the different stakeholders to agree to a shared vision with the goal to make progress toward sustainable development in economic, social and environment spheres. Ecosystem sustainability would not be an issue to many even though it will be useful for growth itself. Many pilot projects have been discontinued once the external funding is used, since there was no interest among the industrialists to invest to ensure their continuation.(Table 5.4 and sections 5.5 and 5.6).

However the zone of agreement of the stakeholders at the local (national) level would be wider than for international level where different countries are involved. Development and implementation of national policies also is relatively easy locally than internationally provided adequate facilities are in place for implementation of such policies with sound leadership as there are lesser cultural diversities. Sri Lanka has developed a national policy on CP and there are various other policies available conducive for application of SCP. However implementation of these policies is not satisfactory for multiple reasons (technological barriers, inadequate financial assistance to cover the incremental cost required, inadequate skilled human resources available to scale up the programmes throughout the country, lack of focused incentives, lack of efficient monitoring and reporting systems, deficiencies in law enforcement, powerful external forces (market mechanisms) to promote linear economic growth through trade and many other reasons) mostly mentioned in the Chapters 5, 8 and 10 and sections 6.6.

In the production side, it was observed that most of the pilot projects implemented to stimulate CP were not continued once the funding was seized in the absence of incentives in the form of rewards and penalties through legislation and market based instruments. On one hand, non-compliance will be an easy option in the absence of effective law enforcement. On the other hand absence of incentive schemes such as market-based instruments will lead to underestimate the ecosystem services in the production process and thereby business as usual practice will be an easy option rather than allocating additional resources for application of SPC practices (Chapter 6).

Provision of financial facilities using the cess<sup>64</sup> imposed on polythene products helped the recycling industry to improve collection systems and also to improve their production processes (section 6.11.3). The government is also exploring the possibilities of using the cess to promote alternatives to polythene products. The Environmental Conservation Levy Act made provision for the imposition of an environmental conservation levy on specified items

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<sup>64</sup> The cess (a shortened form of assess) is generally a tax. It is a term formally applied to local taxation, in which sense it is still used as an official term in many countries.

and services that have a harmful impact on the environment. The revenue accumulating from this levy was to be directly utilised for taking corrective action to eliminate or alleviate the hazard. However, in December 2010 during the annual budget discussions, the Sri Lankan government introduced a new taxation system and the Environmental Conservation Levy ACT will not be functional. Environmental issues are supposed to be taken care of within the new system. This is an event where local (national) collaboration is necessary to review the conservation levy process, to identify gaps and to make an attempt to continue it with necessary modifications by keeping the principle of the Levy i.e. the '*Polluter Pays Principle*'. Imposition of levies while discouraging the use of environmentally harmful products and activities will eventually act as a pushing factor for the stakeholders to collaborate among each other to eliminate or alleviate the hazard. The Polluter Pays Principle is valid for both production and consumption sides.

Also on the consumption side, "*incentives*" and "*facilitation*" to enhance the knowledgebase on ecosystem services and the possible health impacts of unsustainable production and consumption practices create consumer pressure on companies to produce more environmental friendly products. In Sri Lanka, imposition of a ban by regulations under the National Environmental Act. on manufacturing polythene bags less than twenty microns thick, created a demand for alternatives. Twenty microns was considered because indiscriminate disposal of such thin bags after usage caused environmental hazards such as by blocking drains etc. Recycling of such bags once contaminated with food is not currently practically possible.

The Ministry of Environment is planning to promote large scale super markets to offer consumers an incentive scheme to provide a discount on their purchase if they bring their own carry reusable bag/s to take their purchased items home, thereby refraining from using the large amount of polythene bags offered by the super market free of charge. A point accumulation system can be used for this purpose at which the rebate can be made after sufficient points are accumulated. In the energy sector, incentives are being offered to those who use CFL bulbs rather than that of more energy consuming incandescent bulbs. Offering home composting bins at concessionary rates to householders also help reduce the amount of garbage to be disposed of while promoting use of composting in home gardens. Home gardening is promoted island- wide by the Ministry of Agriculture and by the media's dissemination of information of best practices and by rewarding best practices.

All these incentives require initial investments to quick start the process and maintain its momentum until the process reaches its maturity blending with the market system. A sound



monitoring system will be required to determine the time targets and the scale of facilitation necessary to ensure the desired mature system. Based on the socio economic conditions, it may be either a short-term process (three years) or a medium term process (five years) or a long-term process (more than five years). The full system should be periodically fine-tuned until the desired results are achieved.

The logic is that “mutual understanding” and “trust” are necessary conditions but are not sufficient to move forward. There should also be “incentives” and “facilitation” to help to ensure that results are actually produced.

However, at the national and local country system levels, in general, all four of these elements are important to have strengthened bargaining power. Meanwhile, at the international level, powerful external stakeholder’s interests could be used to block such changes against the common interest of implementing the SPC model. In such a context, the model will show how collaboration can fail due to the situation in which forces pulling stakeholders away from each other are stronger than the forces that push them toward each other so that they can mutually search for solutions. The section 6.12.5 elaborates upon this conclusion.

### **9.5 Verification of the pulling/pushing forces within the International System**

In the globalised economic system, external forces & pressures through trade and commerce could lead to heavy negative impacts on the implementation of the SPC model in Sri Lanka. On the other hand if the global leaders were to commit themselves to reverse the trends of the unsustainable production and consumption practices by cooperating with each other, it would be a tremendous opportunity for Sri Lanka as well as for the other countries to move forward to a green, environmentally friendly society.

In this context all four conditions proposed in the theoretical framework would be essential prerequisites to facilitate satisfactory outcomes of the implementation of the model for SPC. However enhancing “*mutual understanding*” and “*building trust*” would be more critical conditions in the international system than at the local/national system. In an interdependent world, “*building of trust*” among different stakeholders is not an optional entity anymore. The two conditions of “*Mutual understanding*” and “*Trust*” are essential among stakeholders in a complex and diverse world will pave way for multiple benefits in the long run.

The climate change issue can be taken as an example.

The recent heated debates on climate change issues provide ample evidence for the need for collaborative action of the global community to halt the adverse impacts of climate change due to anthropogenic activities.<sup>65</sup>

Figures 9.1, 9.2 and 9.3 illustrate the highest degree of global attention on the issue of climate change, which has become the centre of focus linked to human '*development*' and '*survival*'. The Figures 9.1 and 9.2 show the breakdown of the participation for the UNFCCC Conferences and its Meetings of the Parties to the Kyoto Protocol. Figure 9.3 shows the participation breakdown of COP9 of the Basel Convention held in Bali in 2008 and COP4 of the Stockholm Convention on POPs<sup>66</sup> held in 2009 in Geneva.<sup>67</sup>

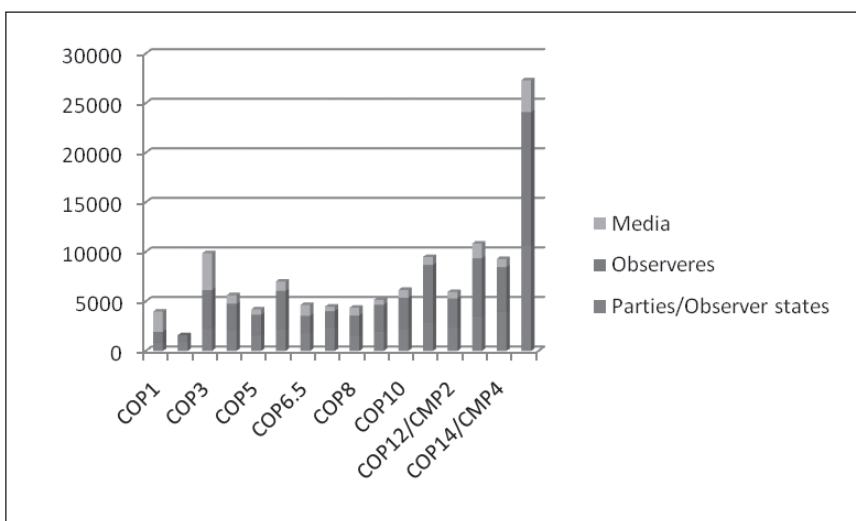
The attendance showed the increasing global attention on climate change talks which has become the centre of focus of the global community under the current multiple global crises as the policy decisions taken by the international community under climate talks have a tremendous bearing on socio-economic situations of all countries and should be resolved via collaboration to help to because the decisions have a tremendous bearing on the survival of all the living beings in the planet earth including humans.

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<sup>65</sup> Two Ad-hoc working groups (AWGs) were established by parties to form two tracks under the United Nations Framework Convention of Climate Change (UNFCCC) and the Kyoto Protocol (KP) with a two year deadline to complete negotiations and conclude its work at COP15 in Copenhagen in December 2009. AWG/KP was designed to seek agreement on new, legally binding obligations for all developed country parties to the Kyoto Protocol to mitigate their emissions beyond their existing commitments and AWG/LCA to undertake a comprehensive process through long term cooperative action under UNFCCC to implement the convention. An overview of the (UNFCCC) and its Kyoto Protocol and the current status of international negotiations were extensively presented in Section 9.6 (C).

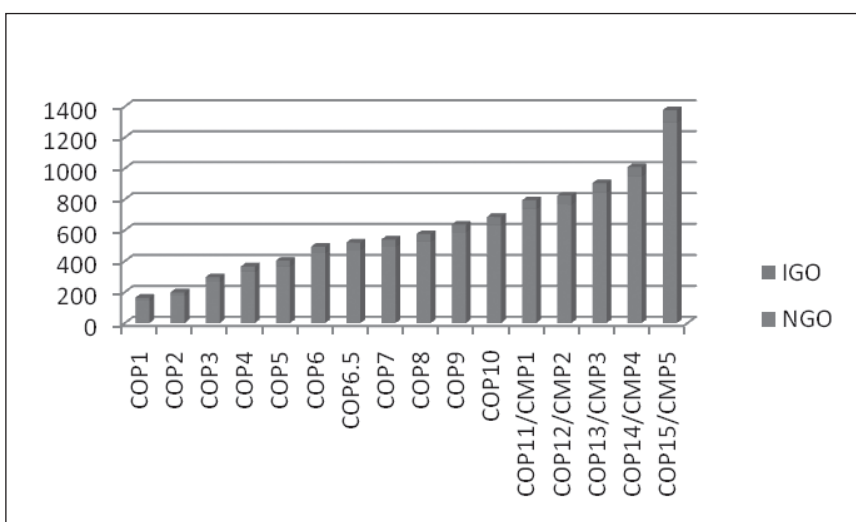
<sup>66</sup> Persistent Organic Pollutants

<sup>67</sup> COP10 of the Basel Convention and COP5 of the Stockholm Convention will be held in 2011.



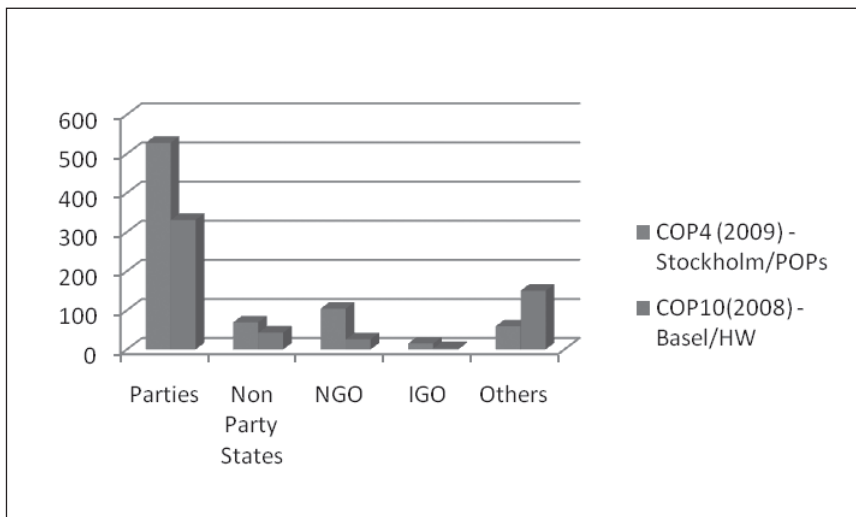
(Source: UNFCCC Secretariat) - Displayed at the Bonn Climate Talks in August 2010

**Figure 9.1: Participation Breakdown of Parties/Non Party States, observers and media of the UNFCCC/CMP**



Source: UNFCCC Secretariat – Displayed at the Bonn Climate Talks in August 2010

**Figure 9.2: Participation of IGOs and NGOs for the UNFCCC/CMP**



Source: Compiled using the data from the websites of the Basel Convention on Hazardous Wastes ([www.basel.int](http://www.basel.int)) and the Stockholm Convention on POPs ([www.pops.int](http://www.pops.int))

**Figure 9.3: Participation of COP4 of the Stockholm Convention on POPs and the COP9 of the Basel Convention on Hazardous Wastes**

The climate change induced problems of today and of the future can be sighted as a classic example of the lack of commitment of the global community to move forward for the global community’s common welfare. At the climate change conference held in Copenhagen in December 2009 (COP15), the global leaders failed to agree to take legally binding, meaningful action to stabilise atmospheric concentrations of greenhouse gases and thereby to seek to reduce the dangerous anthropogenic interference with the global climate system. Additionally, most of the delegates had complaints about deviating from the formally accepted UN negotiating and decision making process at COP15. Such deviations will push the stakeholders away from good governance practices that can cause serious negative impacts on the outcomes and impacts from the UNFCCC convention and also from the UN system.

Based on the scientific evidence, the global community needs to keep the increase of global average temperature below 2<sup>0</sup>C in the 21<sup>st</sup> century to prevent catastrophic climate change impacts with 50 percent level of confidence. The health of present and future generations will

largely depend on the ability of the global leaders to achieve agreement on these targets based on the principle of the “common but differentiated responsibility and respective capabilities,” considering the need to achieve sustainable and equitable development throughout the globe. Actions to address the issues of climate change are dependent upon the commitment to adhere to SPC approaches by people in all the countries.

As stated in Section 6.9, after years of deliberations, based on the Bali Action Plan,<sup>68</sup> COP15 failed to sufficiently address the climate change issue as expected. Under the Kyoto Protocol, it was expected that COP15 conferees would agree on new, legally binding obligations for a second commitment period for all developed country parties to the Kyoto Protocol to mitigate their emissions beyond their existing commitments. Under the UNFCCC it was expected that agreement would be reached to undertake a comprehensive process through long-term cooperative action to implement the convention.

Instead of following the two track approach, the attempts of the COP15 presidency and of a few powerful countries to adopt an accord titled, “the Copenhagen Accord<sup>69</sup>” developed by a minority group (26 countries) without following a transparent procedure in accordance with the UN system, created confusion and mistrust among the parties (representing a force pulling stakeholders away from each other).

The result was that instead of adopting the accord, COP15 only took note of it. Most of the delegations were concerned and dissatisfied with the conduct of COP15 and its decision-making process. There is a strong need for improvements of mutual understanding of the socio-economic problems of different countries as well as to more fully understand the scientific evidence of climate change impacts on the entire world. Trust is a central issue in such negotiations as decisions. In this case, since decisions were taken by a smaller group without transparency and were imposed on the larger group, trust and mutual understanding were eroded due to serious deviations from the formal UN negotiating process.

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<sup>68</sup> Bali Action Plan (BAP) was adopted at the 13<sup>th</sup> conference of the parties to the UNFCCC and 3rd meeting to the protocol held in Bali, Indonesia with a view to focus on the long term issues of climate change; mitigation, adaptation, finance, and technology and capacity building. The two AWGs established referred in the footnote 4 was the mechanism established to implement the Bali Action Plan.

<sup>69</sup> The “Accord” contains twelve paragraphs with much diluted open ended texts that ignore the progress made during the two-year negotiating process.

## 9.6 Significant events of COP15 selected to validate the Theoretical Framework

The following key events of COP15 were selected to validate the Theoretical Framework, based on a minimum set of conditions necessary to ensure collaboration of different stakeholders. The minimum conditions include: “*Mutual Understanding*”, “*Trust*”, “*Incentives*” and “*Facilitation*” (Section 2.8.2)

### (A) The need to build and maintain “mutual understanding” and “trust” among the stakeholders throughout the negotiating process

#### (1) Event – Partial solicitation based upon favoured groupings

Context: Repeated attempts by the Danish Prime Minister of the hosting country of COP15, to solicit an agreement to an un-negotiated text (the so-called Danish Text) with a few, selected heads of states, as the final outcome of the conference in November 2009, just a few days prior to the conference and his continuous efforts to conduct informal consultations with selected heads of states without transparency or inclusiveness among the other representatives of global community.

#### Impact

His actions led to an utterly chaotic situation among the parties from the beginning and continued throughout the conference. The most unfortunate outcome of this undemocratic process was the division between developed and developing countries despite the previous, two-year negotiation process. Building trust is difficult. Breaking trust is not affordable.

#### (2) Event – Conflicting interests

The attempt by the Danish Prime Minister to take over the presidency for COP 15 from the Danish Minister of Energy and Climate who is the president.

#### Impact

This situation worsened the already chaotic situation, and heightened the anger of the delegates, who increasingly had a feeling of instability and insecurity in the whole process. They also felt fear about the likely increased pressure that would be imposed upon them during the final high-level meetings to obtain agreement when most of the heads of states were present.

In fact, even though the Danish Energy and Climate Change Minister presided over the conference during the first week, as a result of pressure from developing countries, during the high level segment, she resigned from the presidency; consequently, the Danish Prime Minister took over the post. This situation resulted in postponement of the plenary meeting thus, creating further delays in the negotiating process.

### **(3) Event – impartiality impaired**

The attempt by the Danish Minister and the Prime Minister to halt the negotiations on the issue of numbers on mitigation targets of industrialised countries under the Kyoto Protocol by the Ad-hoc Working Group of the Kyoto Protocol - AWG-KP, while allowing negotiations of long term cooperative action, by the AWG-LCA, to a certain extent.<sup>70</sup>

The USA is a Party to the UNFCCC and not a party to the Kyoto Protocol (KP). The developed country parties to the KP were reluctant to make further legally binding commitments without commitments from USA for comparable emission reduction targets. Some developed countries wanted to have a single agreement, which means the termination of the KP after 2012. Initially even though it seemed that the motivation for this position was to force major emitters/economies and countries with emerging economies also to take responsibility with legally binding commitments to reduce emissions, it seemed that the motivation of some developed countries was to relax their level of commitment or to avoid taking legally binding commitments altogether.<sup>71</sup> KP negotiations were suspended most of the time without allowing the parties to continue negotiations on emission reduction targets of Annex I countries while AWG-LCA group continued their work.

Developing countries insisted upon decisions for a second commitment period. Decisions at AWG-KP were crucial for a final outcome of AWG-LCA too to ensure commitments of all the developed countries for ambitious emission reduction targets.

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<sup>70</sup> Under the Kyoto Protocol, it was expected to agree on new, legally binding obligations for all developed country parties to the Kyoto Protocol to mitigate their emissions beyond their existing commitments. An Ad Hoc Working Group (AWG-KP) was established in 2005 to decide on further Commitments for Annex I Parties under the Kyoto Protocol before the end of the first commitment period (2012), another Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) was established in 2007 under the Convention (UNFCCC) with a mandate to focus on key elements of long-term cooperation.

<sup>71</sup> The text of the Copenhagen Accord does not mention any legally binding commitment for emission reductions from the developed countries.

## **Impact**

This process caused the African Group and the Least Developed countries supported by the G77<sup>72</sup> and China to call for suspending negotiations from all the issues other than negotiations on numbers (ambitious targets for mitigation)

### **B) The need to build and to maintain ‘mutual understanding’, ‘trust’, ‘incentives’ and ‘facilitation’ among the stakeholders throughout the COP 15 negotiating process**

#### **(4) Event – Disrespect for mutual interests**

Urging developing countries to offer mitigation targets without committing to provide adequate financial resources

## **Impact**

This situation kept the delegates from developing countries far from coming to an agreement for a fair deal. This reflects the absence of the necessary conditions of incentives and facilitation, the absence of which pulled the stakeholders away from each other and could lead to complete failure in collaboration.

#### **(5) Event – Non consensus**

The reluctance of the EU and Japan to offer ambitious targets until the USA offered comparable mitigation targets and the desire of merging the two tracks (Kyoto Protocol (KP) and the Convention (UNFCCC) – section 6.9.C)

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<sup>72</sup> G77 is the largest intergovernmental organisation of developing states in the United Nations that provides a forum for them to articulate and promote their collective interests and enhance the joint negotiation capacity at international forums. The G77 established in 1964 by seventy-seven developing countries signatories of the “Joint Declaration of the Seventy-seven Countries” at the first session of the United Nations Conference on Trade and Development (UNCTAD). At present there are 133 member countries in G77.



## **Impact**

This situation caused the suspension of negotiations on mitigation under the KP because the USA was very firm on its position,<sup>73</sup> urging countries in economies in transition also to come out with emission reduction targets. Developing countries suspected this approach to be an attempt to kill the KP; consequently they invested much time and energy seeking to keep the protocol alive. In fact it was observed later that the pledges submitted by Annex I countries are far below the levels required based on the scientific evidence.<sup>74</sup>

### **(6) Event - Dogmatism**

The on-going efforts of the COP 15 presidency, both the minister and later the prime minister to conduct informal meetings with selected countries called, “Friends of the Chair” and by putting pressure on all of the other countries through them to agree to what was discussed at these closed meetings.<sup>75</sup>

## **Impact**

This situation increased the frustration of the delegates and led to frequent suspensions of negotiations due to strong protests by the delegates.

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<sup>73</sup> The USA emission reduction target was 17% at 2005 levels which is far below the comparable emission reduction targets expected by other annex I countries. At a later date Canada also reduced their pledges claiming the necessity to be compatible with USA targets.

<sup>74</sup> The current aggregated pledges of 17-25% whereas the requirement should have been 25-40%. There are ambiguities as to whether these pledges truly reflect the emission reductions as there are loopholes in the calculation process.

<sup>75</sup> In fact the COP presidency convened the final plenary on December 19, at 3.00 a.m., one day after the formal closing date of the conference, and for the first time he officially announced that a meeting had occurred with 26 countries and the Copenhagen Accord was presented to the conference to adopt. Just after the announcement, he tried to suspend the meeting for one hour for the parties to read the document without allowing parties to open discussion or to even make a point of order. This provoked a delegate to use her name plate to loudly bang on the table for almost a minute to be heard by the presidency (TWN).

The concern of the delegates was, “After keeping the majority of the delegates for long hours and after several leaders of developed countries had told the media that an agreement has been made even before presenting the text at the plenary, the COP presidency tried to just throw the paper on the table and to leave the room!” She reported that she had to bang her name plate on the table so hard that she cut her hand in her effort to get the attention of the COP presidency before he left the podium (TWN).

## **(7) Event – co-opting**

The attempt to develop an ‘Accord’ with the “Friends of the Chair with a much diluted text without fair and legally binding targets,” as a way forward by offering financial assistance to developing countries (US\$ 30 billion for the period of 2010-2012 and long-term finance of a further US\$ 100 billion a year by 2020). However, the details of the methodology for mobilisation of the funds and for allocation of funds were not clear.

### **Impact**

Agreement of the African group leaders and some other countries to the Accord. However, many delegates took a neutral position while a few delegates vehemently protested the undemocratic process that led to that proposal. The COP 15 decision to make a “note” on the Accord without referring to it as a decision of the COP itself, shows the gloomy and uncertain situation and raised serious questions about the validity of the outcomes.

## **9.7 Significant events of COP16 selected to validate the Theoretical Framework**

Results of the COP16, which was held in Cancun, from November 29, to December 10, 2010, reflect another dimension of the international environmental negotiating process in contrast with the results from COP15. Initially, rebuilding the trust was key during the negotiating processes of interim Ad-Hoc meetings held between COP15 and COP16. However, a paradigm change of the trend of the negotiating process was seen at COP16, namely they seemed to only focus upon resolving disagreements among countries by indirectly encouraging Parties to be silent or neutral as a strategy to continue the UNFCCC process.

Third World Network (TWN) reported that ‘the Cancun Conference was marked by a questionable method of working, that is quite similar to the method used by the WTO but is not used in the United Nations. This was illustrated by the fact that the host country, Mexico, organized small group meetings led by Mexico and a few other Ministers, which it selected, who discussed draft versions of texts on various issues. The final document was produced through the usual process of negotiating among delegations, but was compiled by the Mexicans as the Chair, and was given to the delegates only a few hours prior to a ‘take-it-or-leave-it’ vote with no amendments allowed..

Apparently, the agreement was just on paper because they anticipated many future changes and commitments, especially from developed countries. The text failed to reflect any legally

binding outcomes on the part of the developed country Parties. It only mentioned individual countries' voluntary emission reduction pledges. The text is open to accommodate new 'carbon off sets' and many other loopholes allowing developed countries to continue 'business as usual', thereby, avoiding obligatory domestic emission reductions.

Agreement to establish a 'Green Climate Fund', which in fact is a positive outcome, was the strategic bargaining tool offered for merging disagreements; this left many, provisions open, which needed attention to avoid dangerous climate change impacts in this century. 'Financial assistance' was one of the four minimum conditions that the author indentified to be essential to create a supportive environment for collaboration. There is a risk that the Convention will be able to meet the targets set and adopted by the Bali Action Plan at COP13 in 2007 to address the climate change problems (section 6.5.3).

Notwithstanding the desire of the developing countries to continue with the two-track process (Kyoto Protocol and the UNFCCC/LCA) in accordance with the Bali Action Plan, the outcome from Cancun was limited to merely bringing the mitigation action of the industrialized countries and developing countries formally under one process as proposed by the Copenhagen Accord. There were no final decisions on the Kyoto Protocol. The Protocol has been kept open, maybe because closing the loop of the Kyoto Protocol altogether at that time would have had serious negative impacts on continuation of the CDM process.

The following decisions of COP16 are considered by the author to validate her other minimum conditions that are required for collaboration to achieve the expected outcomes of the UNFCCC in order to avoid dangerous impacts of climate change:

- Under the '*Nationally appropriate mitigation commitments or actions by developed country Parties*', in COP16 took note that 'Quantified economy-wide emission reduction targets should be implemented by Parties included in Annex I to the Convention as communicated by them as contained in document FCCC/SB/2010/INF.X . (to be issued).
- Under the '*Nationally appropriate mitigation commitments or actions by developing country Parties*', in COP 16 took note that 'Nationally appropriate mitigation actions are to be implemented by Non-Annex I Parties (developing countries) as communicated and contained in document FCCC/AWGLCA/2010/INFY (to be issued).

([www.unfccc.int](http://www.unfccc.int))

Both documents (FCCC/SB/2010/INF.X and FCCC/AWGLCA/2010/INFY) referred to above do not exist (to be issued) and hence the provisions therein are open ended (not known to any Party at present). All the Parties but one (Bolivia) agreed to adopt this decision, which based on a spirit of compromise, anticipated a fair deal in future. TWN reported that ‘The Cancun meeting in fact made it more likely for the developed countries to shift from the Kyoto Protocol and its binding regime of emission reduction commitments, to a voluntary system in which each country only makes pledges on how much it will reduce its emissions’.

Bolivia (the only country which did not adopt the COP16 outcome and challenged its validity) claimed that ‘the decision represented a step backward by postponing indefinitely a decision under the Kyoto Protocol and it opened the doors to a regime which will be flexible and voluntary for a pledge and review approach and not a system where all Annex I parties will fulfill set targets’.

TWN reported that ‘the Cancun conference suffered an early blow from Japan’s announcement that it would never agree to make another commitment under the Kyoto Protocol. The conference never recovered from that blow’.

Many speculated that COP 16 made 2010 a ‘make-or-break-year’ for international climate change negotiations.

The COP16 decision on financing was supposed to set up a committee to design various aspects of a ‘Green Climate Fund. No decision was taken on the scale of the fund. Also it is noted that COP 16 decided to establish a governing body for the fund with 24 members comprised of an equal number of members from developing and developed countries despite the significant differences in proportion of global populations in the developing and developed countries (about 80% Vs 20%).

With these limitations, there is a high probability to adopt the same strategy used at the COP16 to merge disagreements of the developing countries on the implementation mechanism of the proposed fund thereby, ignoring the principle of ‘Common but Differentiated Responsibilities’ and by moving away from the commitments and responsibilities for domestic emission reductions by developed countries, thereby taking the lead to combat the climate problem. During the period of 1990-2008, the total aggregate GHG emissions for Annex I non-EIT Parties (developed countries) have increased by 7.9% excluding land use, land use changes and forestry (LULUCF) considerations and increased by 8.3% with LULUCF considerations (FCCC/SB/2010/18-[www.UNFCCC.int](http://www.UNFCCC.int)).

Therefore, improving '*Mutual Understanding*' and '*Building Trust*' will be very crucial at this stage to ensure the kind of collaboration required to address the climate change problem based on scientific evidence. Strategies of merging disagreements based only on the political economy will create serious threats for the future of the UNFCCC and thereby, will threaten the ecosystem's stability.

The President of COP 16 was the Minister of Foreign Affairs of Mexico, whereas, the COP15 presidency was the Danish Minister of Energy and Climate Change initially and subsequently it was the Danish Prime Minister. Both of them failed to get into a common agreement in Copenhagen. The Mexican presidency was able to achieve a common agreement without resolving many key issues such as legally binding emission reduction targets. The final result was basically a reflection of the Copenhagen Accord. The question is how far the COP16 agreement will proceed to resolve the climate problem with timely action by all countries in the world?

Under these circumstances, it is evident that the ability of the global community to follow a credible international environmental governing system will be the key for future global sustainable development. Credible scientific evidence is essential for the Parties to consider seriously the need for taking timely action to address the climate problem with 'mutual understanding' thereby changing from the current negotiating tactics to achieve the needed outcomes.

However, the current inability or lack of will of the global community to take timely action to reduce emissions will have serious impact on human life and on the life supporting ecosystems in future as nature will not negotiate with humans and will maintain its equilibrium at the expense of many lives and life supporting systems. Sooner or later, this situation will create no further options for the remaining global community other than resorting to SPC for their existence or to suffer serious ecological/survival consequences.

## 9.8 Conclusions

Global leaders can learn lessons from the outcomes of COP 15 in the following ways;

It is urgent that we look back at the full process and identify the real deficiencies in the negotiating process by all the countries and make a collective effort to increase the areas of agreement because the earth's global atmosphere will not negotiate with humankind. In this context, it is obvious that the 'will to effectively collaborate,' was one of the key missing components of the process.

Therefore, future negotiations should be focused on achieving the targets of the convention based on scientific evidence. In this context, all the countries will have to make sacrifices based on common but differentiated responsibility and their respective capabilities with the highest degree of commitment.

The global community anticipated that the world political leaders would agree to a fair, effective and comprehensive global climate deal at COP15, which is an unequivocal requirement to stop climate change from slipping out of control based on science.<sup>76</sup>

In fact, at the Climate Summit held during the 64<sup>th</sup> Session of the United Nation General Assembly in September 2009 in New York just prior to COP15, Mr Ban Ki-Moon, the Secretary general of UN, stated that *“Success in Copenhagen can jumpstart a fundamental transformation of the global economy, strengthening, climate-resilient development and most urgently, assisting the world’s poorest and most vulnerable to adapt to the inevitable impacts of Climate Change.”*

However the global leaders at COP 15, failed to agree to ambitious targets as expected by the global community. The Copenhagen Accord is silent on implementation of a legally binding mechanism to ensure mandatory emission reduction targets, which was anticipated in the Bali Action Plan adopted at the COP13 of UNFCCC. Offsetting of emission reductions without domestic reduction targets will not satisfy the atmospheric requirements as polluter pays principle has its own limitations.

The Copenhagen Accord may be seen as an international political commitment that can be the basis for their political negotiating positions related to climate change. However, the undemocratic process through which the Accord was designed and presented created scepticism among delegates from many developing countries as to whether the Accord would be able to mitigate the global emissions based on scientific evidence.<sup>77</sup>

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<sup>76</sup> COP 15 can be sited as a remarkable global event in many ways. One is that 115 heads of states or governments attended the conference, which shows the political sensitivity of the climate change issue. Another feature was that there were 30,000 applications that registered for the conference despite its capacity limit of 15,000. The high level of the interest of the global community on the outcome is another feature.

<sup>77</sup> According to the International Panel of Climate Change, it is necessary to keep the global temperature increase below 20 centigrade in the 21st century to avoid dangerous impacts due to climate change with 50% probability. This will require industrialized countries to cut emissions as much as 30% at 1990 levels by 2020 and 80% by 2050. Most vulnerable countries demand that societies reduce the 20 target to 1.50 in order for them to be within safety levels.

The proposed funding mechanism must have been an attraction to African Countries, Small Island Nations and Least Developed countries. However in the Accord, provisions of funding have been left open, which would facilitate industrialised countries to offset their emission reduction targets by other means instead of setting ambitious emission targets domestically. The funding mechanism is also not clear. The main objective of UNFCCC will not be fulfilled by such approaches. Firm commitments to reduce emissions based on the scientific evidence are not an optional subject to the conditionality of countries concerned. The atmosphere will not negotiate with us.

In order to address the climate change issue based on scientific evidence, all countries have to make sacrifices based on the principle of common but differentiated responsibility as agreed by the convention with the highest degree of commitment.

The heated debates of the global community on the climate change issue provide ample evidence for the essentiality for the proposed, ‘minimum conditions for collaboration,’ to achieve mutually acceptable outcomes for the majority of the stakeholders and consequently, to share a common vision; without them the following will result:

- Uneven results, possibly leading to a complete breakdown of trust;
- Distorted results due to lack of participation and withdrawal by some of the parties;
- Inadequate results due to shortfalls of inputs;
- Unsatisfactory results due to uneven technical capacity.

The Montreal Protocol has often been sighted as the only international instrument that was able to meet the objectives to a satisfactory level. The success is due to its effective implementation mechanism with strong political leadership coupled with sufficient financial resources provided for the developing countries for implementation of its provisions; all of these factors are pushing forces to accomplish the agreed upon outcome.

A sound monitoring mechanism is necessary to evaluate the effectiveness of the international environmental agreements to maintain ecosystem stability that is scientifically documented. Based on the results, the strategies, procedures and processes may have to be modified or changed. The need for collaboration throughout such a journey is essential. The global environmental governance is a critical aspect to be ensuring improvement of the state of the environment around the world to result in sustainable, societal development. The present Global Environmental Governance systems are currently limited to papers about theory. It has

failed to adequately face the past, present and emerging environmental challenges faced by the global community.

It is predictable from the framework that uncoupling of key elements of the conditions will pull stakeholders away from each other, which will result in failure of collaboration. This will result in serious problems of accountability, which will eventually lead to a search for alternative mechanisms for dealing with global issues. Then there may be a deadlock that will prevent achievement of the desired outcome. Consequently, the severity of the problems will increase. The proposed framework can help stakeholders to understand why the collaboration failed and to help them find ways to succeed in the future.

Because of serious concerns, the environmental dialogue is expanding internationally. The stakeholders are coming together to discuss, debate and deliberate on action although there is no consensus with regard to commitments. Fortunately, in spite of the limited progress, discussions are continuing. Experiences of COP16 are an example. As stated in Chapter 7 of this dissertation, it is premature to draw conclusions on the UN governing system under the UNFCCC regime in the absence of clarity on the validity of the final decisions adopted at COP16 with strong objections from Bolivia.

According to the convention, decisions should be adopted by consensus. While Bolivia claimed that ‘consensus’ is not the majority’s decision, the president of COP16 claimed that the objection of one delegation did not constitute a lack of consensus. Bolivia said that there was a respect for the rule of ‘consensus’ even in Copenhagen. Bolivia had asked for an opportunity to discuss issues with technical arguments, scientific data and legal arguments and not for political positions.

The fact of the matter, however, is that discussions are continuing. . Many speculated that COP 16 made 2010 a ‘make-or-break-year’ for international climate change negotiations.

In reality the main obstacle to achieve the desired changes is the lack of sustained collaboration at local and international levels in order to reverse the unsustainable consumption and production practices.

As presented in Chapter 2, depending on the outcome of the dialogue, new questions can be posed; new options can be discussed until consensus is reached. The discussions should be continued until participants are in agreement with the proposed way(s) forward. Countries cannot afford to shut down the dialogue especially in light of the present and emerging environmental calamities that we are experiencing today.



The lack of required depth of knowledge and openness and the abundance of ego and greed are stakeholder traits in a heterogeneous world among people with diverse and competing goals, objectives, skills, and motivations expected as natural at the doorstep of collaboration. The resultant time that would be needed to arrive at consensus is a reflection of perceived space, thresholds or tolerance levels of some parties, which generate dynamics for other parties to react by regrouping, south-south dialogue, boycotting, non-compliance, and many such reactions until adequate depth of understanding is forced to return.

The will and commitment of the governments will be generated with the realization of the impending threat for survival. Until such a system of collaboration is developed and agreed upon, the current dialogue will continue.

Considering the real world context, the development theories should be useful to analyse socio-economic phenomena of ‘development’ and ‘under-development’ based on the problems related to present and emerging economic, social and environmental issues within diverse and heterogeneous political and cultural systems.

The expectation of the world community for COP 15 was ‘to seal the deal’ by agreeing to ambitious emission reductions in accordance with IPCC predictions to prevent dangerous climate impacts due to global warming. Earth Negotiating Bulletin reported that ‘given the feelings of mistrust after Copenhagen, the Mexican Presidency understood that they would need to “change the tone” in Cancun.

Mexico managed a disciplined and extensive campaign aimed at restoring faith within and among the delegations’. The pathway to a successful outcome in Durban, South Africa in 2011 is far from clear. Nevertheless, many saw restoring faith in the process and laying to rest the ghosts of Copenhagen as the most important achievement: “We’ve shown the world and each other that Cancun can, and did deliver what was required at this stage to keep moving forward on this long and winding road (ibid).

A new geography of country groupings is envisioned to deal with issues if imbalances in power continue. Dogmatism has no future. Countries are being pushed towards a pragmatic collaborative framework that has to emerge. Such a framework will force countries to deal with strategic and pragmatic issues that must be developed and implemented to make something really happen while being mindful of the forces that have to be engaged and empowered for seeking and implementing common visions and strategies, as suggested by this thesis author’s proposed framework. The same system will apply at national level under different conditions based on the political and socio-economic situation of the countries.

The proposed framework highlights what forces are to be promoted and what are to be diffused to maintain an open dialogue to facilitate the NCPCs and other local SCP systems to strengthen the collaboration among stakeholders at the national and at international levels; consequently, they will be better able to help societies make progress toward sustainability.

A function of the framework is to juxtapose the two types of forces and factors for designing and testing possible scenarios. What forces are to be promoted/accelerated and what forces are to be slowed or discontinued? Depending on the results of the dialogue, fresh questions will be asked; new responses will emerge until consensus is reached. The discussions must be continued and be transparent. Certainly there will be pressure groups, which will engage in arm-twisting, threats of withdrawal and attempts to co-opt the SCP processes. The framework shows where, what and how different forces are operating and points to issues of accountability that are essential driving forces to help to bring the stakeholders back to collaborative processes.

## CHAPTER 10

### CONCLUSIONS AND RECOMMENDATIONS

#### 10.1 Introduction

This Chapter presents conclusions and recommendations of this dissertation based on the analysis of data, information, findings and conclusions presented in the previous Chapters and are also based upon an integration of the personal observations and experiences of the author. One of the prime objectives for this dissertation was to plan and to develop a SPC model that can be effectively implemented in Sri Lanka. A SPC model was developed and presented in Chapter 8 based on the analysis of the literature, the research data and findings presented in the previous chapters, and personal observations and experiences based upon the developing country perspectives in relation to global changes.

In order to deepen the understanding of the conclusions and recommendations, the process from which the results were generated is briefly outlined in section 10.1.

The author searched for answers to the following three research questions in order to identify strategic approaches for the development of the SPC model considering the need for economic, social and environment development within the framework of sustainable development:

**RQ1:** *What are the existing frameworks, policies, systems and processes for promoting SPC in other countries and in Sri Lanka?*

**RQ2:** *Why did the existing frameworks, policies, and systems and procedures prove to be inadequate in promoting SPC?*

**RQ3:** *How can Sri Lanka meet the challenges and effectively guide the development and implementation of its new National SPC programme?*

The answers to the research questions were developed from information and data gathered from extensive literature review, two case studies including surveys, interviews, and personal observations made at various leading international environmental conferences and working groups, and based upon the experiences of the author's work in the field of the environment for the past 19 years.

The two case studies were used to link the information gathered via the literature review to the real life context was devoted for:

- Evaluating the potential of UNIDO/UNEP NCPC network designed to promote CP in developing countries and also the potential of the international community to promote CP (Case Study One: Chapter 6).
- Examining the views of a leading international environmental policy group on the need and the potential for application of SCP practices locally and globally (Case Study Two: Chapter 7).

While local trends and conditions were evaluated extensively, it was necessary:

- To understand and to apply the facilitation roles that can be played by the international community to strengthen and enhance the national efforts;
- To understand the negative external forces that can override the national efforts in the processes of application of SPC practices.

The experiences gained by direct observation of the current global environmental and sustainable development negotiations were extensively used to validate the findings from the surveys and literature review and also to understand the positive and negative external forces that can create a significant impact on implementation of the SPC model for Sri Lanka.

Section 10.2 of this Chapter briefly presents the research findings and results<sup>78</sup> in relation to the three research questions in a logical sequence in order to deepen the understanding of the recommendations. This section extensively discussed the need for the sustainability perspectives of the SCP for Sri Lanka and the issues related to meeting the challenges for effectively guiding the implementation of the new National SPC programme. The concept of the “Middle Path” that means moving away from extreme affluence and abject poverty is recommended for Sri Lanka and proposed to other countries too as a strategy to sustainably manage the common but shrinking environmental space available for all living beings for existence.

Sections 10.3 and 10.4 present: two recommendations ‘*at the local level*’ and three recommendations ‘*common to international and local levels*’ respectively.

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<sup>78</sup> Details are presented in the respective Chapters. See the Table of Contents.

### **Recommendations at the Local level:**

1. A proposal for a SPC Model for Sri Lanka (section 10.3.1).
2. A system for monitoring performance of the SPC model that highlights the need for continuous improvements during its implementation until sustainability criteria are fully integrated into the national agenda to effectively manage the ecosystems of the country (section 10.3.2).

### **Recommendations common to International and Local levels**

Three key fundamental roles of the global community essential for promoting SPC globally and locally are:

1. *The development and publication of indicators of Sustainable Human Development as a basic prerequisite to guide countries to make progress on the path of sustainable development*<sup>79</sup> (section 10.4.1);
2. *Ensuring sound global environmental governance to promote SPC and to ensure ecosystem stability, which is essential to support the existence of all living beings* (section 10.4.2); and
3. *Collaboration as the key to success on the journey of sustainable development nationally and globally* (section 10.4.3).

Application of SPC is a dynamic process that needs continuous improvements based on the past and present performance and on effectively predicting the future. Finally, section 10.5 presents the proposals and recommendations for future research to support such continued application of SPC to achieve long-term sustainability of ecosystems.

## **10.2 Research Questions and Answers**

Significant global attempts have been made to promote sustainable development throughout the world. However, despite these attempts, most of the present problems continue to become more severe while new problems are emerging at a rapid rate. This consequent worsening situation requires the urgent attention of the global community to review and build upon the

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<sup>79</sup> The author of the dissertation proposed a modification to the sustainable human development index that was developed by the Ministry of the Environment of Sri Lanka in 2008 to include population trends as important criteria to be considered for sustainable development.

progress made thus far and to accelerate work to bridge the gaps toward making the desired truly sustainable societies to become a reality.

The answers to the three research questions in order to identify strategic approaches for the development of the SPC model considering the need for economic, social and environmental development within the framework of sustainable development are as follows:

### **Research Question 1**

#### **What are the existing frameworks, policies, systems and processes for promoting SPC in other countries and in Sri Lanka?**

From an international perspective; the researcher identified the following key, existing frameworks, policies, systems and processes available to promoting SPC:

Most of the international frameworks and policies have been developed at the international UN level. Also various countries have taken numerous initiatives since 1980s to promote preventive approaches instead of depending solely upon ‘end-of-pipe’ treatment to reduce the costs of treatment as well as to anticipate and to prevent environmental pollution in those countries.

The UN initiatives can be categorised at the level of responding to environmental issues in general, such as by the UN, in general, as well as within specialised UN organisations. Also initiatives of universities and professional journals contribute to worldwide spreading of the knowledge of SPC.

#### **Some key existing frameworks, policies, systems and processes for promoting SPC:**

Some key existing frameworks, policies, systems and processes for promoting SPC are presented in the Table 10.1. Some of these initiatives can be directly related to policies, frameworks, systems and processes individually while most of the initiatives fall under more than one category based on the purpose(s).<sup>80</sup>

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<sup>80</sup> Annex 1 and Table 4.2 also provide a broader view of these initiatives.

**Table 10. 1: Some key existing frameworks, policies, systems and processes for promoting SPC.**

Subject	Category	Framework	Policy	System	Process
Establishment of the UNEP as an outcome of the UN Conference on Human Environment held in Stockholm 1972		√	√	√	√
Multilateral environmental agreements/treaties developed and adopted within the UN system <sup>81</sup>		√	√	√	√
Recognition of Cleaner Production formally at the 1992 world summit (UNCED) as a tool to achieve sustainable development <sup>82</sup>			√		
Establishment of Regional and International CP networks <sup>83</sup> and Roundtables (e.g. UNIDO/UNEP NCPC network established in 1994 (section 4.7).		√	√	√	√
Establishment of the Commission of Sustainable Development in 1992 as an outcome of the UN Conference on the Environment and Development (UNCSD) held in 1992, by the world community. <sup>84</sup>		√	√	√	√

<sup>81</sup> During 1972 to 2002 sixteen (16) major MEAs have been adopted by the global community (Table 4.2) within the UN system . The UN was founded in 1945 after the World War II to stop wars between countries and to provide a platform for dialogue. Its aims were facilitating cooperation in international law, international security, economic development, social progress, and for achieving world peace. Even though the UN Charter does not explicitly mention “environmental protection”, UNEP was established as an outcome of 1972 UN Conference on Human Environment.

<sup>82</sup> Agenda 21, Chapter 20.

<sup>83</sup> There are CP/SCP networks and roundtables, which promote CP/SCP nationally, regionally and globally. These roundtables provide opportunities for CP promoters to exchange their views on CP/SCP and to help them to become organised to take further action to promote CP worldwide.

<sup>84</sup> The objective of CSD is to integrate environmental concerns into the economic development process, and to achieve sustainable development based on the three major pillars: “environment”, “economic” and “social” development.

Subject	Category	Framework	Policy	System	Process
Establishment of eight millennium development goals in 2000 at the Millennium Summit (the first goal being eradication of poverty in developing countries with the seventh being ensuring environmental sustainability) to improve the standard of living of the communities		√	√	√	
Reiteration of the need for CP to promote SCP at the Johannesburg Summit in 2002 held 10 years later after UNCED			√		
Development of a 10-year plan to promote SCP worldwide (the most recent initiative taken) as a result of the Johannesburg Summit held in 2002 which is named the Marrakech. <sup>85</sup> The process of SCP was clarified; this programme will be reviewed by CSD in 2010-2011 (Section 4.7)		√	√	√	√
Transformation of CP regional networks into SPC networks (e.g. APRSCP - Asia and Pacific Sustainable Consumption and Production Network)					√
High quality, knowledge management programmes on CP/SCP through highly professional journals <sup>86</sup>				√	
Various university programmes, <sup>87</sup> which promote SPC nationally and internationally through capacity building, courses, curricula, M.Sc. and Ph.D. research programmes				√	√

<sup>85</sup> The first meeting to develop the ten-year plan was held in Marrakech in June 2003, hence the name.

<sup>86</sup> The Journal of Cleaner Production & The Journal of Industrial Ecology.

<sup>87</sup> Post Graduate courses such as the Erasmus University International Off-Campus Ph.D. Programme on Cleaner Production, Cleaner Products, Industrial Ecology and Sustainable Development.



CP with its basic principle of application of preventive strategies is applicable for successful implementation of all the MEAs. Various regional centres established under these MEAs can provide an effective input for application of SPC.

NCPCs generally offer basic services on awareness raising, training of local experts, offering technical services, and policy advice on CP. Some NCPCs promote EMS, CSR, and ISO14000 as a door opener to CP as companies prefer to accept such initiatives rather than in-depth technological changes. While some NCPCs prefer such diversification some NCPCs prefer to provide specialised services to industries to improve their technical capacity and industrial processes. In some countries, there are specialised and stronger agencies/institutions available with the mandate of providing specialised services in certain sectors such as energy, water and overall productivity improvements. Some NCPCs consider these specialised organisations as a challenge for NCPCs being specialised to certain sectors and prefer diversification. Some NCPCs concern over the risks of changing demand in par with the marketable topics that emerge from time-to-time, that may reduce the demand of their customised services. Very few NCPCs effectively network with institutions other than universities, in order to ensure broader service delivery geographically and technically.

At the national level, in Sri Lanka, there have been significant CP partnership programmes operational since 1990. Awareness of existing national organisations such as the Central Environmental Authority (CEA), The Industrial Technology Institute (ITI), The National Engineering Research (NERD) centre, The Ministries of Environment and Industrial Development, and The Federation of Chambers of Commerce on CP/SCP, can be sighted as having positive impacts upon SCP efforts. A separate institution named the ‘Sustainable Energy Authority,’ was established to facilitate implementation of the recent energy policy to ensure 10% of the electricity to be from non-conventional renewable sources by 2016.

Significant national policies are also in place to promote CP, life cycle thinking and green economic development.<sup>88</sup> Sri Lanka is a party to almost all the MEAs which integrate environmental management systems in the development agenda. The Sri Lankan NCPC was established in 2003 as a result of the partnership programmes. Some universities have included CP in their curricula and there are many initiatives taken to educate k-12 children on SCP.

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<sup>88</sup> The national environmental policy adopted in 2003 recognised the importance of “life cycle” and “Cleaner Production” principles to be applied. A National CP policy was also developed and approved by the Sri Lankan Cabinet of Ministers in 2005. Sectoral policies for health, tourism, and fisheries were developed thereafter. The National Action Plan for Haritha (Green) Lanka Programme was launched in 2009 to promote a green economy in Sri Lanka. Use of coral based lime in the construction industry has been prohibited.

## Research Question 2

### **Why did the existing frameworks, policies, and systems and procedures prove to be inadequate in promoting SPC?**

Today, it has become a challenge for industrialised countries to reverse their unsustainable production and consumption patterns that were designed to reinforce the resource intensive linear economic development model, which is increasingly exceeding the carrying capacity of global ecosystems. At the same time, non-industrialised countries that contain nearly 80% of the world's population are facing unprecedented challenges to ensure the well-being of their people within the shrinking environmental space. The challenges are being increased due to the addition of 70,000,000/yr of people to the planet.

The effectiveness of the existing MEAs, CP/SCP promotional programs and networks including the UNIDO/UNEP NCPC network, the knowledge management networks under the UN and outside of it, have been of limited value due to the absence of integrated approaches to consolidate and to scale-up the efforts with effective, environmental quality monitoring mechanisms and other supportive mechanisms. The present global environmental governing system has failed to ensure commitment of the global community to address the present and emerging environmental issues with a shared vision.

With the existing unpredictable, volatile, and bureaucratic funding mechanisms and governing systems, the MEAs' services are mostly limited to short-term strategies, which are inadequate to fulfil their long-term obligations due to unpredictable technical and financial resources<sup>89</sup> for their successful implementation.

The resource constraints and the multiple, global crises related to finance, food and environmental risks, create intense local pressures to *'think locally and act globally'* from their internal conditions and conflicting interests that tend to replace the commonly accepted adage to *'think globally and act locally'*.

The emission reduction pledges/targets of the industrialised countries stated during the climate change negotiations can be sighted as a classic example. During the period 1990-2008, for Annex I Parties to UNFCCC, the total aggregate greenhouse gas (GHG) emissions

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<sup>89</sup> At present there are proposals for fast track and long term financing and embedded, conditionality for climate change related activities. However there are serious concerns by the developing countries on the governance structure of the funding mechanism, sources of funding and their adequacy.

<sup>90</sup> LULUCF-Land use, Land use change and Forestry.

excluding emissions/removals from land use (LULUCF<sup>90</sup>) practices decreased by 6.1% and including (LULUCF) it decreased by 10.4%.

However, it should be noted that for annex I Parties with economies in transition, greenhouse gas (GHG) emissions excluding LULUCF practices were decreased by 36.8% and including LULUCF practices they were decreased by 48.5% respectively, whereas for Annex I non economies in transition Parties (developed countries), GHG emissions excluding LULUCF increased by 7.9% and including LULUCF they increased by 8.3% (UNFCCC Secretariat). Details of this were presented in Chapter 6. It may be that the high emission reductions achieved by the countries in economies in transition may be due to the economic crises that prevailed; now there is also a rising trend of emissions in those countries.

It is clear that external international forces, which are most powerful to promote and support the linear economic development model under globalisation, override the fragmented and limited efforts designed to promote SPC.

The present weak environmental governance system drastically failed to secure collaboration of the global community to address the ever increasing environmental challenges faced by the global community, which needs timely action to prevent dangerous negative impacts on the entire global ecological system.

There is an urgent need for a continuous updating of the knowledge base of the global community on SPC from the political level to the grassroots, community levels to promote SPC as a long-lasting solution for the present environmental crises in a collaborative manner.

In Sri Lanka, even though significant CP partnership programmes have been conducted since 1990's, continuation of these partnership programmes did not occur due to various reasons such as inadequacies in financial, technical and skilled manpower. Even though significant national policies have been developed in Sri Lanka to promote CP, implementation of these policies is inadequate due to inadequate human resources and predictable financial support. Additionally, the market-based incentives and disincentives are inadequate to help to make effective progress on SCP, due to the fact that the government has other priorities.<sup>91</sup> For example the present national environmental legislation is framed with its primary focus upon on end-of-pipe, pollution control approaches.

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<sup>91</sup> Sri Lankan environmental legislation focuses upon 'end-of-pipe' treatment. Draft legislation to promote industries to move beyond 'end-of pipe' treatment, which promote application of SPC is pending.

### Research Question 3

#### **How can Sri Lanka meet the challenges and effectively guide the development and implementation of its new National SPC programme?**

Answers to research question 3 are divided into two categories to provide clarity in conclusions and recommendations.

#### **A. Conclusions**

Currently, the world is confronted with two limiting factors in economic development. One is natural resource depletion and thereby, scarcity of resources is becoming increasingly challenging. The other is excessive waste generation including emissions resulting in land, water and air pollution. Therefore, both the industrial and service sectors can benefit from application of CP/SCP throughout the life cycle of products, processes, and services. Findings of Case Study One clearly show that in the light of the present multiple global challenges that human societies are facing, no single country is able to address the challenges in isolation.

There is a potential to build on and move beyond the existing initiatives taken by the global community within and outside the UN to address the problems related to sustainable development by strategically promoting SPC based upon the mutually supportive nature of both systems. There is a dire need for establishing an international environmental governance system, which would be responsive to the common but differentiated responsibilities and the respective capabilities of the global community to address the critical environmental problems based on scientific evidence within the framework of sustainable development.

Collaboration of stakeholders both at the national and international levels is essential to establish such a governance system that should be responsible for facilitating implementation of SPC practices both horizontally and vertically in country development processes. Mutually supportive strategic tools are necessary to ensure and guide the collaborative efforts. Three key strategies are recommended in this dissertation in section 10.4. These strategies include: *'Development and publication of indicators of sustainable human development'*; *'Ensuring global environmental governance'*; and *'Ensuring collaboration as a key to success in the journey of sustainable development'*.

The power of the community was evident from the literature review and the case studies (Chapters 2, 6 and 7) to act as catalytic agents to promote SPC at national and global levels by ensuring that the political leaders, the business community and other policy makers are empowered with sound SPC knowledge and skills for effective service delivery.

Knowledge management and dissemination programmes based on “the Family” as the centre of focus will dramatically reduce the cost of integration of SPC strategies as the “Family Members” are integral to all the socio-economic activities of a country. The knowledge management should be a continuous dynamic process where ‘Family members’ and ‘communities at large’ will be able to make the ‘right’ choices in the human development process at home, in public places, universities, research institutions, training and education centres, work places, and at political levels. The power of ‘the family’ as a change agent is immense as family members are also the producers and consumers in all societies. Individuals making ‘right’ choices can help to result in good governance of the country. The findings of the two Case studies support these conclusions.

The NCPCs and their global networks can play increasingly important roles in stimulating and promoting application of CP/SPC nationally and globally. However, NCPCs, as single institutions, are not able to promote SPC throughout Sri Lanka and in other countries basically for the reasons stated in the answer to Research Question 2.

Collaboration of stakeholders at all levels is essential to ensure successful implementation of the SPC model. Furthermore, incentives should be provided to encourage stakeholder participation, non-negotiable conditions should be addressed in the form of legal provisions, rules and procedures.

Sri Lanka’s unique historical, societal development provides a valuable model to both ‘national/local’ and global leaders, about the benefits and possibilities of adhering to the “middle path”. Table 10.2 shows performance of the human development in 2005 in respect to a few OECD (developed) countries along with global and regional perspectives in comparison with the status of Sri Lanka.

**Table 10. 2: Human development status of selected countries, of global and regional perspectives and of Sri Lanka - 2005**

Country	HDI Rank	Life Expectancy At birth	Average Literacy Rate	GDP Per Capita (ppp US\$)
Iceland	1	81.5	99.0	36,501
Canada	4	80.3	99.0	33,375
Japan	8	82.3	99.0	31,267
Netherlands	9	79.2	99.0	33,684
USA	12	77.9	99.0	41,890
UK	16	79.0	99.0	33,238
Developing countries		66.1	76.7	5,282
South Asia		63.8	59.5	3,416
OECD		78.3	99.0	29,197
High Human Development		76.2	99.0	23,986
Middle Human Development		67.5	78.0	4,876
Low Human Development		48.5	54.4	1,112
World		67.5	78.6	4,876
SRI LANKA	99	71.6	90.7	4,579

HDR rank (1-70) - High Human Development

HDR rank (71-155) - Medium Human Development

HDR rank (156-177) - Low Human Development

*Source: HDR/UNDP 2007/2008*

While Sri Lanka ranked 99 in terms of its HDI, significant comparable achievements have been made in terms of the “Life Expectancy at Birth” and “Average Literacy Rate” with nearly ten times lower income than that of highly developed countries. The income/GDP per capita of Sri Lanka is even less than the global average. Child survival to age five also adds another dimension of human development. In 2003, the percentage of child survival to age five in high-income OECD countries (US\$ 28,500) was 99.4 whereas; Sri Lanka achieved 98.5 per cent with an income of US\$3,750. It is urgent that Sri Lanka maintains and accelerates the progress of improved health of its people, which is also directly related to quality of life and to “Happiness” as an important part of well-being.

## **B. Recommendations**

### **B1. Knowledge Management**

Multiple knowledge management systems built upon scientific evidence can help to stimulate bottom-up approaches as well as top-down approaches for promoting SPC nationally and globally. Such knowledge and empowerment can support the development and implementation of an effective global environmental governance system, which is an essential prerequisite to address the present, unprecedented global environmental challenges.

It was concluded in Chapter 6 that existing programmes should be extensively scaled up to ensure widespread application of CP/SCP nationally and worldwide. Also, new and additional, extensive, low cost knowledge management systems such as online ‘training-of-trainers’ programmes, and information dissemination systems such as JCLP/JIE etc. are necessary to rapidly build the capacities, worldwide for application of CP/SCP in a cost effective manner.

Considering the shrinking environmental space available for all living beings, the concept of the ‘middle path, should be given serious consideration in theory and of course in real societal practice. The knowledge management systems and models should therefore, be designed and implemented to facilitate behavioural changes based on scientific evidence of the negative impact of human behaviour on ecosystem limitations. This will eventually help communities to realise that adhering to the concept of the “Middle Path” is no longer an option but an imperative requirement for human existence.

The knowledge management models and information should be developed by national, regional and international institutions within the UN system and outside to achieve progress on making the transition from unsustainable to sustainable societal development. The following recommendations are made.

#### **General knowledge management models are required for behavioural changes**

- For community groups, initially promoting voluntary action on SPC for reducing their ecological footprints within the framework of their living environment, considering the family as the centre of focus;
- Facilitating innovation, creative thinking and exchange of views of community groups among themselves on the positive outcomes of SPC and the negative outcomes of not taking timely action;

- For political leaders on long-term planning for future with community empowerment, business promotion, and the possibilities of gradual transformation within the existing socio-economic situation in order to move forward to radical changes along with the local and business community support based upon crucial value changes.

### **Specific knowledge management models are required for behavioural changes**

- For formulating national plans so members of local communities will be better able to understand and support the wisdom of the national plans;
- For facilitating implementation of the local plans so that the entire society will benefit;
- For promoting cultural messages that unsustainable consumption practices are not acceptable;
- For educating children and youth about the drawbacks of unsustainable production and consumption practices;
- For facilitating citizen consultations at various levels;
- For transfer of technology appropriate for local conditions;
- For creating green job opportunities;
- For stimulating youth to move into green jobs;
- For measuring individual ecological footprints at home, work places, schools etc;
- For identifying research needs on technical and socio-economic issues to bridge the gaps;
- For sensitising the media on continuous monitoring and reporting performance.

### **Traditional Knowledge**

It is equally important and significant to make use of the potential of the traditional knowledge that reflects SPC principles extensively. In Sri Lanka, traditionally, wastage was considered to be a misuse of resources; wastes arising from one process were used for some other purpose. Also, preservation of forests in upper watershed regions was considered to be an imperative to maintain soil stability and also as a water storage entity. Ancient irrigation systems were built on that principle.



This knowledge base should be blended and enhanced with new scientific knowledge to further improve outcomes and impacts. A knowledge-based society backed by the environmentally friendly cultural influences could promote the ‘middle path’ which is essential for societies to follow in order to address the unprecedented environmental and socio-economic issues of the modern world. The knowledge management systems should be used to compliment the legislative efforts beyond compliance toward SCP.

### **The need for understanding of the Co-existence of national and international policies**

MEAs can support countries to develop and disseminate knowledge management models and review and revise the models based on the status of compliance periodically as all the MEAs are focused on reducing negative environmental and human health impacts due to unsustainable production and consumption practices. On the other hand, countries can also support implementation of MEAs by developing national policies and knowledge management models to encourage their citizens to use SPC practices. Both programmes are or can be mutually supportive.

With the high literacy rate, Sri Lanka will be able to transform the country into a knowledge based society that is built upon the concept of the “Middle Path” for human existence in harmony with the natural environment, IF there is the political will that is also supported by the people.

### **B2. Essential infrastructure necessary to promote SPC in Sri Lanka**

In order to implement SPC models covering all of Sri Lanka, services of many other institutions are necessary in addition of the contribution of NCPCs. However the Sri Lankan NCPC can enhance their service delivery by working much more closely with university faculty and students, working with chambers of commerce, industrial trade associations, departments of human services, departments of environment, trade, industry, tourism, etc. The capacity of Sri Lanka’s NCPC should be expanded so that they can scale-up their services based on demand driven approaches because they have great potential to stimulate application of CP/SCP and to be much more actively engaged in transfer of environmentally friendly technologies by networking and co-working with the other NCPCs.

For effective integration of SPC practices, the following are urgently needed in Sri Lanka,

- **Responsive and effective agents** to sensitise, promote & to make the population fully aware of CPs/ESTs/SCP;
- ***Responsive, qualified and capable agents*** to develop/adapt/adopt/transfer Green Technologies and to provide technological and non-technical services to promote implementation of SCP;
- ***Responsive and committed funding agents, Angel funds, and prudent investments*** to support the development and implementation of SCP in Sri Lanka;
- ***Suppliers of skilled human resources*** to promote and support the implementation of SCP and;
- ***Developers and implementers of sound, SD-based fiscal measures.***

**Supportive public policy, SD-oriented environmental regulations, SPC recognition, rewards, & penalties** are crucial elements in order for Sri Lanka to create a conducive environment to support the evolution of such service providers in the new market economy.

**Periodic monitoring and reporting of the Ecosystem's health are essential in order** to provide the society insight into the dynamic changes in the ecosystem's services such as water quality and quantity, climate regulation (clean air), waste treatment, provision of food, provision of medicinal plants, provision of raw materials, provision of recreation and many more location specific services.

All of these elements are essential conditions to effectively integrate SPC into the economic and social developmental programs, at all societal levels, in order to make effective progress in implementing the proposed Sri Lankan SPC model.

### **10.3 A Sustainable Production and Consumption Model for Sri Lanka**

Despite the existing national programmes and initiatives, a SPC model for the Sri Lanka is necessary to focus on issues related exclusively to SPC in order to integrate multiple SPC issues in all sectors of the economy.

It is important to note that, Sri Lanka is vulnerable to several global environmental changes such as climate change to which the country is not responsible for creating. CO<sub>2</sub> emissions of Sri Lanka were 0.6 t/capita in 2004, which is insignificant, compared to the global average 4.5 t/capita of which high income countries account for 13.3 t/capita, middle income countries 4.0 t/capita and low income countries 0.9 t/capita respectively (HDR 2007/8 – UNDP).

Sri Lanka is a developing country although it acquired the lower middle-income standard recently. Sri Lanka needs economic development to improve the standard of living of the people. Still 5.6 % of the population earns an income of less than 1US\$ and 41.6% earns an income less than 2US\$ per day. The GDP per capita has increased from US\$ 295 in 1981 to US\$ 2053 in 2009 and poverty has declined from 22.7% in 2002 to 15.2% in 2006/7; however there are high regional disparities (Section 5.4).

These economic challenges require the country to focus on adaptation measures to reduce the vulnerability of the communities and their livelihoods in addition to the growing need of economic and social development to improve their standard of living. As an environmentally friendly country, Sri Lanka's policy is to join hands with the global community to address the global environmental challenges. The principles behind Sri Lanka's environmentally friendly practices are remarkably similar to the modern concepts of conservation, sustainable use of natural resources and lifecycle thinking, which are promoted via modern environmentalism. These practices were, in fact, ingrained as ethics in the very fabric of ancient Sri Lankan society with its rich traditional knowledge, can be used as a sound foundation upon which to promote SPC practices if the efforts are supported by state policies, programmes and by economic support.

Because there are no massive, energy-intensive infrastructures in Sri Lanka, the transition to a more sustainable economy will be easier than for highly industrialised countries. The problem Sri Lanka is facing is to meet the high incremental costs of implementing environmentally friendly technologies.

The SPC model for Sri Lanka was developed and presented in Chapter 8 in this dissertation in the context of the facts described in the foregoing paragraphs. Implementation of the SPC model was linked to the implementation mechanism of the existing Haritha (Green) Lanka programme,<sup>92</sup> which is mutually supportive. Coordinating mechanisms of the National Environmental Action Plan were also considered in developing the coordinating mechanism of the SPC model (section 5.9.7). The assumption is that "Isolated programs that are not linked to existing implementation mechanisms will not be sustainable in the long-run."

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<sup>92</sup> The Haritha (Green) Lanka programme launched in 2009 and administered under the leadership of the head of the state with a view to addressing the critical conflicting environmental and economic development issues (Chapter 5) which can be used to promote SPC by focusing on medium and long-term programmes need for sustainability that, if left unattended, would frustrate our economic and social development programmes (section 5.9.9).

Prudent prioritisation of sectors for investment to promote SPC is crucial for achieving results with attractive and quick returns. Investment local and foreign in education sector is of such a priority area to be considered for the following reasons:

- The high literacy rate of the country demands opportunities for the educated youth and adults searching for decent employment in country or abroad and for the student population who seek entry to local and foreign universities every year with a result of draining foreign exchange out of country;
- Unrest among educated youth is considered a time bomb and the country needs to respond to this need without losing time;
- Attracting foreign direct investments to have centres of education excellence to attract foreign students from the region has been a recognised potential area which has started already under the government policy;
- Commensurate local investments to improve conditions in the local universities add value to the intervention which will be admired by the local stakeholders who advance a case for ensuring assistance to local students;
- Space in education can be expanded beyond in-country physical boundaries with modern IT based pedagogy and with politically and religiously neutral but culturally attractive Sri Lankan society for the diverse religious and ethnic communities in the countries of the region;
- The central location, geography and climate, ease of travel, friendly nation, prevailing peace and security, connectivity allowing the use of modern ICT tools and conducive environment for learning are positive factors for the island Sri Lanka to offer investment space of knowledge based economic activity beneficial for both investors and the country;
- The current country program that placed high priority to develop the service sector by expanding international ports, airports, expanding tourism with emphasis on eco-tourism to tap the best that the country can offer in order to create a huge demand for human resources for knowledge management and trading skills;
- The limitations of further exploitation of the natural resource base of the country that has come near saturation of exploiting the agriculture base that compels the country to put priorities on the service sector, which can have lower ecological footprint and is vast untapped potential in Sri Lanka;

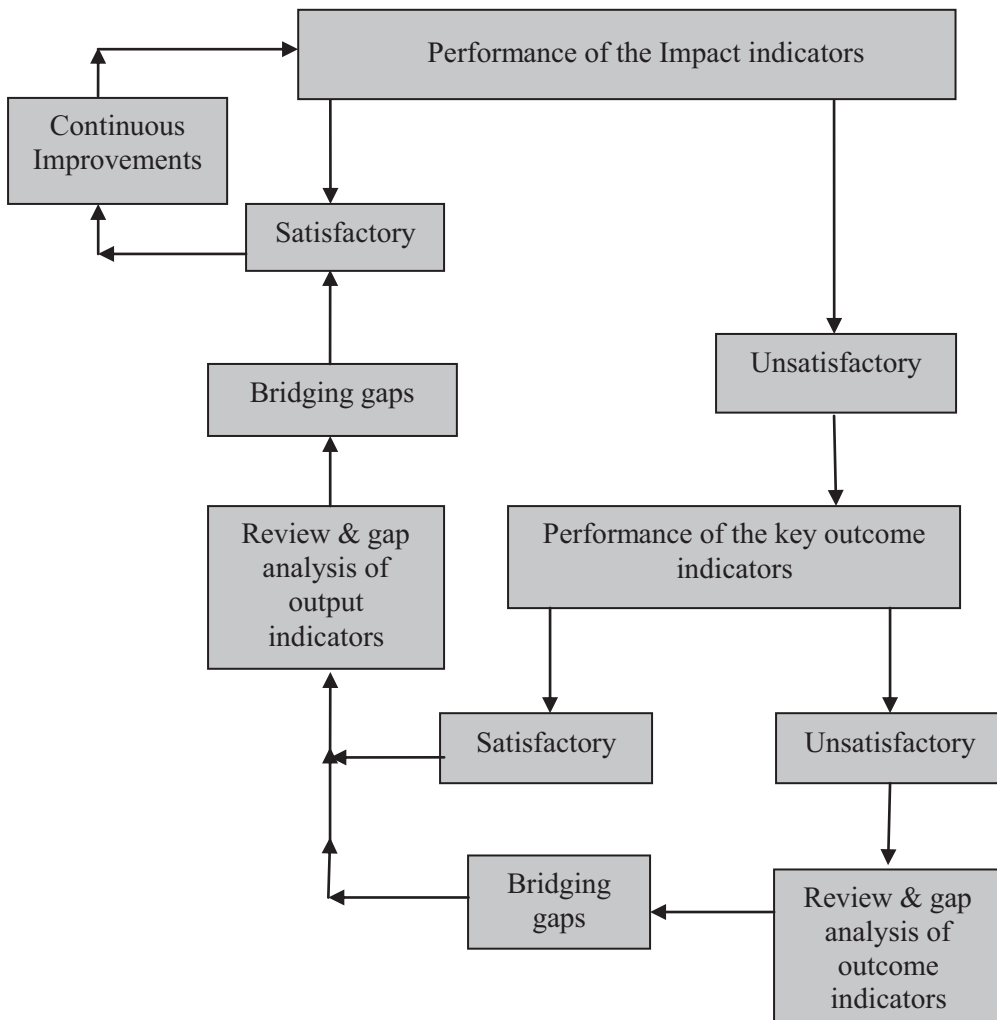
- The capacity to produce skilled human resources for the international demand because it possesses the advantage of being a gateway to the expanding economy in neighbouring India due to favourable trade relations.

Foreign direct investment is necessary to establish infrastructure facilities to enhance the capacities of the existing universities and technical education centres and also to establish new fully developed educational Centres of Excellence. Provision of such investments by developed countries in country assistance facilitates developing countries tremendously to move away from the traditional path of “business as usual” to a more sustainable development path, thereby helping to sustainably manage the shrinking environmental space without further deterioration.

### **10.3.1 Performance Monitoring of the SPC model**

A desirable system for behavioral changes of the society is proposed within the model, to highlight the need for the development and implementation of an effective system to monitor the progress of the adoption of the model; additionally an integrated approach to reporting and public education on SCP is included (Chapter 8).

An effective reporting system should be established to monitor the progress of the SPC model based on the key performance indicators presented in section 8.6. A framework of the monitoring mechanism is shown in figure 10.1.



**Figure 10.1: Proposed framework of the monitoring mechanism of the SPC model of Sri Lanka with output, outcome and impact indicators**

Application of SPC is a dynamic process, which needs continuous improvements. Once the key performance of the impact indicators is satisfactory, still continuous improvements can be made to improve the efficiencies with fewer efforts. If the performance of the key impact indicators is unsatisfactory, it is necessary to regularly review the performance of the outcome indicators, identify gaps and to then review the performance of the output indicators and to make corrective changes.

This cyclic process should be continued until the key outcome indicators are satisfactory. The same model, with appropriate modifications of performance indicators, could be used by other developing countries for enhancing their progress on sustainable human development.

#### **10.4 Three Fundamental Roles of the Global Community Essential to Promote SPC Globally and Locally**

This section presents three significant, fundamental roles of the global community to strengthen and enhance the national efforts of application of SPC.

##### **10.4.1 Development and Publication of Indicators of Sustainable Human Development**

Sustainable human development indices are of paramount importance for countries to properly understand the sustainability of their development scenarios<sup>93</sup> and their impacts on the stability of the natural ecosystem based on which all lives on earth depend (section 4.10).

Sri Lanka developed a Sustainable Human Development Index (SHDI) adding some additional parameters to the Human Development Index UNHDI<sup>94</sup> published by UNDP as a measure of human development. Sri Lanka's SHDI includes (1) An Ecological Index (ECI) that considers the bio-capacity and the ecological footprint (2) The Climate Change Index (CCI) that considers the total and per-capita carbon emissions and (3) The Poverty Index that considers the proportion of the non-poor population (section 4.10 of Chapter 4).

However, the author proposes a modification to the SHDI that the "Population Trend Index (PTI)," should also be integrated into the formula to more accurately reflect the sustainability of the human development. The PTI can be calculated similarly to the other indices.<sup>95</sup> The modified SHDI can be calculated by adding the negative value of PTI (-PTI) into the formula for calculating the SHDI (section 4.10 (4)).

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<sup>93</sup> Today, it has become a challenge for the industrialized countries to reverse their unsustainable production and consumption patterns that have been designed on and ingrained in their massive resource intensive infrastructure. At the same time, non-industrialized countries that represent nearly 80% of the world's population are facing unprecedented challenges to develop their economies within a shrinking environmental space.

<sup>94</sup> UNHDI measures the average achievement in a country in three basic dimensions: life expectancy at birth; the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight); and GDP per capita in purchasing power parity (PPP) terms in US dollars.

<sup>95</sup> Population trend index (PTI) = [(Population trend of Country – Minimum population trend)/( Maximum Population trend– Minimum Population trend)]

Sustainable human development indices are of paramount importance so governmental leaders can more adequately understand the sustainability of their development efforts and their impacts on the stability of the natural ecosystems upon which all life on earth is interdependent (section 4.10).

Table 10.3 presents the different interpretations of human development with ‘HDI developed by the UNDP (UNHDI)’, the ‘Sustainable Human Development index (SHDI) developed by Sri Lanka’ and ‘Modified SHDI’ incorporating the population trends. It contains the 10 highest ranked countries in relation to the UNHDI along with their corresponding SHDI and modified SHDI values<sup>96</sup>.

**Table 10. 3: HDI profile of the highest ranked countries of UNHDI and corresponding SHDI and modified SHDI**

Country	HDI		SHDI		MSHD – MOD1	
	Rank	Value	Rank	Value	Rank	Value
Norway	2	0.968	10	0.416	7	0.297
Australia	3	0.962	11	0.413	13	0.285
Canada	4	0.961	8	0.423	8	0.296
Ireland	5	0.959	20	0.371	32	0.241
Sweden	6	0.956	2	0.452	2	0.329
Switzerland	7	0.955	26	0.363	24	0.253
Japan	8	0.953	50	0.327	37	0.235
Netherlands	9	0.953	36	0.348	29	0.247
France	10	0.952	25	0.366	22	0.257
Finland	11	0.952	5	0.434	4	0.316
Sri Lanka	99	0.743	27	0.363	33	0.239

Note: Analysis of SHDI and modified SHDI: the Ministry of Environment of Sri Lanka.

It is observed that Sweden, Norway and Canada are among the top 10 under all three scenarios.

<sup>96</sup> Iceland, which has been ranked as number one under UNHDI, is not included due to non availability of data to calculate SHDI. Similarly some countries listed under UNHDI could not be considered for analysis of SHDI due to non availability of data. The main objective of these modifications is to highlight the importance for considering ecological and population aspects for sustainable human development.



It is clear that most of the countries that ranked highest under UNHDI have lower SHDIs due to their relatively higher CO<sub>2</sub> emissions. Those countries with trends toward low population increases have improved MSHDIs than SHDIs. Similarly it is evident that most of the countries that ranked lowest under UNHDI have improved SHDIs and modified SHDIs due to their relatively lower emissions and their trends toward low population increases. Also SHDIs and MSHDIs are relatively lower than UNHDI values. The need to balance economic, ecological and social (population) dimensions for sustainability is essential for implementation of a SPC model in any country.

These indicators can be useful for countries for monitoring the effectiveness of their sustainable development measures and of their national SPC models. It can also help them to improve national and global environmental governance systems based upon increased mutual understanding of the status of the sustainability of individual countries, which are interlinked for global sustainability.

#### **10.4.2 Ensuring global environmental governance**

The present multiple global crises related to finance, food, energy, climate change, depletion of natural resources and increasing pollution, provide ample evidence of the need for a transformation of the pattern of economic development used by industrialised countries to improve the standard of living of their people in a manner that does not destroy the eco-systems upon which they/we are all totally interdependent.

Findings of '*Case Study One*' clearly showed that, in light of globalisation backed by the linear economic growth model, no single country would be able to make the desired transition without international cooperation. This is because there are powerful external forces operating in the present market-based system, which create and impose many pressures to continue the momentum to grow.

Fortunately, there is a potential to build on and move beyond the existing initiatives taken by the global community under UN and outside to address the problems related to sustainable development by strategically promoting SPC via building upon the mutually supportive nature of both systems. In order to fulfil this vision, there is an urgent need for establishing an international environmental governing system, which is responsive to the common but differentiated responsibilities of the global community to address the critical environmental problems. This new governance system should be based on scientific evidence within the framework of the sustainable development.

It has to be emphasised that the proposed environmental governance system should not be a stand-alone organisation, which would create another administrative burden for implementation activities. The proposed environmental governance system should evolve from the existing, weak negotiation/implementation system of the global community to effectively address present and emerging global environmental challenges in collaborative manner. Until such a system is in place most of the existing problems will remain and new problems will emerge in different forms and scales. At present the UNEP is working on establishing a global environmental governing system. However, further, in-depth research is necessary to design a system, which can be made acceptable for all the countries with sound justification.

Modern environmentalism<sup>97</sup> emerged nearly 40 years ago in 1970s as a result of public concerns and protests due to a series of unprecedented environmental calamities experienced in the industrialised countries. In fact, those concerns drew attention of the global community for the need of a global environmental governing system to address the environmental challenges. However, the global community has not yet achieved the expected results due to multiple socio-economic and political reasons that are importantly due to the fact that they have not worked and lived within the eco-system's limits. Human population increases and changing lifestyles based upon the faulty paradigms of on-going economic growth are threatening the existence of all. As a result, while some old challenges still remain, new challenges are emerging (Chapter 4).

Even after 40 years since launching global environmental governance (GEG) system of some sort at the first major UN Conference on the Human Environment (UNCHE) held in 1972 in Stockholm, the 'Development Theme' is still mostly viewed as economic development nationally and internationally. It is imperative to note that at the same time, few countries recognise 'Happiness' as a guiding philosophy of development.<sup>98</sup>

Sustainable human development indicators demand extensive reforms of global and national economic and social development policies and strategies and a sound environmental governing system to keep the ecosystem stability within acceptable limits.

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<sup>97</sup> Ecological modernisation (Chapter 4)

<sup>98</sup> The Kingdom of Bhutan, designated as a least developed country by UN, has recognized "Gross National Happiness as its guiding philosophy of development. Bhutan is a country, which has a long history that is deeply embedded in Buddhist culture and spiritual values. Happiness is defined by the World Database of Happiness (Veenhoven, R) is the degree to which an individual judges the overall quality of his life-as-a-whole, favourably (<http://worlddatabaseofhappiness.eur.nl>).

It is impotent to note that in prehistoric times, nature and ecosystem services were respected spiritually and later this spiritualism became a strong, informal element of culture that was structured by religious institutions (Chapter 2). In fact, this informal system was stronger than modern environmental legislation in environmental management because compliance was semi-voluntary. These spiritual aspirations can be seen in many countries today. The principles of these spiritual beliefs that emerged from *'learning by experiences'* and *'learning by doing'* are now being replaced or supported by formal scientific evidence.

The role of the scientific community is critical to address the gaps and weaknesses of the present enforcement of environmental legislation and of the present global environmental governance system with reliable scientific evidence to reflect the limits of the carrying capacities of the ecosystems and their linkages to economic and human development. Ecological and social science evidence integrated with native knowledge can help communities to build their capacity for intelligent predictions beyond spiritual beliefs.<sup>99</sup>

The scientific community should tailor their communications to target audiences with appropriate levels of detail so as to engage and empower all members of society to become effective change agents for SD. The global community is in a critical stage where intelligent prediction-based knowledge management systems are essential prerequisites to address the multiple global challenges that we are facing today, including security problems, which have a direct bearing on the SPC globally and nationally (sections 6.5.2. and 6.5.3 and Chapter 9).

A complete reverse of the *"think locally and act globally"* instead of the traditional *'think globally act locally'* advocacy was announced today due to the political economy of the subject matter. For example thus far, countries failed to come to consensus on global issues mainly due to intense pressures from their internal conditions and conflicting interests. Therefore, some political leaders are beginning to use the revised slogan, *"think locally and act globally"* in the absence of a global environmental governance system to direct countries to responsibly share the limited global environmental/ecological space based on equity. The desirable system in the context of present multiple global crisis will be a cyclic process through *"think globally-act locally and then again think globally"* with feedback loops within a collaborative and sound environmental governance framework.

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<sup>99</sup> The scientific community such as that represented by the IPCC is working to bridge this gap in relation to climate change impacts. However, the very slow progress of the recent negotiations of the global community on climate change issues, revealed the need and importance for additional inputs from the scientific community to sufficiently convince global society to commit to and to take action to prevent dangerous impacts upon humankind and the supportive eco-systems, due to climate change.

The world military expenditure has increased 49% between 2000 & 2009 (Stockholm International Peace Research Institute – year book 2010, [www.worldissues.org](http://www.worldissues.org)). Even though the military expenditure is considered as an economic indicator, in general, the increasing trend in military expenditures is an indicator of deficiencies of natural resources on the one hand and an indicator of attempts to protect resources from internal or external threats. Both create further threats for ecosystem stability and SPC worldwide.<sup>100</sup>

### **10.4.3 Ensuring collaboration of stakeholders as the key to success in the journey of sustainable development nationally and globally**

The theoretical framework was developed to highlight the importance of collaboration in theory as well as in practice. Collaboration is one of the major components of the SPC model developed for Sri Lanka (Fig 8.1). Both international and local collaboration is a necessary pre-condition for successful implementation of the SPC model. It was found that the theories presented in sections 2.3, 2.4 and 3.5 did not adequately address the issue of ecological sustainability in the economic development process. However, there were important elements that can be used in these theories (section 2.3, 2.4 and 2.4) when taken together, in an integrated manner in the development process. That is why a theoretical framework was necessary with minimum conditions to promote collaboration in the theory and in practice.

The theoretical framework presented in section 2.8.2 posits that collaboration, at all levels, national, regional and international is the key to address the present multiple global environmental calamities. The theoretical framework developed by the author, identified a minimum set of conditions to achieve effective collaboration among various stakeholders. These are: mutual understanding, trust, incentives and facilitation (financial and technical).

The following possible negative outcomes will occur in the absence of collaboration among the relevant stakeholders:

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<sup>100</sup> The world average military expenditure in 2009 accounts for 2.7% of GDP, with the global distribution as: the USA with 46.7%, China: 6.6%, France: 4.2%, U.K.: 3.8%, Russia: 3.5%, the next 10 countries: 20.7% and the rest of the world 11.7% (Stockholm International Peace Research Institute – Yearbook 2010, [www.worldissues.org](http://www.worldissues.org)).

- Uneven results;
- Distorted results;
- Inadequate results;
- Unsatisfactory results.

The model shows how collaboration can fail due to the fact that the forces pulling stakeholders away from each other are stronger than the forces that pull them toward each other to search for and to implement SCP actions.

Failure of the global community to address the critical environmental issues such as climate change provides evidence that, at the international level, enhancing “*mutual understanding*” and “*building trust*” are more critical than that of within the local/national system because at the local and national levels, possibilities for achieving agreements are larger due to common cultural and relatively narrow socioeconomic conditions than is possible at the international level. Also, development and implementation of national policies are relatively easier within the national systems than within the global level. However, in an interdependent world, “*building of trust*” among different stakeholders is not an optional entity anymore. The two conditions of “*mutual understanding*” and “*trust*” among stakeholders in a complex and diverse world can help to facilitate multiple benefits in the short and long-run (Chapters 6,7 and 10).

The findings of this dissertation show that a new ‘theory of collaboration’ is needed to direct the behavior of humans to manage production and consumption. To support this contention, note that country representatives failed to come to consensus on the global issues of climate change due to intense pressures from their internal conditions and interests. The International communities’ efforts failed to respect universally accepted rules of decorum at international fore as they resorted to the use of intimidation and undemocratic means of persuasion to advance their highly biased formulations of conditions they wished to impose upon others. The climate change issue can be taken as an example of this (Chapter 9).

The author proposed a theoretical framework with a minimum set of criteria necessary to secure collaboration. This theoretical framework can be tested further along with the evolution of global negotiating processes in the future and move beyond the minimum conditions to enhance effectiveness and sustainability of collaboration.

The efforts of developing countries to reverse the trends of ‘business-as-usual,’ will depend on the ability of the global community to develop, implement and adhere to a global policy and to global governance principles to distribute the world resources to live within the dynamic limits of the ecosystem’s carrying capacity. In this context it is necessary to ensure ‘equity’ and equitable sharing of environmental/atmospheric space/resources among all countries. It is also necessary to achieve environmental equity and development equity to achieve SD with responsibility.<sup>101</sup>

Regional differences in approaches will be essential where neighboring countries are collaborating and innovating for development of low cost knowledge management systems and regionally appropriate technology transfer to help them to achieve SPC.

## **10.5 Proposals and Recommendations for Future Research**

### **10.5.1 Monitoring and reporting systems**

Successful implementation of the SPC model requires effective and efficient monitoring and reporting systems at the national, provincial and local levels within different sectors. Collaboration at the international level at different scales is also necessary to help to ensure sustainability of the implementation mechanisms. Further research is therefore, necessary to test the validity of the framework of the proposed monitoring system presented in section 10.4. This needs robust coordination mechanisms, at all levels, which do not change due to governmental changes.

### **10.5.2 Development of indicators**

As stated in Chapter 9, development of indicators to monitor the progress of the policies and programs, periodic assessment of the status of the evolving changes in the health of the ecosystems and effective dissemination of information among the general public are all essential to provide the directions to modify the policies, programs and means of implementation of the proposed SPC model, as appropriate.

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<sup>101</sup> In 1990, global emissions were at 29.694 GTCO<sub>2</sub>eq, of which Annex I (Developed) countries were responsible for 17.991 GTCO<sub>2</sub>eq and Non Annex (Developing countries) are responsible for 11.703 GTCO<sub>2</sub>eq. It is expected that the world community must achieve a 50% reduction in carbon dioxide emissions below their 1990 emission levels (the proposal of Small Island Nations claiming scientific evidence). Sri Lanka’s emission is 0.6 T/capita whereas, the global average 4.7 and the USA’s emissions are 20 T/capita.

It is necessary to test the key performance indicators presented in Chapter 8 to monitor the progress of the SPC model for their validity and adequacy nationally. Extensive research is necessary to report the linkages of the ecosystem services and sustainable human development, which demands skilled human resources and technical and financial assistance. National and regional networks of the scientific community are essential in this exercise.

### **10.5.3 Incentive schemes**

Effective and nationally appropriate market-based instruments to promote citizen's behavioral changes should be developed and tested for their effectiveness to maintain the ecosystem's health. It is necessary to develop liability and compensation systems for different behaviours of the community and to test their validity to effectively balance ecosystem health and human development scenarios.

### **10.5.4 External forces beyond national boundaries**

The national efforts of application of SPC can be either encouraged or slowed-down, based on the global environment, trade and other socio-economic policies. Further research is necessary to identify supportive as well as perverse international policies, which can be discussed at various international fora forming like-minded groups to address the challenges and promote SPC internationally in collaboration with the international community through the philosophy 'Think globally act locally and again think Globally' through feedback loops.

### **10.5.5 Conditions to improve collaboration of stakeholders**

The minimum set of conditions proposed in this dissertation to promote SCP should be further researched in order to improve the effectiveness of the different levels of collaboration. Recognising the need for transformation to the philosophy 'think globally and act locally and again think globally through good governance practices, theorising collaboration is needed to direct the behavior of the global community to address the present unprecedented global multiple challenges related to resource deficiencies, human development needs, ecosystem stability and global security.

### **10.5.6 Testing of the SPC Model for its applicability in other countries**

The SPC Model developed for Sri Lanka is universally adoptable in its basic features. The model components described the conditions required and will have to be adjusted based on specific country situations. As a demonstration, Sri Lanka has been described and proposed for application to inform the results to a wider audience. The framework was designed to accommodate possible changes of priorities/thrust areas due to political changes and subsequent government changes. The substance of the SPC programme will remain as it is until the minimum conditions stipulated in the model are fulfilled.

Further research is necessary to test the SPC Model developed for Sri Lanka in other countries to determine if it can be applied more broadly with appropriate modifications based on specific country situations.



## **Annex 1: An Overview of Major Events that have taken place related to SPC**

### **Years 1972-1979**

1972

United Nations Conference on the Human Environment, Stockholm, Sweden

United Nations Environment Program (UNEP) established

The limits to growth published by the Club of Rome

Landsat satellite launched

UNESCO Convention Concerning the Protection of World Cultural and Natural Heritage

1973

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Drought of the Sahel killed millions of people

First oil crisis

1974

Symposium led to the Cocoyoc Declaration

1975

First Personal Computer goes on sale

Great Barrier Reef Marine Park declared in Australia

1976

Dioxin release in an industrial accident at a pesticide plant in Seveso, Italy

The Tangshan earthquake caused a huge death toll in eastern China

More than one million people were made homeless by an earthquake in Guatemala

1977

Toxic chemical leak into the basement of houses in Love Canal, United States

United Nations Conference on Desertification, Nairobi, Kenya

The Green Belt Movement established in Kenya

1978

Floods in Bengal State, India, drown 1,300 people and destroy 1.3 million dwellings

1979

Major accident at the Three Mile Island nuclear power station in the USA

First world Climate Conference, Geneva, Switzerland

640-Km oil slick in Gulf of Mexico forms after blow-out beneath Ixtoc drilling rig

Convention of the Conservation of Migratory Species of Wild Animals (CMS)

## **Years 1980 – 1989**

1980

Global 2000 report in the USA

World Climate Program established

World Conservation Strategy launched by IUCN, UNEP and WWF

Beginning of the International Decade for Drinking Water and Sanitation

Brandt Commission published, North-South: a program for human survival

1981

1982

United Nations Convention on the Law of the Sea (UNCLOS)

United Nations General Assembly adopted the World Charter for Nature

1983

Monsoon storms in Thailand, killed 10,000 people

1984

Famine in Ethiopia caused by exceptional and long-lasting drought

Chemical Accident at Bhopal, India, killed thousands and maims many more

World Industry Conference on Environmental Management

Typhoon Ike kills 13,000 people in the Philippines and leaves 1.12 million homeless

1985

Vienna Convention for the Protection of the Ozone Layer

International Conference on the Assessment of the Role of Carbon Dioxide and other Greenhouse Gasses, Villach, Austria

1986

The world's worst nuclear disaster occurred at Chernobyl, Soviet Union. It spread radioactive fall-out over large areas of Europe

The International Whaling Commission imposed a moratorium on commercial whaling

A fire in a chemical manufacturing plant in Basel, Switzerland, released tons of toxic chemicals into the Rhine, killing fish as far north as the Netherlands

1987

The Montreal Protocol on Substances that Deplete the Ozone Layer was developed

Our Common Future (the Brundtland Commission Report) publicised the concepts of sustainable development

The UNEP Governing Council called for a working group to investigate a the establishment of a biodiversity convention

1988

A UN resolution recognised Climate Change as a 'Common concern of Mankind'

Hurricane Gilbert killed 350 people, left 750,000 homeless and caused US\$ 10 billion in damages in the

Caribbean, Mexico and the United States

1989

Fall of the Berlin wall

Exxon Valdez released 50 million litres of crude oil into Prince William Sound

The Basel Convention on the Transboundary Movements of Hazardous Wastes and their Disposal was developed

The Inter Governmental Panel of Climate Change (IPCC) was established

## **Years 1990 – 1999**

1990

Eco-efficiency was established as a goal for industry

The first IPCC Assessment Report warned of impending global warming

The Second World Climate Conference was held in Geneva, Switzerland

Global Climate Observing system (GCOS) was created

1991

Millions of litres of crude oil were spilled and burned during the Gulf War

Global Environmental Facility was established to finance conventions

‘Caring for the Earth,’ was published by IUCN, UNEP and WWF

1992

The UN Conference on Environment and Development (the Earth Summit), was held in Rio de Janeiro, Brazil

The Convention on Biological Diversity was developed

The UN Framework Convention on Climate Change was established

1993

The Chemical Weapons Convention was developed

The World Wide Web contained only 50 pages

The World Conference on Human Rights was held in Vienna, Austria

1994

The First meeting of Factor 10 Club was held in Carnoules, France

The UN Convention to Combat Desertification was developed

The International Conference on Population and Development was held in Cairo, Egypt

The Global Conference on the Sustainable Development of Small Island Developing States was held in Bridgetown, Barbados

A broken pipeline spilled thousands of tonnes of crude oil on the tundra on the Kori Peninsula, of the Russian Federation

1995

Year of the Sea Turtle

World Summit on Social Development was held in Copenhagen, Denmark

The Fourth World Conference on Women was held in Beijing, China

The second IPCC report was released; it served as a major driver for the development of the Kyoto Protocol

The World Business Council for Sustainable Development was created

1996

The United Nations Conference for Human Settlements (Habitat II), was held in Istanbul, Turkey

The World Food Summit was held in Rome, Italy

ISO 14 000 was created to guide the development & implementation of environmental management systems in industries

The Comprehensive Nuclear Test Ban Treaty was developed

1997

The Kyoto Protocol was developed and some countries adopted it

Rio+10 Summit reviews implementation of Agenda 21

1998

Warmest year of the millennium

Extensive forest fires in Amazonia and Indonesia

The Rotterdam Convention on the Prior Informed Consent (PIC) Procedures for Certain Hazardous Chemicals and Pesticides in International Trade was developed

1999

Launch of Global Compact on Labour Standards, Human Rights and Environmental Protection occurred

The World's human population reached 6 billion

## **Years 2000-2002**

2000

Size of the ozone hole reached new records, affecting the southern tip of South America, Australia and New Zealand

The Cartagena Protocol on Bio-safety was adopted

The Millennium Summit was held in New York, United States

The World Wide Web has 50 million pages

The World Water Forum was held in The Hague, the Netherlands

2001

The IPCC published its Third Assessment Report, with increased estimates of global warming and enhance urgency or action to be taken by all

The Stockholm Convention on Persistent Organic Pollution was held in Stockholm, Sweden

2002

The World Summit on Sustainable Development was held in Johannesburg, South Africa

## **Annex 2: Decentralisation and devolution of Environmental Activities**

The subject of environment is handled by different administrative divisions/levels in accordance with the legal provisions made by their acts, statutes and ordinances within the provisions of the constitution of Sri Lanka. This section provides an overview of these systems to provide insights of the provisions that can be used to promote SPC throughout Sri Lanka.

### **Administrative Divisions of Sri Lanka**

Local government is divided into two parallel structures, the civil service, which dates to colonial times, and the provincial councils, which were established in 1987. In addition to that, there is a third layer, which is comprised of local authorities elected. This layer was also in existence during the colonial era, well before the establishment of the provincial councils.

#### **The Civil Service Structure**

The country is divided into 25 districts, each of which has a district secretary (the GA, or Government Agent) who is appointed. Each district comprises 5–16 divisions, each with a DS, or divisional secretary, again, appointed. At a village level Grama Niladari (Village Officers), Samurdhi Niladari (Development Officers) and Agriculture Extension Officers work for the DSs. Altogether there are 324 divisional secretariats.

This network can be actively used to promote environmental management activities through district coordinating committees and divisional committees. Under the NEAP3, District Environmental Law Enforcement Committees (DELEC) was established in each district to facilitate environmental management at district and divisional level. The District secretary chairs the committee with the assistance of the divisional environmental officer (DEO) allocated to the District Secretariat by the CEA. DEOs have been allocated in each division by the CEA to facilitate these divisions to effectively perform environmental activities. Divisional secretaries are part of the systems of natural resource management at divisional level; they are responsible for activities such as issuing licenses for sand mining.

Even though initially, the DELEC system functioned effectively with financial assistance provided by the MoE for its functioning, once the funding ended there was no interest by most of the district secretariats to continue the programme. A National Environmental Law Enforcement Committee (NELEC) was also established in the MoE to assist DELECs during implementation of NEAP 3. At present the NELEC is not functioning due to deficiencies of skilled human resources and to lack of funds. These are some of the challenges that have to be seriously considered in developing and implementing the SPC model.

#### **The Provincial Council Structure**

Under the 13th amendment to the constitution (1987) the provincial administrative system was established between the central government and the existing local authorities (Municipal Councils – MCs), Urban Councils – UCs and Pradeshiya Sabas – PSs - Village Councils). There are nine (9) provincial councils in the country. Provincial councils are directly elected for five 5-year terms. The *Provincial Councils* have full statute making power with respect to the Provincial *Council List*, and shared statute making power respect to

the *Concurrent List*.<sup>102</sup> While all matters set out in the *Reserved List*<sup>103</sup> are under the central government. The subject of environment is under the concurrent list. “*Protection of the environment within the province to the extent permitted by or under any law made by the parliament*” is the responsibility of the provincial council. So far, only the North Western Provincial Council has enacted its own environmental statute.

## **The Local Governmental Structure**

Below the provincial level are elected Municipal Councils and Urban Councils, responsible for municipalities and cities respectively, and Pradeshiya Sabhas (village councils), again elected. This local government system has been in operation well before the provincial council system starting from the colonial era. At present there are: 18 Municipal Councils, 42 Urban Councils and 270 Pradeshiya Sabhas.<sup>104</sup> The Local Government Acts and Ordinances have powers related to environmental management within their area of jurisdiction.

NEA contains provisions for devolution of its powers to other institutions/authorities. CEA has delegated authority to local authorities to issue EPLs for low polluting industries. CEA has also designated project approval agencies under the EIA system.

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<sup>102</sup> For the subjects listed under the concurrent list requires the approval of the parliament to enact separate statutes under the provincial councils.

<sup>103</sup> Provincial Councils can not enact separate statutes for the subjects listed in the reserved list.

<sup>104</sup> The above statistics include the new local government authorities established by the government in January 2006

### Distribution of Local Authorities in Sri Lanka

Province	District	Number of Local Authorities				
		MC	UC	PS	District	Province
Western	Colombo	4	5	4	13	48
	Gampaha	2	5	12	19	
	Kalutara	-	4	12	16	
Central	Kandy	1	4	17	22	42
	Matale	1	-	11	12	
	Nuwara Eliya	1	2	5	8	
Southern	Galle	1	2	17	20	49
	Matara	1	1	15	17	
	Hambantota	-	2	10	12	
Northwestern	Kurunegala	1	1	18	20	32
	Puttalam	-	2	10	12	
North-Central	Anuradhapura	1	-	18	19	26
	Polonnaruwa	-	-	7	7	
Uva	Badulla	1	2	14	17	29
	Monaragala	-	1	11	12	
Sabaragamuwa	Ratnapura	1	2	14	17	27
	Kegalle	-	-	10	10	
North	Jaffna	1	3	13	17	34
	Kilinochchi	-	-	3	3	
	Mannar	-	1	4	5	
	Vavuniya	-	1	4	5	
	Mullativu	-	-	4	4	
Eastern	Batticaloa	1	1	10	12	43
	Ampara	1	1	16	18	
	Trincomalee	-	2	11	13	
<b>Total</b>		<b>18</b>	<b>42</b>	<b>270</b>	<b>330</b>	<b>330</b>

It is significant to note that the proportion of Pradeshiya Sabha (Village Councils) in the entire profile, which reflect the rural nature of the country. The present governmental policy, to empower communities in rural areas, has to be made with care in keeping with the rural ambience. SPC should therefore, be the key to such development.

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Leela Padmini Batuwitige is a Chartered Civil Engineer with three Masters Degrees-Master of Engineering (Sri Lanka), Master of Science (Ireland), Master of Public Administration (Harvard University-USA) under the Edward S Mason Program in Public Policy and Management – Mid Career Master of Public Administration (MPA), and presently working as the Additional Secretary (Environment & Policy) of the Ministry of Environment of Sri Lanka. Ms Batuwitige has been actively involved in sustainable development issues over the past 19 years in the Ministry of Environment and has extensive experience in: Development of National Environmental Policies and Strategies, International Environmental Policies, International Environmental Negotiations, Industrial Ecology and Green Design, and Natural Resources Economies in Developing Countries. She represented Sri Lanka in various international conferences and working groups related to: the Basel Convention on Hazardous Wastes, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework convention on Climate Change and its Kyoto Protocol, UN Commission of Sustainable Development, UNEP Governing Council/Global Environmental Ministers Forum and many other regional meetings and working groups. She represented the Asia and the Pacific region at the Inter-sessional Working Group to review the 10 year Strategic Plan for the implementation of the Basel Convention. She also represented the Asia and the Pacific Region in the Ad-Hoc Joint Working Group on Development of Synergies (Cooperation and Coordination) between the Basel, Rotterdam and the Stockholm Conventions. She was a Vice Chair at the 4th Meeting of the Open Ended Working Group of the Basel Convention. At present she serves as a member of the Compliance Committee which is a subsidiary body of the Basel convention. She has published several papers on waste management, environment and development related policy interventions. She has been offered a Special Recognition Award by the National Cleaner Production Center (a member of the UNIDO-UNEP Cleaner Production Network) for the invaluable contribution to Cleaner Production in Sri Lanka in 2007.





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