SUSTAINABLE CONSUMPTION & PRODUCTION: MAKING THE CONNECTION

Abstract:

This UNEP DTIE paper provides general background information for training on Sustainable Consumption and Production (SCP). It is based on training material that was prepared and delivered by UNEP DTIE through the partnership with InWent to practitioners in the field of Cleaner Production (CP). Over the last decade, changes in consumption patterns have offset the environmental gains that have been achieved through programs aimed at making production processes cleaner and more efficient. After outlining this global context and the policy response for changing unsustainable patterns of consumption and production, life cycle thinking and product focus are presented as basic principles within an integrated systems approach to link ongoing work on cleaner production with sustainable consumption activities needed in the future. To allow the CP practitioners to implement the approach and to make real changes towards sustainable development, the paper gives an overview on the overall tools and strategies and tools to promote Sustainable Consumption and Production in an integrated way. Analytical, procedural and communicational approaches as well as policy instruments are introduced. A key role for CP practitioners is to engage themselves in an integrated approach of consumption and production as a natural extension of the original Cleaner Production mandate, they are well placed to help business to better design, produce and sell cleaner products and grasp innovation opportunities.
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Section I.

Introduction

In recent years, it has become increasingly clear that sustainable economies must be built around sustainable products, not just sustainable industrial processes. Over the last decade, changes in consumption patterns (e.g., population growth, an increasing standard of living, individual desires to consume products and services) have offset the environmental gains that have been achieved through programs aimed at making production processes cleaner and more efficient. Process-oriented strategies can effectively reduce the environmental impacts associated with the design and manufacture of products. However, by their nature, they do not address the increasingly significant environmental impacts associated with the selection, use, and disposal of products by consumers. This challenge requires the adoption of product-oriented strategies and a paradigm shift from a narrowly focused process management to a broader and more comprehensive product management and the needs they are designed to meet.

Why are Cleaner Production Centres (CPCs) well placed to meet this challenge? First, UNIDO/UNEP’s National Cleaner Production Centres (NCPCs), who were amongst the first CPC’s, have an existing mandate to develop expertise in product management strategies. According to UNEP’s definition, cleaner production is “the continuous application of an integrated preventive environmental strategy to processes, products, and services” (emphasis added). Second, the current situation gives CPCs an opportunity to expand the services they can offer and to meet an economic need. On the level of international trade, companies are increasingly becoming concerned about what trade restrictions are or could be applied to goods and services to enter the international market. The need to address products and therefore consumption issues has been reflected in the international policy arena since 1994, when the Norwegian government hosted an international symposium on sustainable consumption as part of the follow-up to Agenda 21. The World Summit for Sustainable Development reconfirmed the mandate to focus on the integration of production and consumption issues. This training is a concrete step to do just that.

To enhance their expertise in product management, the CPCs will need to understand the forces behind consumption as well as production. This training course was designed to familiarize the CPCs with sustainable consumption issues and practice of tools and strategies to better understand the forces that affect and shape production patterns. The skills and knowledge that the CPCs will acquire through this course will enhance their existing cleaner production initiatives and introduce potential new opportunities for revenue generation.

The course has three specific objectives:

1. *To help the CPCs understand the integrated concept of sustainable consumption and production and the importance to their work of such an approach.*

Consumption and production have traditionally been conceptualized as separate systems. This distinction is reflected in the multitude of programs or initiatives that have been established in one area or the other (but rarely both). Yet neither consumption nor production operates as an isolated system. The consumption of
products requires that products be produced, and the production of products requires that they be consumed. Converting an economy towards more sustainable forms of production therefore requires a transition towards more sustainable forms of consumption.

2. To help the CPCs identify opportunities for leveraging sustainable consumption / production in their home countries.

The CPCs can have a significant impact on sustainable production and consumption efforts in their home countries. First, they can help businesses improve the environmental attributes of their products and services, minimize the environmental impacts of their production activities, gain recognition for “green” products, and identify new markets for their greener products or services. Second, the CPCs can influence national policy by advocating laws and programs designed to change production and consumption patterns. Third, the CPCs can foster multi-stakeholder networks, which promote the partnership and collaboration that are necessary for sustainable development. Finally, the CPCs can play an important supporting role by serving as national sources of information and expertise on sustainable consumption and production.

3. To introduce the CPCs to tools and information to help them leverage sustainable consumption/production in their countries.

To decouple economic growth from environmental degradation, it is necessary to implement both production- and consumption-oriented strategies. The participants will learn about a variety of tools and approaches for making consumption and production patterns more sustainable. The training package will also familiarize participants with resources for further information about consumption and production.

The package begins with a look at the environmental impact of current consumption and production patterns – i.e., “Global Context of Sustainable Consumption & Production (Section II). It then looks at an integrated production/consumption cycle from a systems perspective (Section III). Then the focus shifts to the range of strategies and tools to change production and consumption patterns (Section IV). Finally, the exercises (Section V), help to improve the understanding of the concepts of sustainable production and consumption on an example from daily life.

The content and format of the package is based on the premise that given the CPCs’ historical focus on cleaner production, the participants already possess a basic understanding of tools and techniques for process improvement. Consequently, the course devotes more time to sustainable consumption and the linkages of sustainable consumption and production. Although not a formal “train the trainer” curriculum, this course has been designed for easy incorporation into the CPCs’ existing training programmes.

It is important for CPCs to understand that the integration of sustainable consumption and production in practice is a relatively new development, one to which all practitioners need to contribute expertise and experience.
Section II.

Global Context of Sustainable Consumption and Production

Rio and the Agenda 21

The United Nations Conference on Environment and Development in Rio de Janeiro in 1992 represented a watershed in the international community’s way of thinking about production and consumption. Prior to the Rio Summit, the environmental issues associated with production had received much more attention than those linked to consumption. However, Agenda 21 brought consumption out from the shadows with a clear message: the success of efforts to eradicate poverty and manage the natural resource base for economic and social development will depend upon fundamental changes in global consumption and production patterns.

Johannesburg and the 10 – year framework of programmes

Recognising that consumption and production patterns are increasingly global and that international co-operation is needed to address the implementation gap, the Johannesburg Summit called in 2002 for the “development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards Sustainable Consumption and Production (SCP) patterns that will promote social and economic development within the carrying capacity of ecosystems.” This would require, among others, the following actions\(^1\):

- Identify specific activities tools, policies, measures and monitoring and assessment mechanisms, including, where appropriate, life-cycle analysis and national indicators.
- Adopt and implement policies and measures aimed at promoting SCP patterns, applying, inter alia, the polluter-pays principle.
- Develop production and consumption policies to improve products and services.
- Develop awareness-raising programmes on the importance of sustainable consumption and production patterns, particularly among youth and relevant segments in all countries, through inter alia, education, public and consumer information, advertising and other media.
- Develop and adopt consumer information tools to provide the information related to SCP.
- Increase eco-efficiency, with financial support from all sources, where mutually agreed, for capacity-building and technology transfer.

UNEP's Governing Council stressed the importance of working on sustainable consumption and production with its Decision in February 2003 (GC22/6). UNEP should take an active role, support regional and national initiatives for SCP and work in co-operation with other UN agencies and stakeholders. UNEP together with UN DESA (UN Department of Economic and Social Affairs) are the leading agencies in the development of the 10-year framework.

The 10-year Framework is not simply a series of meetings to discuss issues of sustainable consumption and production, but is intended to promote implementation of sustainable consumption and production at the national and regional level, with co-ordinated international

\(^1\) Chapter III, JPOI, WSSD, 2002.
support. Therefore the work should be linked to other international processes - for instance on water and energy - and to the thematic discussions as part of the multi-year programme of work of the Commission on Sustainable Development.

Meeting the "implementation challenge" requires that the following phases are carried out:

a) Organizing regional consultations in all regions to promote awareness and identify priorities and needs for sustainable consumption and production;
b) Building regional strategies and implementation mechanisms with regional and national ownership;
c) Implementing concrete projects and programmes on the regional, national and local levels;
d) Monitoring and evaluating progress and exchanging information and experience at the international level.

UNEP together with UN DESA\(^2\) is co-ordinating the international co-operation and facilitating the regional and consultative process to identify the priorities, needs and opportunities of each region as the first phase of the Framework. In 2003, Latin American and Asia Pacific initiated this consultative process. As a result, the Latin American and Caribbean Strategy on Sustainable Consumption and Production was developed, as well as a proposal for the establishment of a Regional Council of Government Experts on SCP. Asia Pacific has identified preliminary ideas on a regional strategy for the Asia-Pacific region with indications of needs and priorities. One proposal was to establish a "help center" with the support of UN ESCAP (UN Economic and Social Commission for Asia and the Pacific) and UNEP's regional office.

During 2004 Africa and Europe have initiated their regional consultations. The African regional meeting will be held in Casablanca in May 2004 and the European regional meeting in winter 2004. This European meeting with representative from all countries will have two forerunner meetings in East and South Europe. The challenge in all the regions is to identify opportunities and pilot projects to start implementing concrete actions that help to shift towards SCP.

The first International Expert Meeting was held in Marrakech, Morocco, June 2003. It was agreed that the follow-up at the international level would mainly consist of co-ordinating activities to support regional and national initiatives. The Marrakech meeting also recommended the establishment of informal task forces or roundtables. Priorities for substantive work were identified as well. There will be a second international expert meeting to review progress in September 2005 in Costa Rica.

**Current consumption patterns**\(^3\)

Current consumption patterns pose a problem because of two seemingly contradictory traits – over-consumption and under-consumption. In the aggregate, worldwide consumption has increased dramatically. At the same time, millions of people are not consuming enough to meet their basic needs. Both trends are placing enormous stress on the global environment.

\(^2\) For more information see: UNEP, Sustainable Consumption programme, [www.unep.ch/sustain/](http://www.unep.org/sustain/)

\(^3\) For more information see also: World Watch Institute, State of the World – Special focus: The Consumer Society, 2004
The past several decades have seen an extraordinary expansion of the global economy and a corresponding explosion in consumption. Global consumption expenditure has grown by an average of 3% per year since 1970. From 1973 to 1998, it doubled in real terms to reach US $24 trillion. Some of this growth in consumption has been essential to human development (food, shelter, clean water, etc.). However, much of this spending has been for “wants” rather than “needs.”

Like wealth, privilege, and power, consumption is distributed inequitably. The richest quintile of the world’s population accounts for 86% of total private consumption expenditures. By contrast, the poorest quintile accounts for 1.3%. It has been estimated that an average person in North America consumes almost 20 times as much as a person in India or China and 60-70 times more than a person in Bangladesh. The distribution of consumption is also unequal within countries. In Mexico, almost all of the richest fifth – and almost none of the poorest fifth – have access to sanitation.4

Although average per capita consumption has increased in many parts of the world, it has not risen for everyone. From 1973 to 1998, the consumption of an average African household decreased by 20% - even while per capita consumption in East Asia grew by a staggering 6.1% annually. Today, over one billion people need to increase their consumption to meet their basic needs - including 100 million people in industrially developed nations.

How is under-consumption an environmental problem? Poverty and lack of infrastructure impair the capacity of less developed countries to look after their own people and natural environments. People who do not consume enough to meet their basic needs are often forced to make decisions for short-term survival that have negative long-term environmental impacts. Poor fishers in Southeast Asia practice cyanide fishing, threatening reef ecosystems in the process. Poor farmers in Sub-Saharan Africa burn trees to gain land for planting rice. The destruction of forests has accelerated erosion and desertification, increasing poverty and deprivation – often without yielding new productive land.

New challenges for Sustainable Production

Production activities (manufacturing, resource extraction, agriculture) also have a significant impact on the global environment. In industrially developed countries, production process innovations have reduced industrial energy use and emissions of specific pollutants such as sulfur oxides and heavy metals. However, the environmental gains realized through these improvements are being offset by trends on the demand side such as population growth and increasing standard of living. Ironically, efforts to improve the environmental compatibility of products and services or to enhance their economic performance have opened up opportunities to consume more of them and, thus, to negate the benefit derived from the original improvements (the “rebound effect”).

More than 1,000 cleaner production demonstration projects have been launched. There is still much work to be done to mainstream sustainable production practices everywhere. The concept of cleaner production must be translated from the manufacturing sector, where it germinated, to the increasingly important service sector. Cleaner production efforts must expand beyond their historic focus on urban issues to address improvements in rural production

4 UNEP, Consumption Opportunities, 2001
activities such as agriculture, dairy farming, mining, forestry and fisheries. Innovations in these areas are critical to protect and manage natural resources as well as to sustain the livelihood of rural communities.

**Environment under consumption pressure**

What is the impact of current consumption and production patterns on the environment? They are depleting many nonrenewable resources, generating pollution and waste that exceed the planet’s sink capacities to absorb and convert them, and contributing to the deterioration of renewable resources such as water, soil, and forests.

When fish stocks are depleted or forests clear-cut, it is easy to see the impact of consumption patterns on the environment. But consumption patterns also affect the environment in many less obvious ways. Energy, water and raw materials are required to make the products that consumers purchase. Soil and ecosystems are disturbed to extract resources and convert land to productive use. The production, use, and disposal of products all contribute pollution and waste to the environment.

In 1998, the World Wildlife Fund developed an index of “Consumption Pressures” to attempt to measure the burden placed on natural ecosystems by human activity. The index looked at six categories of data from 152 countries to calculate consumption pressure per person and per country. The index is an interesting tool to compare the environmental effects of consumption among different countries.\(^5\)

The environmental effects of current production and consumption patterns are neither localized nor equitably distributed. For example, while deforestation is concentrated in developing countries, much of it has taken place to meet industrialized countries’ demand for wood and paper. Similarly, it is predicted that climate change, which is largely a result of intensive fossil fuel use in industrial societies, will most adversely affect countries such as Bangladesh and Pacific island nations that have not significantly participated in (or benefited from) industrialization.

How can we consume and produce in an environmentally sustainable way? It is possible for production to deliver products that improve the basic quality of life for many people with minimal environmental effect. Similarly, it is possible for people to consume resources in a way that do not jeopardize the environment and do not stimulate the demand for products that are unsustainably produced. In order to achieve these goals, we must abandon our approach to consumption and production as separate systems. The section: Integrating Sustainable Consumption and Production introduces tools for looking at a single integrated system focused on products, which represent the nexus between consumption and production.

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\(^5\) WWF, Consumption Pressures, 1998
Section III.

Integrating Sustainable Consumption and Production

Understanding Sustainable Consumption and Production

Agenda 21 made clear that changing consumption and production patterns is at the heart of sustainable development. But what does it mean to make production and consumption “sustainable”? The terms “sustainable production” and “sustainable consumption” can evoke a variety of reactions from different people. In order to effectively discuss these ideas, it is necessary to develop a shared understanding of the two concepts.

UNEP’s definition of Cleaner Production is: Cleaner Production is the continuous application of an integrated preventive environmental strategy to processes, products, and services to increase overall efficiency, and reduce risks to humans and the environment. Cleaner Production can be applied to the processes used in any industry, to products themselves and to various services provided in society. The United Nations Commission on Sustainable Development’s defines “sustainable consumption” with an emphasis on quality of life and intergenerational equity. But both definitions share a focus on products/services rather than on processes alone. This reflects a common emphasis on a comprehensive approach to all phases of a product’s/service’s life cycle.

To gain a deeper understanding of sustainable consumption and production, it may be helpful to review the following points:

- **The gains in productivity/eco-efficiency are overtaken** by the overall increase in production. This trend is clearly shown in many sectors. For example, the global energy used in metallurgical alumina production for each ton of products has reduced by 10% from 1991 to 2000. However, the total global production has increased by over 40%. Thus the total energy used for alumina production has continued to increase. Similar situation exists with regards to extraction of natural resources. Over extraction of water leading to unprecedented lowering of water tables, extensive fishing resulting in depletion of fish stocks, shrinking forest covers are just some of the well-known examples. This means that until the overall demand for material-based products stabilizes, the adverse environmental impacts will not be reduced. In other words, the improvement in efficiency alone will not reverse the current trend of environmental degradation. Population growth and the increasing desire for more products and services needs to be addressed at the same time.

- **Sustainable consumption is about more than “consuming green”**. “Green consumerism” has been criticized as a narrowly focused strategy of “providing eco-products for niche markets serving affluent consumers, supported by modest policy initiatives such as eco-labelling.” Sustainable consumption seeks to reform underlying consumption patterns and to use the demand side to leverage long-term social, economic and environmental benefits.

- **Sustainable consumption is about changing patterns, not “doing without.”** A common misperception is that changing consumption patterns would be identical to forcing consumers to purchase fewer products and services (the level). The potential strength of the concept, however, is that it promotes different consumption choices, allowing consumers to satisfy their needs with better performing products or services that use
fewer resources, causing less pollution and negative social impacts (the pattern). The concept stimulates product and technology innovation and opens up new consumption patterns based on performance and higher service content rather than on material contents. This creates space for consumption for the vast majority of the world’s population that does not have access to basic needs or is even struggling to survive.6

- Sustainable production and consumption will require “leapfrog change.” Sustainability will require the creation of new systems and businesses that fundamentally alter the current relationships between resource-consumption-waste and the creation of economic value. Incremental improvement to existing systems of production and consumption will not suffice. In building these systems, developing countries have the opportunity to put in place a performing economy and alleviate poverty without using outdated technologies and products – i.e., to “leapfrog” over the path taken by industrially developed countries.7

Fundamental and dramatic changes are necessary to make production and consumption sustainable. It will be difficult (if not impossible) to make these changes by addressing consumption and production patterns separately. Their interconnectedness, particularly around products and services, mandates a whole-system strategy. The second half of this Section introduces approaches for addressing consumption and production as parts of a single integrated system.

**A Systems Approach to Consumption and Production**

The first half of this Section focused on putting sustainable production and consumption in context. The discussion so far has been one-dimensional, that is, it has examined consumption and production separately. This half of the Section will begin to look at production and consumption as a multi-dimensional, integrated system.

A classic manufacturing “system” schematic has inputs, a process, and outputs. See Figure 1 for an illustration. This is quite simplistic and represents what happens within the boundary of a manufacturing facility. While it is very useful for production process focused work, it is a very limited and linear model: raw materials in, products and waste out.

**Facility level Process Flow Map**

![Diagram of a facility level process flow map with inputs and outputs](image)

Figure 1: Manufacturing system scheme

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6 For more information see: UNEP, Global Status Report on Sustainable Consumption and Production, 2002

7 IBID and UNEP, WSSD Outline for a work programme on promoting sustainable consumption and production patterns, August 22, 2002
Stepping back to take a more “macro” view reveals a slightly more sophisticated system. This system, which looks at resource productivity and energy efficiency, goes beyond the basic manufacturing facility and includes extraction, distribution, consumption and waste management in a life cycle perspective, as indicated in Figure 2. While it is more comprehensive, it is still nonetheless a linear system. It is process-focused (i.e., focuses on processes within the manufacturing system) and only hints at recycling.

Figure 2: The life cycle perspective for products and services

Like production systems, consumption systems have been formally diagrammed. This model shows the various “actors” affecting consumer behavior - technology, economy, demography, institutions and culture. It depicts how they interact and indicates potential outcomes. The consumer behavior corresponds to the society’s need for products and services in Figure 2 that is the basis for the life cycle to exist.

Production-focused strategies have a solid history of achievement and established infrastructure, but they have two major drawbacks. First, consumption issues have drawn attention to their limits. Second, production-focused strategies (like consumption-focused strategies) reflect “a simplistic division into separate spheres of action: production-focused (producers, processes, technology facilities) and consumer-focused (needs, awareness, behavior).” This dualistic categorization does not accurately reflect the complexity of existing social and economic structures.

According to this “engineer’s view” of processes to meet human needs, consumption and production operate in the same system, which is closed and non-linear. The primary emphasis of this view, however, is still on process or production. There is a high risk of focusing on only part of the whole system.
A nice story gives us a clue to a system and its parts. If an elephant comes the first time to a city of blind people and five blind men would start at different parts of the elephant describing what they experience. Their description might cover a snake as well as a palm tree or even a rope. If the elephant decided to move and each of the men had to react to the movement based on their perception of what the elephant looked like, the probability of an even less clear description will be fairly high. This illustrates the danger associated with seeing only a part of the big picture.

How do the parts of the production/consumption system come together? Products are the clear connection between the production and consumption systems. The production system produces products, which are then consumed by the consumption system. Conversely, the consumption system consumes products that are produced by the production system. This interrelation is presented in Figure 3.

An emphasis on production and consumption focuses attention on the system’s subparts. By contrast, an emphasis on products focuses attention on the whole system. Moving past production-focused or consumption-focused subsystems to a broader and more comprehensive product-focused system will involve a paradigm shift.

It is common to think of production and consumption as discrete stages in a product’s life cycle chain, with production (an industrial activity) preceding consumption (a domestic activity). But production and consumption are inextricably interwoven. All production consumes resources and energy: to produce something requires that something must be consumed. Indeed, in terms of mass or weight, the largest volume of materials consumed in a national economy is consumed not by individuals, but by industrial production facilities, particularly those in the resource extractive industries.
A closer look at the product-focused consumption and production system reveals that each node in a product chain is both a production and a consumption node. There is no one, single determining node; not one point that can be labeled as the point of consumption (or the point of production, for that matter). The consumption that occurs at any one node is determined by the production/consumption activities that precede it.

The production-consumption system is a complex system. As is usually the case in complex systems, it is often difficult to see the relationship between cause and effect. Frequently, a change in mindset or structure is distant from the change in behavior it creates. This may make it difficult to attribute a direct causal link between an action or initiative and a distant outcome.

Change processes are often made possible through a series of small steps rather than one big action. While the path to achieving a goal is often difficult to discern, it should not be a barrier to beginning the journey to achieve that goal. In order to fix current problems we need to move beyond our current understanding and “think outside the box” for solutions. This section established an integrated understanding of sustainable production and consumption and provided a life cycle based systems approach for further analysis.
Section IV.

Strategies and Tools for Sustainable Consumption and Production

This section gives an overview on the overall strategies and tools to promote Sustainable Consumption and Production (SCP) in an integrated way. Analytical, procedural and communicational approaches as well as policy instruments are introduced.

Towards SCP with the 10-year Framework of programmes

To reach the aim of sustainable development the Johannesburg Summit called for the “development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production patterns that will promote social and economic development within the carrying capacity of ecosystems.”

This effort was supported by UNEP's Governing Council Decision (GC22/6) in February 2003. The Governing Council stressed the importance of working on sustainable consumption and production and called on UNEP to take an active role working in co-operation with other UN agencies and stakeholders in support of regional and national initiatives for SCP. In particular, the Council called for efforts to:

- Strengthen existing eco-efficiency, cleaner production and sustainable consumption programmes, such as the UNEP’s regional cleaner production roundtables;
- Facilitate the transfer of environmentally sound technology and design of products and services.
- Strengthen the role of business and industry in promoting SCP (finance sector, tour operators and telecommunication industry).
- Enhance corporate responsibility and accountability.
- Develop and facilitate consumer awareness campaigns.
- Provide information to governments to assist implementing sustainable consumption, such as UN Guidelines for Consumer Protection.
- Develop training and capacity building for governments, local authorities and business on SCP.

The major policy principles that are used in working on the upper topics are:

- Continuous improvement,
- Transparency,
- Eco-efficiency,
- Precaution,
- Life cycle thinking,
- Polluter pays principle and
- Common but differentiated responsibilities.

These principles are widely known and self explanatory. Put into other words: working with an attitude of continuous improvement and transparency, sustainable development can be implemented with life cycle thinking, eco-efficiency and precaution on the basis of the polluter pays principle and common but differentiated responsibilities.
Given this overall framework and general principles, strategies to shift towards sustainable consumption and production are outlined below. Then, in a next step, the corresponding tools are explained, giving practitioners a variety of approaches and tools to put strategies into practice.

**Strategies to promote Sustainable Consumption and Production**

The following concepts are considered as strategies in this document:

- Dematerialization,
- Consumption Optimisation,
- Life Cycle Management,
- Product Service Systems,
- Education and Training, and
- Investment and Insurance, Corporate Environmental Responsibility and Reporting.

**Dematerialization** addresses needs and functionality rather than the product alone. The throughput of materials and energy in industrial and consumption processes is considered and allows a major increase in resource productivity.

**Consumption optimisation** seeks to make patterns of consumption meet consumer demands more sustainably. Optimised consumption patterns need not be only related to efficiency, they can also reflect consumption that is conscious (i.e. seeks to improve quality of life) and appropriate (i.e. at the right level).

**Life Cycle Management (LCM)** is an integrated concept for managing the total life cycle of goods and services towards more sustainable production and consumption. Various procedural and analytical tools are available to integrate economic, social and environmental aspects into an institutional context.

**Product Service System (PSS)** is a strategy to promote a marketable mix of products and services that are jointly capable of fulfilling a client’s need with less environmental impact. The focus is on needs rather than on products and creates, by de-coupling economic growth and environmental degradation, win-win solutions. Main PSS business approaches are services providing added value to the product life cycle, final results for customers and “enabling platforms for customers”.

A good example of sustainable **Education and Training** is this training package itself. Another example is UNEP’s/UNESCO YouthXchange. This project provides capacity building on sustainable consumption for youth organisations, schools, and consumer organisations. It facilitates communication about the complex concept of sustainable consumption to a young audience and relates it to relevant issues at international and local level.

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8 For more information see: UNEP, Life Cycle Management programme, http://www.uneptie.org/pc/sustain/lcinitiative/lcm_program.htm
9 For more information see: UNEP, Product-Service Systems and Sustainability: Opportunities for sustainable solutions, 2002
10 For more information see: UNEP/UNESCO: YouthXchange, training kit on responsible consumption, 2002, http://www.youthxchange.net
Investment and Insurance strategies can be used to promote sustainability. For example, environmentally sound techniques such as solar systems or thermal insulation can be made attractive through offering lower credit rates or even special credit lines. Insurance can offer lower rates for environmentally sound cars or for using building materials which pose lower environmental impacts in case of fire. (These strategies like those of Corporate Environmental Responsibility and Reporting are not part of this training.)

This section is not intended to provide an exhaustive review of economic and policy options available to the private and public sectors. Rather, the purpose is to acquaint participants with some useful strategies.

Applying the strategies: using available tools

There are several tools available to promote the strategies outlined above. The tools are described in terms of being analytical, procedural or communicative tools.

This document considers the following approaches as analytical tools:
- Environmental Risk Assessment
- Life Cycle Assessment
- Material Flow Accounting
- Prioritisation of functions

The following approaches are procedural tools:
- Environmental Management Systems
- Eco-design

And the following are considered as communicative tools:
- Consumer Communication and Marketing
- Eco-labelling
- Multi-stakeholder dialogue

Analytical tools

- Environmental Risk Assessment (ERA)\(^{11}\)

Risk assessment is introduced to emphasize that it is part of everything that occurs in human society. We should pay to the risk derived from pollutant exposure. Out of the 2.1 million deaths per year during the late 1980s in the United States, about 460,000 were due to cancer. The risk to die from cancer, without taking into consideration the age factor, equals 22% (460,000/2,100,000 =0.22). Individuals who smoke one package of cigarettes per day have approximately a 25% risk to die from heart disease. In the meantime, the US Environmental Protection Agency (EPA) intends to control exposure to toxic substances with risk levels ranging from \(10^{-5}\) to \(10^{-4}\) (0.00001 % to 0.01 %), throughout the life of a human being.

\(^{11}\) For more information see: UNEP, Chemical risk Assessment, 1999
Environmental Risk Assessment (ERA) is a process that makes it possible to determine the probability for negative effects on human health or the environment as a result of exposure to one or more physical, chemical or biological agents. ERA requires knowledge about the negative effects of the exposure to chemical substances or materials, as well as knowledge about the intensity and duration necessary for these to cause negative effects on population and the environment. Decision-making, within sound risk management, entails examining the various choices for risk reduction. The risk assessment scope is generally local and environmental impacts are presented in the form of risk per researched recipient.

- **Life Cycle Assessment (LCA)**

  The key analytical tool supporting the strategic approach of Life Cycle Management is Life Cycle Assessment. The LCA methodology according ISO 14040 consists of four phases.

  The **Goal and Scope Definition** phase is designed to obtain the required specifications for the LCA study: what questions do we want to answer and who is the intended audience? The following steps must be taken:
  1. Defining the purpose of the LCA study, ending with the definition of the functional unit, which is the quantitative reference for the study.
  2. Defining the scope of the study, which includes the drawing up of a flowchart of the unit processes that constitute the product system under study, taking into account a first estimation of their inputs from and outputs to the environment (the elementary flows or burdens to the environment).
  3. Defining the data required, which includes a specification of the data required both for the Inventory Analysis and for the subsequent Impact Assessment phase.

  The **Inventory Analysis** collects all data of the unit processes of the product system and relates them to the functional unit of the study. The following steps must be taken:
  1. Data collection, which includes the specification of all input and output flows of the processes of the product system, both product flows (i.e. flows to other unit processes) and elementary flows (from and to the environment).
  2. Normalization to the functional unit, which means that all data collected are quantitatively related to one quantitative output of the product system under study, most typically 1 kg of material is chosen, but often other units like a car or 1 km of mobility are preferable.
  3. Allocation, which means the distribution of the emissions and resource extractions of a given process over the different functions which such a process, e.g. petroleum refining, may provide.
  4. Data evaluation, which involves a quality assessment of the data, e.g. by performing sensitivity analyses.

  The result of the Inventory Analysis, consisting of the elementary flows related to the functional unit, is often called the "Life Cycle Inventory (LCI) table".

  The **Impact Assessment** phase aims to make the results from the Inventory Analysis more understandable and more manageable in relation to human health, the availability of

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resources, and the natural environment. To accomplish this, the inventory table will be converted into a smaller number of indicators. The mandatory steps to be taken are:

1. Selection and definition of impact categories, which are classes of a selected number of environmental such as global warming or acidification.
2. Classification, comprising the assignment of the results from the Inventory Analysis to the relevant impact categories.
3. Characterization, which means the aggregation of the inventory results in terms of adequate factors, so-called characterization factors, of different types of substances in the impact categories, therefore a common unit is to be defined for each category, the results of the characterization step are entitled the environmental profile of the product system.

The Interpretation phase aims to evaluate the results from either Inventory Analysis or Impact Assessment and to compare them with the goal of the study defined in the first phase. The following steps can be distinguished:

1. Identification of the most important results of the Inventory Analysis and of the Impact Assessment.
2. Evaluation of the study's outcomes, consisting of a number of the following routines: completeness check, sensitivity analysis, uncertainty analysis and consistency check.
3. Conclusions, recommendations and reporting, including a definition of the final outcome; a comparison with the original goal of the study; the drawing up of recommendations; procedures for a critical review, and the final reporting of the results. The results of the Interpretation may lead to a new iteration round of the study, including a possible adjustment of the original goal.

At present, LCA is primarily used by companies (company internal use) to support their environmental decision making. The most frequent applications are related to:

1. design, research and development,
2. comparison of existing products with planned alternatives, and
3. providing information and education to consumers and stakeholders.

Companies generally tend to first of all use LCA for incremental product improvements and not for real product innovation, i.e. so far LCA is barely used for the complete redesign of existing concepts and even less for alternative fulfilment of functionality. Increasingly, the manufacturer of a product is being held responsible for its manufacturing operations as well as for the uses of the product and how it is disposed. This chain responsibility has been formalized in some countries as an obligation to ‘take back’ the product and its packaging (electrical and electronic industry in EU, for example). This responsibility can also extend to the upstream process of a product. Companies are increasingly looking at supply chain management as a way to improve environmental performance. For a producer to address these concerns, an LCA can play a critical role in helping them to identify and quantify the issues involved.

At present the main role of LCA in policy development is in environmental labelling and the formulation of regulations on product policy and waste management. However, there are high expectations of its future significance in a number of other policy areas — such as green government purchasing, eco-management, green design guidelines and awards, and

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13 UNEP, Towards the global use of life cycle assessment, 1999
sector benchmarking. The significance of LCA will increase when it is a part of a standard decision-making procedure. The public sector is undertaking LCAs in relation to policy development, for example in product and waste policy (UK and Germany); for procurement of environmentally preferable products (USA); in directives for waste management (EU waste directive) and cleaner production (EU IPPC- Integrated Pollution Prevention and Control). Furthermore, LCA has been used in sector covenants between the public and industrial sectors, such as the Dutch packaging covenant. Overall, governments are seen to be responsible to promote LCA because of its potential to achieve environmental improvements for sustainable development. LCA is one of the few tools that can be applied to both the economic and environmental aspects of a product. The use of a well-developed LCA framework will allow governments to address social and economic sustainability indicators on a product level.

Consumers and consumer organizations express their need for environmental information to make (ecological) product choices and to establish guidelines for how to achieve more sustainable consumption patterns. However, consumers do not make environmental assessments by themselves. They rely to a large extent on consumer organizations and on other organizations to provide such information, for example through labelling information including ecolabels.

Klaus Toepfer, UNEP Executive Director recently observed “Consumers are increasingly interested in the world that lies behind the products”. Consumers are not only interested in price and quality, they also want to know how, where and by whom a product has been produced as well. This is not true for all consumers, but it is the case for an increasing number of consumers, in both developed and developing countries. The fact that the consumer is interested in the source of their purchases means that companies and governments should be interested in it as well. This creates opportunities for those whom have been trying to sell cleaner products, or have been trying to implement environmental policies.

- **Material Flow Accounting (MFA)**

  MFA refers to accounting in physical units (usually in tons) the extraction, production, transformation, consumption, recycling and deposition of materials in a given location (i.e., substances; raw materials; products; wastes; emissions into the air, water or soil). Within the range of the present work, MFA encompasses methods such as Substance Flow Analysis (SFA) and other types of material balance calculations for a given region. Examples of flow assessments are:
  - Eco-toxic substances such as heavy metals that may cause environmental problems due to their accumulation capacity.
  - Nutrients such as nitrogen and phosphates due to their critical influence over eutrophication.
  - Aluminum whose economic use, recycling and re-use are to be improved.

- **Function based approach**

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14 See for more information: Wuppertal Institute, ConAccount "Quo vadis MFA?", 2003
http://www.wupperinst.org/Sites/Projects/material-flow-analysis/u43.html
“Human needs should be met by products and services that are aimed at specific ‘functions’ such as food, shelter and mobility, and that are provided through optimised consumption and production systems that do not exceed the capacity of the ecosystem”. This describes the goal of an emerging group of efforts, which can be described as a “function-based approach”. This approach may take different forms but in general they are similar in that they identify how better to meet basic needs through different systems of products and services.

The key element of a Function Based Approach is that it enables policy makers to review the environmental impacts of a group of activities that meet needs and from that point identify actions to be taken. The application of this analytical approach can differ. It could review a group of activities that are required to meet a basic need – ranging from materials extraction to the ultimate product disposal- thereby providing information on priority areas where the environmental impacts are severest and thus enable a policy maker to identify priority areas for action. In another application, this approach would governments to focus their global policy making efforts in reducing environmental impacts. The Table 1 shows an example for such a prioritisation of functions with an example in the Netherlands:

<table>
<thead>
<tr>
<th>Need area or function</th>
<th>Direct and indirect energy use per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelter</td>
<td>39 %</td>
</tr>
<tr>
<td>Food</td>
<td>18 %</td>
</tr>
<tr>
<td>Mobility</td>
<td>18 %</td>
</tr>
<tr>
<td>Personal care</td>
<td>9 %</td>
</tr>
<tr>
<td>Leisure</td>
<td>8 %</td>
</tr>
<tr>
<td>Clothing</td>
<td>6 %</td>
</tr>
<tr>
<td>Education</td>
<td>2 %</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Table 1: Average energy use in a household in the city of Groningen as reported by Tukker in AIST (2003)

From the perspective of usage (direct and indirect), energy optimisation in the fields of shelter, food and mobility provides the greatest opportunities for improvement. These “functions” account for 75 % percent of the energy used in a household.

Procedural Tools

- **Environmental Management Systems (EMS)**

An Environmental Management System, internationally most frequently established by applying ISO 14001, is a means of ensuring effective implementation of an environmental management plan or procedures in compliance with the companies’ environmental policy objectives and targets. A key feature on any effective EMS is the

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16 For more information see: UNEP, Production and Consumption tools, http://www.unepcpc/dpctools/ems.htm
preparation of documented system procedures and instructions to ensure communication and continuity of implementation.

An environmental management system can:
→ Assure a high-level of environmental protection.
→ Continuously improve their environmental performance.
→ Obtain competitive advantages due to these improvements.
→ Communicate progress via the publication of activities undertaken.

EMS has been developed for organizations involved in industrial activities, energy generation, recycling and solid and liquid waste treatment. Additionally, it can be applied to other sectors such as: energy, gas and water supply, construction, trade, transportation, financial services, public Administrations, and industries involved with entertainment, culture, sport, education and tourism.

At present, on the international scene, the ISO 14001 standard on environmental management systems is most often recognized. This standard is not contrary to the established EU EMAS scheme (Eco-Management and Audit Scheme). For some developing countries it might be economically interesting to apply the EMAS scheme if important clients are situated in the EU.

- **Eco-Design**

Working on the design aspects of a product and service is a key area because:
- Product eco-design and eco-innovation is the key to de-linking economic growth from resource consumption.
- 30-80 % of the environmental impact of a product and or service is decided at the design stage. Design is the most effective way to decrease environmental impacts and increasing product value and utility.
- Eco-design provides a hands-on approach to putting sustainable development into practice.

Promoting and supporting eco-design is in everyone’s interest, however the roles played by stakeholders in its implementation differ. Industry has a direct interest in eco-design as a way to create successful products that respond to social and community concerns. Consumers need to send clear signals that such products are necessary to meet their expectations. Governments can support eco-design through their significant purchasing power as well as through setting a supporting policy framework. Industrial designers, and the institutions that train them, need knowledge and practice in eco-design.

Eco-design addresses the relation between a product and the environment. It means that the environment becomes a “co-pilot” in product development. In this process the environment is given the same status as more traditional industrial values, such as profit, functionality, aesthetics, ergonomics, image and overall quality. Eco-design implies that there is a need to balance ecological and economic requirement while developing products.

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18 For more information see: UNEP, Eco-design activities, http://www.uneptie.org/pc/sustain/design/design-subpage.htm and UNEP, Ecodesign – A promising approach to sustainable production and consumption, 1997
Eco-design therefore looks at the environmental aspects at all stages of the product development process to design products that make the lowest environmental impact throughout the product life cycle. Financially this means reduced waste generation and savings on waste disposal costs.

Eco-design can be an important strategy for small and medium sized companies both in developed and developing countries to improve the environmental performance of products and at the same time improve the competitive position on the market.

Other related terms include design for the environment, life cycle design and environmentally conscious design and manufacturing.

Eco-design checklists and guidebooks provide support for the qualitative environmental analysis by listing all the relevant questions that need to be asked when establishing environmental bottlenecks during the product life cycle.

The process of planning and design may involve:

1. Analyse the environmental product profile
   1.1. Analyse internal eco-design drivers
   1.2. Analyse external eco-design drivers
2. Generate improvement options
3.1. Study feasibility of the improvements options
3.2. Defining the eco-design implementation steps.

Three main improvement options for products (and services) can be identified as:

- **Product focus** – making existing products better and more resource efficient (eco-design applying life cycle thinking through Life Cycle Analysis (LCA), Material Flow Analysis (MFA) and Life Cycle Management (LCM);
- **Results focus** – producing the same outcome in different ways (sustainable enterprise and product innovation applying Cleaner Production (CP) and life cycle thinking through LCA, MFA and LCM;
- **Needs focus** – questioning the need fulfilled by the object-service system, and how it is achieved. The missing link in this tool conception– the need focus – is developed in the Product Service Systems that is described under strategies.

**Communicative Tools**

- **Consumer Communication and Marketing**

  The advertising sector (advertisers, advertising agencies & the media) can have a significant influence on consumers. Thus, by utilising its talents and communication skills the advertising sector can help shift consumption patterns towards sustainability because: companies play a key role in promoting sustainable products and services;

  19 For more information see: UNEP Advertising Forum,
  http://www.uneptie.org/pc/sustain/advertising/advertising.htm
governments/non-governmental organisations (considered as advertisers since they also develop ads) conduct campaigns that improve environmental protection and foster sustainable development;

advertising agencies inspire their client's communication strategies;

the media can increase awareness about sustainability issues;

within the advertising sector: stakeholders can focus on environmental management and ensure that their practices move towards energy efficiency, recycling and waste reduction.

First of all, there is a need to better understand the consumer. This might sound obvious, but the use of consumer research data by environmental policy makers, both at national and international level, is not very common. Advertising professionals use their findings to give the consumers what they already want. They know that it is very hard to convince people to buy something they do not want, so they look for “underlying driving factors” such as status, image, positive emotions and use those to promote their products. An example of this would be a well-known soft drink. It is sold everywhere to people who think they are “cool” and “modern” and a “world citizen” if they drink it. The company uses emotion rather than rationality as a sales tactic. The nutritional value or the taste of the drink might be less than any natural fruit juice. Advertising it has not identified all the reasons why you should drink it, it has just shown other happy people – the ones with whom one wants to identify. As contrast take the label of any organic drink or any environmentally product. It is full of factual information and may communicate “guilt” rather than “joy”. Advertisers know that guilt does not sell. It is one of the key lessons that cleaner production practitioners can, or at least be aware of.

The second area of work is to understand the driving forces behind consumption. A “Global Consumer Class” survey was conducted in co-operation with Consumers International, focusing on the middle class in major cities - an emerging group of consumers who share the same consumption patterns (they drink the same drinks, eat the same fast-food, use computers, e-mail, and chat for example). The goal was to identify whether they also shared the same dreams or ideals. If so, it would provide a platform upon which to build activities and campaigns. It also tested the growing awareness of consumers world-wide. It showed that the level of concern is quite high and more importantly – contradictory – consumers in developing countries are not less concerned, and on the contrary, they are very concerned. However, these driving forces do not always point into the same direction. A joint study done by McCann Ericksson - one of the world’s leading advertising agencies - and UNEP, shows that there exists a paradox in consumers’ ideals and their behaviours. Most people sincerely would like to end poverty, stop violence and racism and get rid of pollution. Everyone should be equal. Yet, at the same time, consumers generally prefer to dress in the nicest clothes, drive a great car, talk on the latest mobile phone and watch new DVDs. It seems that these objectives are clashing.

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20 This concept of the Global Consumer Class was lately adopted by the World Watch Institute: State of the World 2004 – The Consumer Society, 2004

21 UNEP/McCann-Erickson, “Can Sustainability Sell?”, 2002
• **Eco-labelling**

Products and services that meet established environmental criteria are allowed to use various official labels “eco-labels” for easier recognition. The eco-labelling scheme provides consumers and end-users with enhanced and more reliable information and also fosters the design, manufacturing, marketing, use and consumption of products and services that exceed existing mandatory environmental quality requirements. Examples could include: paper manufactured without the emission of organic chloride compounds, a washing machine with low water and energy consumption, or a refrigerator manufactured with recyclable component parts. Examples of eco-labels include the Blue Angel in Germany and the White Swan in the Nordic countries.

The status of the eco-labelling and product information at the international level is not coherent or widespread. At global level, including food and non-food products, there are 700 labels and 2000 green claims; of which only 17 of the green claims are part of a systematic eco-labelling scheme. They cover product categories ranging from laundry detergents, household cleaners, paints and varnishes, household paper, sanitary items, wood, textile, white domestic appliances, garden products to include also tourism, energy production or efficiency and services. ISO classified labels or indicators for environmental claims use three categories:

→ National Eco-labels (also called in ISO 14024 "Label Type I")
  Examples: EC Eco-label, Nordic Swan and Blue Angel.

→ Self-environmental declarations (also called in ISO 14021 "Label Type II")
  Examples: Ozone friendly label, Green dot and Animal cruelty free.

→ Indicators based on Life Cycle Assessments (also called in ISO/TR 14025 "Label Type III"). Only example: Environmental Product Declaration (EPD) promoted by the governments of Sweden, Norway, Italy, Canada, Korea and Japan, and companies such as Volvo and ABB.

Type-III claims consist of detailed quantified product information with a pre-set of life cycle impact parameters based on a study according to ISO 14040. The related Environmental Product Declarations have gained popularity as a tool especially for business-to-business communication and seems to have potential to be widely used by institutional buyers in their efforts for green procurement.

In general, for the communication to consumers, one overall environmental Type-I label based on a single indicator is considered to be the most effective option to influence consumer choices. However, consumers are likely to be interested in more detailed environmental information for durable goods such as cars or electronics for which a Type-III label might be provided and influence the purchase.

• **Supply chain management**

A company may have the opportunity to influence its suppliers to provide a product or service that has a reduced environmental impact. This is known as “supply chain

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22 For more information see: Global Ecolabelling Netwok, http://www.gen.gr.jp/
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23 For more information see: UNEP; Production and Consumption tools, http://www.unepie.org/pc/pc/tools/supplychain.htm
management.” Examples of supply chain management include screening suppliers for environmental performance, working collaboratively with them on green design initiatives, and providing training and information to build suppliers' environmental management capacity. In the United States, automobile manufacturers have already taken steps to “green” their supply chain by requiring their suppliers to meet certain environmental performance standards. Likewise, the WEEE Directive will require manufacturers of electronic equipment to meet certain environmental criteria in order to sell their products in the European Union.

- **Multi-stakeholder dialogue**

Generally this kind of tools promotes interaction between different groups to exchange ideas and positions. It has been widely used in the last decade to work on sustainability issues.

On the international level the World Business Council for Sustainable Development considers it as a very useful tool to *provide opportunities for major groups to share their concerns, experiences and proposals in specific areas and discuss them in detail with governments. Such exchanges help to promote meaningful participation among major groups and governments in the intergovernmental decision-making process.*

However this tool can be used from the international to the local level between every institutional or organizational setting to promote the dialogue with stakeholders. The recommendations to achieve good dialogues focus on these major topics:
- Define a thematic focus,
- Have rules for interaction before starting,
- Provide facilitation from outside,
- Come to clear objectives and
- Ensure follow-up.

**Policies and related Instruments**

Governments can use a wide range of policy tools to encourage companies to adopt more sustainable practices. These tools vary in their degree of aggressiveness, from compulsory requirements to voluntary initiatives. This section reviews four categories of policy instruments that can be used to encourage SCP: legal (enforcement-based), financial (incentive-oriented), social (voluntary), and internal (government-oriented).

- **Legal Instruments**

Legal instruments establish a framework for stakeholders to operate in society. They can help direct the actions taken to address issues with environmental impacts. In part they can pose mandatory requirements and sanctions for non-compliance. Potential legal instruments include: public procurement policies, consumer protection laws (including product standards and liability schemes), mandatory reporting/information disclosure requirements, and Extended Producer Responsibility (“EPR”) mechanisms. In addition

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through compliance and enforcement actions governments can highlight preferred strategies to meet requirements, which can include prevention-oriented approaches.

In general, consumer protection laws have been designed to minimize the possible risks to a consumer that might be associated with purchasing or using a product or service (product standards) and to provide a mechanism to compensate for any harm arising from such purchase or use (liability schemes). Traditionally, consumer protection schemes have not addressed the other risks that a product may pose (e.g., to the environment). Nor have they required disclosure of information about characteristics that are “invisible” in the final good (e.g., production process and waste management). In 1999, an international consortium of NGO’s sought to incorporate elements on sustainable consumption into the United Nations Guidelines for Consumer Protection, which is intended to help national governments develop appropriate policies and laws. These expanded Guidelines have the potential to help countries craft legal frameworks that promote sustainability. However, a global governmental study conducted by UNEP and Consumers International in 2002 determined that many countries are not aware of the sections of the Guidelines that pertain to sustainability.

Mandatory reporting/information disclosure schemes require companies to report on their use and/or release of chemicals. The Toxics Release Inventory in the United States is an example of a successful program that has brought a significant body of industrial chemical use data into the public eye. Other examples of government programs include Pollution Release and Transfer Registers in Canada, Australia and the UK; mandatory environmental reporting in Denmark; and the PROPER initiative in Indonesia.

Extended Producer Responsibility (EPR) is a policy approach in which producers accept significant responsibility - financial and/or physical - for the treatment or disposal of products. The extension of producer responsibility (EPR) to the post-consumer phase of a product gives governments a new policy option to address the growing problems of waste. The two distinguishing features of EPR policies are: the shifting of responsibility upstream to the producer, and the provision of incentives for producers to include environmental considerations in the design of their products. EPR aims at making environmental improvements throughout the life cycle of a product by making the manufacturer responsible for various aspects of the product's life cycle. This could include the take-back, recycling and final disposal of the product.

- **Financial Instruments**

  Currently, the market sends economic signals that favour unsustainable patterns (e.g., discarding and replacing products rather than repairing them). Governments can correct these market signals with financial incentives that help make the price structure for goods and services internalise the environmental costs and benefits associated with their production, use, and disposal. Financial instruments that can provide incentives to adopt more sustainable practices include: taxes and credits, subsidies, and tariffs.

  “Eco-tax” strategies are designed to encourage environmentally beneficial behaviour (e.g., development of renewable energy sources) or discourage practices with an adverse

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25 For more information: UNEP; Financing Cleaner Production, http://www.financingcp.org/
environmental impact (e.g., use of fossil fuels). There have been numerous successful examples of eco-tax strategies in industrially developed and developing countries. A drawback to an eco-tax strategy is its potential to cause producers to move to another jurisdiction with a different regulatory approach.

In theory, subsidies aim to increase the supply of a social good. In practice, subsidies on energy, agriculture, roads and water cause environmental (and social) harm. The global cost of these subsidies is estimated at $700-900 billion a year. Removing water subsidies would reduce world water use by 20-30% (up to 50% in parts of Asia).

Trade policies can prompt environmentally preferable changes. A prime example is the “greening” of the Indian textile industry in response to a German ban on azo dyes. In some cases, however, sovereign nations’ attempts to promote sustainability through their own regulatory schemes may be challenged as “covert protectionism” under international trade laws.

• Social Instruments

Social instruments are ones that the government can use to encourage voluntary action by the general public or by business and industry. Potential social instruments include: awareness raising campaigns, education and training initiatives, eco-labelling schemes, sector-based initiatives, and rewards for voluntary information disclosure.

General Public

Information is a potentially effective tool for empowering consumers to act in favour of the environment. Improved access to quality information can enhance public environmental awareness and give the public the opportunity to take account of environmental concerns in their everyday decisions.

There are several drawbacks to a strategy that relies too heavily on information provision, however. First, it is not clear to what extent information actually affects consumer behaviour. With regard to environmental actions, in particular, numerous studies have documented large gaps between knowledge and action. Second, in an age of Internet-enabled “information overload,” many people may be resistant to additional messages. Third, government are not always seen as credible providers of information. For many consumers, NGOs are a more credible channel of communication. Also eco-labels are intended to help consumers make environmentally aware choices.

Governments can promote the integration of sustainability into education and training in several ways. First, governments can educate the public through the use of hot lines, web sites, and software programs to help consumers and businesses measure their environmental impact. The drawback of this approach, however, is that it relies on citizens who possess the appropriate technology (telephone, computer) to display initiative in seeking out information. Second, governments can seek to integrate sustainability elements into school curricula and professional training. However, successful education for sustainable consumption is resource-intensive: it requires a “whole government” approach.
with cooperation among ministries, departments, agencies.\textsuperscript{26} Third, governments can convene or at least support roundtables and networks such as the sustainable consumption and production roundtables sponsored by UNEP.

\textit{Business and Industry}

Governments can also use information-based strategies to encourage voluntary action by business and industry. Examples of information-based strategies include: promoting the adoption of targeted, high-profile demonstration projects, to showcase the techniques and cost-saving opportunities associated with sustainable production and consumption; publishing and disseminating relevant case studies; and encouraging voluntary disclosure of information on environmental performance.

Sector-based initiatives allow governments to devote resources to industries with significant environmental impacts. They facilitate the dissemination of best practices and foster improvements in industry norms.

Programmes to encourage voluntary information disclosure are becoming more and more common. Some programs, such as the U.S.’ Environmental Performance Track, reward participating companies with improved public recognition, access to governmental technical assistance, and regulatory flexibility. Industry favors voluntary approaches because they provide more flexibility to the private sector than do other policy instruments such as taxes. However, the environmental effectiveness of the voluntary approaches is unclear, effective monitoring is often lacking, and transaction costs can be considerable.

- **Instruments for procurement**

  Instruments for procurement are ones that a government can use to promote sustainability by changing its own practices or policies. Such instruments include in particular sustainable public procurement.

  Procurement of governments, local authorities and other official institutions has an important influence in the economy. Sustainable Procurement (SP)\textsuperscript{27} enables government bodies a chance to create and promote a market demand for creating more sustainable goods and services.

  SP is the process in which organisations buy supplies or services by taking into account:
  \begin{itemize}
  \item the best value for money considerations such as, price, quality, availability, functionality, etc.
  \item environmental aspects, economic, and social aspects
  \item the entire life cycle of products.
  \end{itemize}

  Sustainable public procurement is a potentially powerful instrument to leverage change in markets because government spending accounts for approximately 15\% of consumption worldwide. The inclusion of sustainable development principles in procurement practices

\textsuperscript{26} OECD, Education and Learning for Sustainable Consumption, 1999
\textsuperscript{27} For more information see: UNEP, Sustainable Procurement Activities, http://www.uneptie.org/pc/sustain/design/green-proc.htm
is already a reality in a number of countries such as Canada, the Netherlands, Norway, United States and South Africa. The experiences in these countries indicate that incorporating sustainable production and consumption considerations into public purchasing is not only a viable option, but also helps to develop sustainable markets. Some barriers identified include: a lack of transparent, clear and homogeneous procurement procedures, the need to train purchasers; a resistance to change; and the lack of a clear "sustainable product" definition.

- Integrated policies

Integrated Product Policy (IPP)\(^{28}\) is a policy that is developing primarily in the European Union. IPP combines Life Cycle Thinking from the cradle to the grave and relies on working with the market. The idea is to move the market to be more “sustainable” by encouraging the supply and the demand of “greener” products. IPP encourages the involvement of stakeholders on all life cycle stages of the product. IPP is based upon the concept of continuous improvement and uses a variety of policy instruments to reach the variety of products, services and different stakeholders to be considered. In the communication from 2003 that describes IPP is stated that LCAs provide the best framework for assessing the potential environmental impacts of products currently available.

The related Europeans Commission's Communications 'Towards a Thematic Strategy on the Sustainable Use of Natural Resources'\(^ {29}\) and 'Waste prevention and recycling strategy' provide further description about an integrated approach to resource use and waste management in relation to IPP. All these initiatives focus on the environmental impacts across the life cycle of products, services and materials, so as to reduce pollution, facilitate recycling whenever economically justified, and reduce the costs of waste disposal.

On a national level progress has been made as well. For example, Japan published a basic plan whose purpose is to promote comprehensive and systematic policies for establishing a recycling-based society. A recycling-based society is one in which the consumption of natural resources is at a low level and the environmental load is low as possible through the use of recycling. Furthermore, the plan is a ten-year programme aimed at changing unsustainable patterns of production and consumption into more sustainable ones responding therefore to the recommendation from the WSSD plan of implementation.

For households, governments can design a package of different instruments including deposit-refund schemes, recycling systems (including the development of technology and infrastructure), taxes in disposable products and packaging, providing information, raising environmental awareness and supporting initiatives on green purchasing.

**Key messages**

To recapitulate the key messages of this section:

- A life cycle perspective is needed;

\(^{29}\) EC, Natural resources strategy, http://europa.eu.int/comm/environment/natres/
This does not mean that CPC’s should expand their work to do everything related to sustainable consumption. For “pure” sustainable consumption (addressing the volume aspect, promoting non-material ways of quality of life etc.) governments and non-governmental organisations are the key stakeholders for action;

A key role for CPC’s is to engage themselves in an integrated approach of consumption and production as a natural extension of the original Cleaner Production mandate; and

CPC’s are well placed to help business to better design, produce and sell cleaner products and grasp innovation opportunities.
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