
PART III:

APFED RECOMMENDATIONS

The Asia-Pacific region has enjoyed more economic growth than the rest of the world in the past decades. However, the wealth has not been equally distributed and a large number of people are still very poor. Already natural resources that have supported economic growth in the region have been over-exploited, and industrial pollution has got to the stage in some parts of the region where it threatens the everyday life of people, as reported in Part I of this report. Increasing pressure on the natural resources of the region and the consequent environmental problems have become serious constraints to sustainable development in the region. Globalisation of economies, trade and information is already well under way. Although globalisation continues to be the driving force for the rapid economic growth of the region, it could potentially bring about adverse effects to society. If appropriate measures are not taken in time, the expected growth in population and the economy will inevitably worsen living conditions and the environment.

To counter such a negative trend and render the development path truly sustainable for the region, various proactive steps should be considered now. Promotion of environmental conservation as an essential pillar of sustainable development is the basis for such steps, and sound partnership among stakeholders complements efforts for sustainability. Proper attention has to be paid to important social concerns such as employment, poverty, medical care and education, as they constitute essential elements for sustainable development. Only a comprehensive approach in which social, economic and environmental aspects are addressed in an integrated manner will enable a sound step forward in the right direction to realise sustainable societies in the Asia-Pacific region.

This basic understanding, which has been elaborated on in Part I and II of this report has caused APFED to put together the following recommendations in three groups. The first set is cross-sectoral in nature, with recommendations considered essential for advancing an integrated approach to environmental conservation. The second group contains recommendations for strengthening each role of major stakeholders as well as for facilitating partnerships. The third group of recommendations promotes an integrated approach in the five sectors that APFED considers critical for the sustainable future of the region, namely freshwater resources; marine and coastal resources; energy and air; land use management including urbanisation, rural development and forest conservation; and chemical issues.

Each individual section has two parts, namely overview and recommendations. The overview is intended to be comprehensive, trying to set out the broad context within which a set of APFED recommendations are developed. At the end of the overview part of each section, a figure is presented to elucidate specific areas that an individual recommendation has addressed, and the inter-relationship among all recommendations contained in the section. The APFED recommendations in each section are always presented after the overview part. Unlike the overview, APFED recommendations are intended to be selective, focusing on key areas considered essential for the promotion of sustainable development in the region.

APFED recommendations are essentially of two types. The first type applies to the regional or subregional level. These underpin APFED's attempt to propose ways towards sustainable development for the region as a whole. The second type addresses important sustainability issues common to many countries in the region. Those recommendations are, therefore, either at the national level or at the local level.

The recommendations are presented in specific and concrete terms to the extent possible, drawing upon innovative policies and practices already initiated in this region. In this respect, attention is drawn to various activities being implemented in the region by the international organisations concerned. A matrix of such activities prepared by UNDP is included in the Appendix of this report for information. Some of the proposed recommendations may seem unachievable in light of current socio-economic conditions, but it is our hope that these recommendations will trigger constructive discussions among stakeholders at all levels in the region, overcoming differences among countries and/or organisations concerned, keeping in mind the broader and longer-term picture for the Asia-Pacific region. The core messages underlying the recommendations are

most important, and the specifics of each recommendation can be improved progressively through stakeholder discussions.

Regarding implementation, APFED recognises the need for further discussions among various stakeholders, and for demonstration projects to prove the effectiveness of the new policies, technologies, capacity building and other social initiatives. APFED is neither an implementing nor a financing body. Keeping this in mind, an APFED Action Platform is attached to this report. It aims at devising a mechanism, by which the APFED recommendations are discussed further among key stakeholders in the region, piloted to examine their feasibility, and applied over the long-term throughout the region.

1. RECOMMENDATIONS FOR INTEGRATED APPROACHES TO SUSTAINABLE DEVELOPMENT

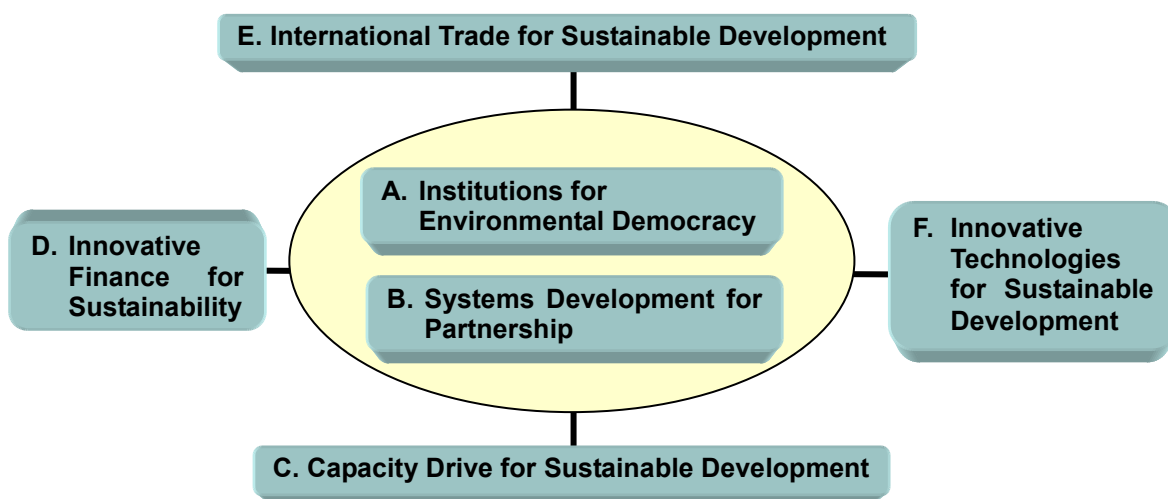
Environmental conservation is one of the three pillars of sustainable development. Before this concept was proposed by the World Commission on Environment and Development in 1989, environmental problems were treated as a technical issue handled in many cases by a separate environmental body within a government. The focus of environmental policies in those days was standard setting, end-of-pipe technology development, and policing to ensure compliance. New environmental policies emerging in the context of sustainable development are different in many respects. They are more an integral part of economic and social policies, basically incentive-based rather than forcing particular action, more participatory than technical, and more international than local.

Although framework environmental laws based on sustainable development concepts have been introduced in many countries in the region, development of environmental policies as an indispensable element of sustainable development is still rudimentary. Recommendations in this chapter focus upon measures to promote this new breed of environmental policy in the region. Reflecting the features of new environmental policies, recommendations centre on (i) provision of incentives, (ii) promotion of stakeholder participation, and (iii) an intensified focus on trans-boundary issues.

While recommendations regarding integration of environmental policies into developmental sectors are discussed in Chapter 3, this chapter proposes measures intended to promote consistent and efficient implementation of cross-sectoral environmental policies. They are meant to strengthen the environmental foundations of the region, upon which various sectoral policies can then be formulated and implemented.

The recommendations are categorised into six sections, namely institution building, systems development, capacity building, finance, trade, and technologies (Figure 22). They constitute key cross-cutting areas to underpin various efforts to promote sustainable development.

Figure 22: Integrated Approach to Sustainable Development



A. Institutions for Environmental Democracy

A.1 Overview

Most countries in the Asia-Pacific region have adopted some form of framework law on the environment, and established environmental agencies and ministries at the national level. These were initially developed under a highly centralised system of governance. Although implementation of national laws and policies has been generally weak in the developing countries in the region, an encouraging trend in recent years has been a shift to decentralised and participatory environmental institutions. Promotion of community participation, decentralisation of administration, integration of national and local decision-making processes, and involvement of NGOs and the private sector in policy making are some of the key changes taking place across the region⁸⁴. The judiciary in some countries of the region has responded well to public interest litigation initiatives and in playing an active role in promoting sustainable development.

One feature of institutional development in the region is the growing number of environmental actors, instead of only national governments. For example, participation of various stakeholders in the formulation of sustainable development policies has increased since the Rio Summit in 1992, and National Commissions of Sustainable Development (NCSs) have been established in many countries. Prior to WSSD, interactions among NCSs took place at the subregional and regional levels. Such a network was helpful in developing documents submitted to WSSD. However, the plurality of environmental governance processes combined with the increasing number of stakeholders could be a source of new challenges to the structure of environmental policy making. Efficient information flow among the various stakeholders and better coordination are needed to avoid conflict or duplication of initiatives.

Decentralisation has been promoted as part of an overall devolution of central government responsibilities to local governments, but also reflects the local nature of many environmental challenges, both in their root causes and impacts. Community-based initiatives and micro-projects have emerged for management of natural resources and the environment. New modalities of governance such as co-management between government and local communities have flourished in natural resource management sectors such as forestry and biodiversity. It is clear that the sub-national level is the most appropriate level for policy integration because it is small enough to understand the ecosystem linkages but large enough to command the resources to make the necessary changes. Given the dependence of local communities on natural resources, their involvement in the management of local resources is considered essential, provided they are given the tools and resources to match their responsibilities. Accordingly, greater transparency, participation in decision-making, proper revenue-sharing and accountability would contribute to furthering environmental democracy in the region.

APFED would go further and suggest that, in addition, strong sub-national processes should explore and build on the region's diversity. Institutional evolution is a long and steady process and needs a core driving mechanism. The core mechanism proposed here is aimed at identifying, sustaining and promoting endogenous sustainable development initiatives for the region.

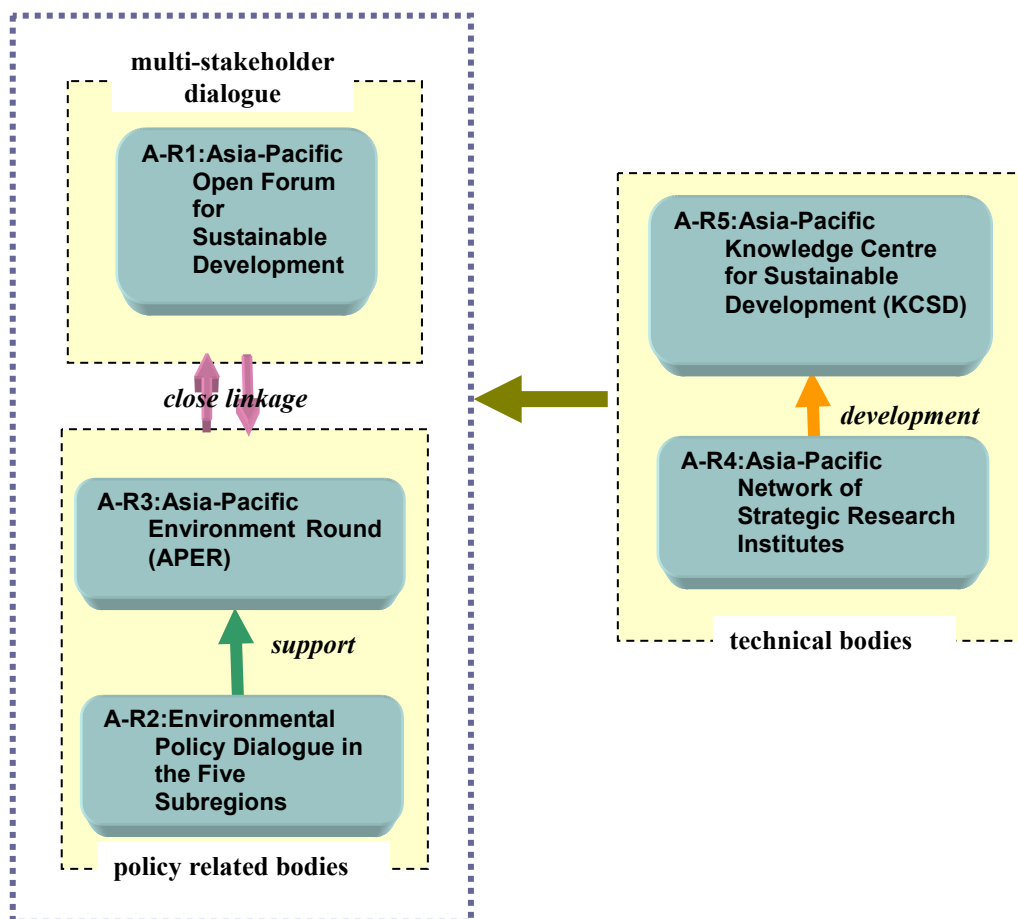
In the following section, new regional and subregional environmental institutions are proposed to enhance environmental governance in the Asia-Pacific region in a manner compatible with the plurality of environmental actors and the myriad of initiatives at the national, sub-national and regional levels. Strengthened multilateral consultations are considered an important first step towards realising the recommendations below. The gradual establishment of loose regional and subregional environmental frameworks is proposed, drawing on past initiatives in the region.

The framework would be composed of three layers of institutions (Figure 23): (i) a multi-stakeholder open forum, supported by specific institutions proposed for the remaining two layers, namely (ii) policy-related bodies, and (iii) technical bodies. The multi-stakeholder forum would set the agenda for the region based on consensus through dialogue. A strengthened regional network of NCSs would be ideal for this purpose. More focussed discussions would be expected in the two specialised institutions, policy and technical, working in a coordinated fashion to address issues identified by the open forum. The policy institutions would be referred to as the Asia-Pacific Environment Round, supported by Environmental Policy Dialogues

⁸⁴ UN-ESCAP and ADB, 2000. SoE 2000

in the five subregions. The technical institutions are: (i) the Asia-Pacific Knowledge Centre for Sustainable Development, based upon (ii) a network of strategic policy research institutes.

Figure 23: Institutions for Environmental Democracy



A.2 Recommendations

Multi-Stakeholder Dialogues

A-R1. Asia-Pacific Open Forum for Sustainable Development

Sustainable development cannot be successfully promoted without collaboration among various stakeholders. The basis for this multi-stakeholder dialogue was initiated in developing the region’s input into WSSD. To address increasing trans-boundary environmental issues, stakeholder dialogues in each subregion should be strengthened as a first step. The environmental and other commonalities shared by each subregion justify this approach. Again, such a subregional approach was adopted during the WSSD process. Five subregional meetings were held, prior to the region-wide meeting for Asia and the Pacific held in Cambodia. Reinforcing existing mechanisms with more thorough participation of stakeholders is more important than reinventing any new mechanism.

The forum would first network the NCSOs already established in the region. The forum should be open to all stakeholders, such as NGOs, community groups, groups representing women, youth, the elderly, minority peoples, as well as the private sector, in addition to the public sector, including local and national governments and international organisations. To complement regional multi-stakeholder dialogues, regional networking of major stakeholders such as business

associations and NGOs should be also promoted.

The forum's main purpose would be to set the priority agenda for sustainable development of the region, taking into account the rotating priority topics to be addressed by the CSD process. The forum would also be an effective vehicle to encourage voluntary initiatives and to jointly monitor progress on commitments made by various stakeholders.

The network secretariat could be on a rotational basis, with one NCSO taking responsibility as the rotating secretariat for a two-year period. The network would meet formally once every two years, but discussions would be continued between sessions through electronic means. Participation in the forum would be kept flexible and possibly expanded according to the issues being deliberated on, so that all key actors could participate in the discussions.

Furthermore, it could be useful to start communications with other developing regions in the world. Cross-fertilisation of ideas can be expected through exchanging ideas and experiences on how sustainable development can be furthered within different political, economic and social contexts.

Policy Institutions

A-R2. Environmental Policy Dialogues in the Five Subregions

ASEAN and the Pacific Island States have developed mechanisms for regular high-level policy dialogues. These mechanisms have proved effective in working out common environmental policies and subregional action plans. However, given the growing needs for trans-boundary environmental action, existing mechanisms need to be further strengthened. In South Asia, policy dialogues coordinated by SACEP should be reinforced to discuss trans-boundary issues such as atmospheric brown clouds, which require joint national actions. In Northeast Asia, annual TEMM policy talks have generated a few encouraging initiatives addressing trans-boundary environmental issues, as exemplified by action taken to address the dust and sand storm issue. In light of this positive experience, TEMM could be expanded to include other countries such as Mongolia. In Central Asia, the development of a partnership agreement on sustainable development could be an opportunity to start regular high-level policy discussions.

UNEP has already taken action to strengthen policy dialogues at the subregional level (Box 12). Strengthened policy dialogue at the subregional level will certainly contribute to activating policy discussions at the regional level. As concrete results are generated, the impetus to regularise regional-level policy dialogue will be reinforced. Once this happens, the Asian-Pacific Environment Round proposed below could be activated.

Box 12: UNEP's Subregional Environment Policy Dialogue in the Asia-Pacific Region

In September 2003, UNEP initiated a Subregional Environment Policy Dialogue (SEPD) for the five subregions of the Asia-Pacific region. As a response to one of the WSSD outcomes, the importance of regional implementation through partnerships between governments and civil society, SEPD includes (i) a forum for consolidated Asia-Pacific views on global issues; (ii) provision of regional inputs to global events, (iii) advice to UNEP on critical emerging environmental issues and policy guidance for effective implementation of UNEP's programmes.

SEPD consists of five ministers and five eminent persons including those from the private sector. The first outcome of SEPD was its contribution to the Global Ministerial Environment Forum held in Jeju, Republic of Korea in March 2004.

Source: UNEP/ROAP

A-R3. Asia-Pacific Environment Round

Although other regions such as Europe and Africa have an inter-governmental body such as the Environmental Directorate of EU, the Asia-Pacific region does not have such a structure. This may reflect the diversity of the region in terms of politics, culture, religion, and nature. However, the envisaged future of this region makes it clear that enhanced coordination will be essential to cope with emerging regional and subregional environmental issues.

The Asia-Pacific Environment Round (APER) would consist of a series of regular policy dialogues involving governments and relevant international bodies. The goal would be to promote region-wide programmes to strengthen environmental governance and to address common environmental policies, thereby contributing to sustainable development. Each round could be limited to a two to three-year period with clear objectives and timelines. APER should be linked to existing high-level meetings in the region, such as the regular ministerial policy dialogues in each subregion, and the Ministerial Conference on Environment and Development, held every five years. The participants would decide on which issues should be resolved in the current round, determine strategic proposals to address these issues, and set an achievable time frame. As a high-level political forum, APER would also serve as an informal mechanism for conflict resolution with regard to trade-offs on competing uses of environmental resources as well as conflicts between the environment and other policy areas. APER would be organised to maximise cross-fertilisation and mutual cooperation with the private sector and NGOs through a close linkage with the Asia-Pacific Open Forum for Sustainable Development proposed above.

Technical Institutions

A-R4. Asia-Pacific Network of Strategic Research Institutes

To promote sustainable development in the region new initiatives are needed constantly, taking into consideration rapidly changing socio-economic situations. A network of strategic research institutes (NetRes) in the region, set up under the APFED process could lay the foundations for this network. If effective in providing the scientific groundwork on the Asia-Pacific sustainability agenda raised by the political forums discussed above, the network could be further reinforced. One possibility is that NetRes could be developed into the Asia-Pacific Knowledge Centre proposed below.

As most countries in the region already produce State of the Environment (SoE) reports, many companies are producing annual environmental reports, and substantial research has been conducted on environment and sustainable development issues, one of the first activities of NetRes could be to prepare a synthesis report trying to identify environmental priorities for the region in a bottom-up manner. Regularly bringing impending regional issues more clearly to the attention of the world, such a report could be developed into a series on “Asia-Pacific Priorities for Sustainable Development” proposed in the next section, i.e., “B. System Development for Partnership”.

A-R5. Asia-Pacific Knowledge Centre for Sustainable Development

Contemporary environmental policy development has to be supported by scientific knowledge and strategic thinking. Complex environmental problems such as climate change, biodiversity, acid rain and other trans-boundary issues that are emerging as policy priorities, are an indication of the knowledge requirement of modern environmental policy making. Sound policy development is intensely knowledge-based, demanding proper understanding of environmental conditions, objective assessment of risks, and framing of appropriate mechanisms to tackle such problems.

In keeping with this requirement of knowledge for policy formulation, a new Knowledge Centre for Sustainable Development (KCSO) should be put in place by enhancing and strengthening the existing system. KCSO should function as a body incorporating the ‘wisdom’ of the region. The centre would systematically accommodate in its database knowledge and information essential for promoting sustainable development in the region. As a technical centre, KCSO would be expected to complement discussions at the Multi-Stakeholder Open Forum and deliberations by the regional and subregional policy bodies proposed above. A similar role has been played by the European Environment Agency for the European Union (Box 13).

KCSO’s responsibilities would include preparing sustainable development indicators, collecting data,

assisting in the preparation of national SoE reports, preparing environmental statistics for the region, introducing environmental accounting, documenting and promoting local indigenous knowledge, and collecting and updating “best practices.” It could technically support development of strategic environmental policies for the region, and help prepare drafts for participatory regional and subregional environmental agreements. KCSD’s priority focal areas could include information on each environmental medium (i.e., air, water, land and nature), eco-products and green consumerism, bio-safety and bio-prospecting, trade and environment related issues, and cleaner production technologies. While maintaining a focus on environmental issues, KCSD would also provide advice on non-environmental questions of relevance to sustainable development.

Box 13: The European Environment Agency

The European Environment Agency (EEA) was set up by the European Union with the task of providing decision-makers with the information needed for making sound and effective policies to protect the environment and support sustainable development. The EEA does not make nor enforce European Union environment policy or legislation: this is the responsibility of the European Commission and the other EU institutions.

The information provided by the EEA focuses in particular on assessing the current and future state of the environment across Europe and the pressures upon it. This Agency also disseminates best practice in environmental protection and technologies, and supports the European Commission in diffusing information on the results of environmental research.

The Agency both gathers and distributes its data and information through the European Environment Information and Observation Network (EIONET), which brings together over 300 environmental bodies, agencies, public and private research centres, and centres of expertise across Europe. The EEA is responsible for coordinating the EIONET.

Source: European Environment Agency: <http://www.eea.eu.int/>

Considering the diversity of the Asia-Pacific region, KCSD should be linked to “nodal centres of excellence,” to be set up or designated among existing institutes in each subregion or country. Nodal centres would assist KCSD in each subregion or country through networking and collaboration. KCSD’s networking should be flexible and open to all capable research institutes interested in the region.

B. Systems Development for Partnership

B.1 Overview

The strengthened regional institutional framework suggested above would be made operational through the development of a number of systems as proposed below. Basically the overarching goal of the proposed systems is to meet goal seven of the Millennium Development Goals: ensuring environmental sustainability. The proposed systems are not intended to be comprehensive, but selective in addressing key areas for sustainable development in the region, and listed according to the major institutional structures discussed in the above section, namely, the Asia-Pacific Open Forum for Sustainable Development, the Asia-Pacific Environment Round (APER), and the Knowledge Centre for Sustainable Development (KCSD) (Figure 24). The following proposals are developed around the principles of being participatory, voluntary, incentive-based, and results-oriented.

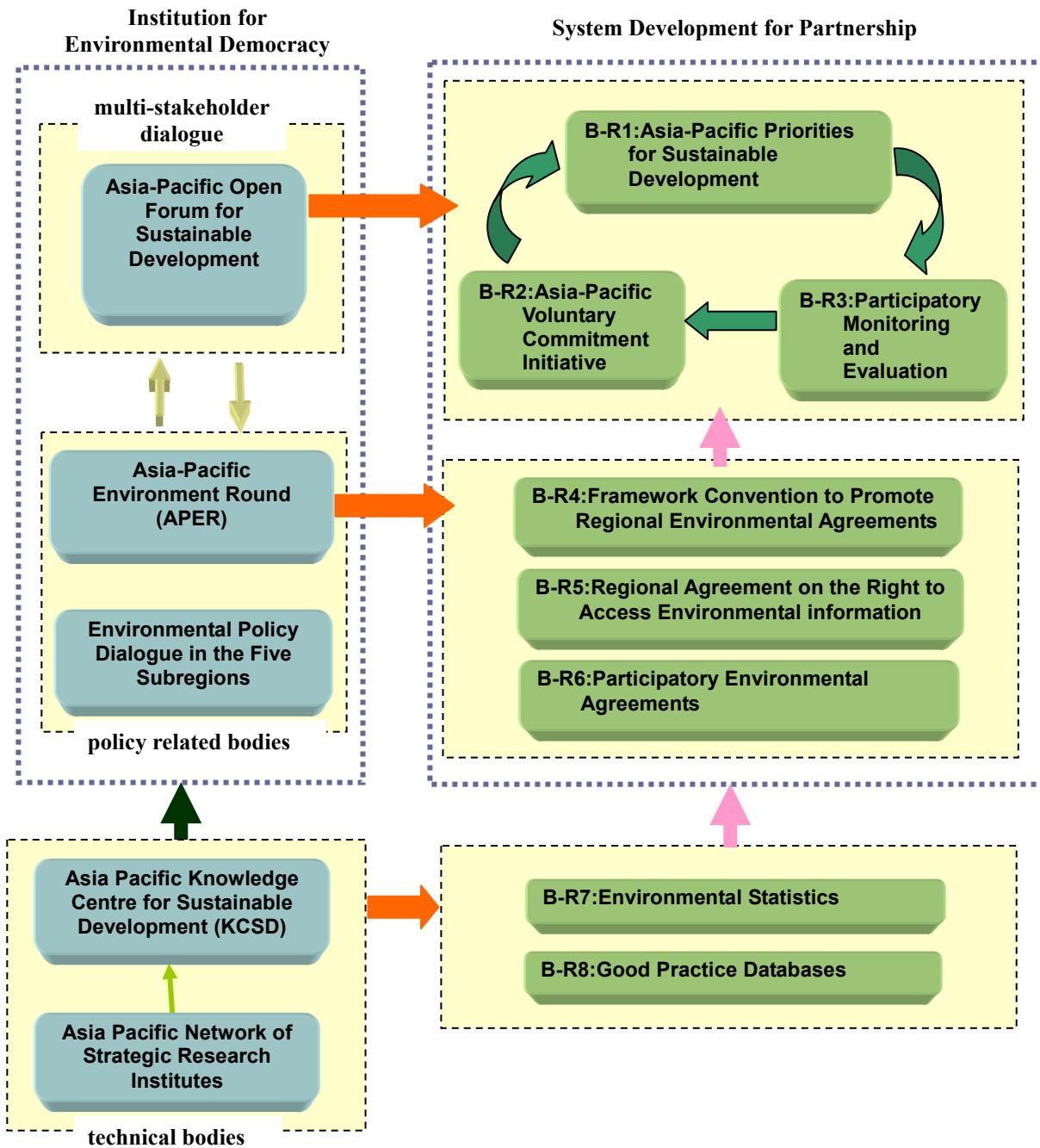
As the Asia-Pacific Open Forum is expected to set the priority agenda for sustainable development and to

encourage voluntary initiatives, the following activities could be considered: (i) Preparation of the Asia-Pacific Priorities for Sustainable Development, (ii) the Asia-Pacific Voluntary Commitment Initiative, and (iii) Participatory Monitoring and Evaluation.

The goals of APER would be to promote region-wide policies and programmes for improved environmental management. As public sector agencies should be basically catalytic and their focus should be to provide an enabling framework within which various stakeholders can function, the top priority of APER should be to build a solid foundation upon which trans-boundary environmental agreements could be developed. There are two specific suggestions in this regard: (i) the development of a framework convention for regional environmental agreements, and (ii) a regional agreement on the right of access to environmental information. More importantly, any future environmental agreement in the region should provide for increased stakeholder participation, as the United Nations Secretary General's report to CSD 12 noted that participation was the weakest part of implementation of Agenda 21 in the Asia-Pacific region.

From the responsibilities of KCSD stated above, additional recommendations cover the two most important activities: environmental statistics and good practice databases. These outputs of KCSD would be the basis upon which innovative policies should be developed in a timely manner.

Figure 24: Systems Development for Partnership



B.2 Recommendations

Initiatives for the Asia-Pacific Open Forum for Sustainable Development

B-R1. Asia-Pacific Priorities for Sustainable Development

The Open Forum, supported technically by KCSD, would prepare the Asia-Pacific Priorities for Sustainable Development (APPSD). APPSD would be the basic agenda-setting activity for the region (i) to continuously identify priority issues, (ii) to stimulate policy discussions on priority issues, and (iii) to provide regional inputs to global agenda setting. The APPSD process should be open to all stakeholders in the region, and a series of multi-stakeholder meetings would be held to elicit various views and opinions. KCSD could provide assistance, if necessary, to hold expert meetings to make specific technical inputs.

Each volume of APPSD should have a focus. The first volume could examine, for example, globalisation and sustainability, to be followed by volumes on renewable energy and freshwater resources. If APPSD's focus followed the rotating focus of the CSD reporting process it would be most effective. The report should not be limited to compilation of statistics but should instead address priority issues and make policy recommendations. The policy recommendations would be more persuasive if they were based on observations of participatory evaluation mentioned below. They would be even more effective if focused on actual performance and implementation, rather than intentions. In this sense, environmental performance-ranking among countries, companies and cities could be an interesting agenda item for APPSD to take up.

B-R2. Asia-Pacific Voluntary Commitment Initiative

The Asia-Pacific Voluntary Commitment Initiative (APVCI) would be a participatory and bottom-up approach to stimulate voluntary commitments to sustainable development by regional stakeholders. The APVCI would be a registry of specific actions to be undertaken by stakeholders, in essence a regional version of the Type II partnerships introduced during the WSSD process, or the United Nations Global Compact Initiative elaborated below. The registry would have selection criteria based on fundamental sustainability principles, taking into account important features of the region. The criteria would be regularly updated so that lessons learned from the preceding projects could be better incorporated into upcoming projects. Time-bound goals and milestones would be specified, and regular monitoring would need to be conducted to ensure progress.

A modest incentive scheme should be considered to fully exploit the potential of the registration system. An incentive may be important, since (i) the proposed scheme is mostly for developing countries, and (ii) so far only about 50 Type II initiatives are from this region out of the world total of 266 partnerships registered. A modest financial facility would provide seed money for innovative initiatives in the region. Even a non-monetary award for best practices may encourage stakeholders to propose excellent ideas and practices. Lesson-sharing, production of dissemination materials, and knowledge-sharing workshops would generate innovative solutions, through a virtual learning cycle.

Box 14: United Nations Global Compact

At the World Economic Forum on 31 January 1999, United Nations Secretary-General Kofi Annan proposed a Global Compact. As an international voluntary initiative, the Global Compact would bring companies together with United Nations agencies, labour and civil society to contribute to development of a sustainable and comprehensive global market. The Global Compact's operational phase was launched at United Nations Headquarters in New York on 26 July 2000. Today hundreds of companies from all regions of the world as well as civil society organisations are engaged in the Global Compact. To join the initiative, companies are required to support ten principles in the areas of human rights, labour, corruption and the environment. The Global Compact aims to create a cooperative relationship between companies and civil society for the development of a sustainable global market, which will contribute to poverty alleviation. To achieve this goal, there are four major mechanisms: Policy Dialogues, Learning, Local Structures and Projects.

Source: <http://www.unglobalcompact.org/Portal>

B-R3. Participatory Monitoring and Evaluation

World focus has now shifted from discussion to implementation. Thus, measures to evaluate actual progress against established goals and plans are more important than before. To that end, every agreement, programme, and project should be subject to transparent and participatory monitoring and evaluation. Evaluation results should be made available even in the draft stage to all stakeholders to solicit their views and opinions. All stakeholders, no matter how critical, should be involved in the evaluation process so that their differing views will be systematically collected and reflected in the evaluation. APVCI could be a good mechanism to promote participatory evaluation as a lesson-learning exercise.

Advanced technologies such as remote sensing and geographic information systems (GIS) should be used, whenever applicable, to obtain objective evidence. Evaluation findings should be used not to criticise those involved, but rather to encourage them to re-adjust projects and programmes for further improvement. The Global Forest Watch initiative being implemented by the World Resources Institute provides a good example (Box 15).

Box 15: WRI Global Forest Watch Initiative

Global Forest Watch (GFW), an initiative of the World Resources Institute, is an international data and mapping network that combines on-the-ground knowledge with digital technology to provide accurate information about the world's forests. Its goal is to infuse transparency and accountability into decision-making processes that determine how forests are managed and for whom.

The initiative is based on the conviction that forest degradation would be significantly slowed around the world if governments and industry actually implemented commitments they have made—nationally and internationally—to manage and protect their forests. By applying a unique combination of satellite imagery, geographic information system, mapping software, the Internet and on-the-ground observation, GFW provides the general public with a clearer picture of threats to the world's forests.

GFW addresses the perennial problem of the lack of transparency and blocked access to information about the world's forests. Its five-year programme promulgates international networking spanning twenty-one countries, covering 80% of the world's remaining intact forests.

Source: <http://www.globalforestwatch.org/>

Initiatives for the Asia-Pacific Environment Round

B-R4. Framework Convention to Promote Regional Environmental Agreements

The Asia-Pacific region has many environmental issues that require joint efforts by more than one country. These include (i) acid rain, and dust and sand storms in Northeast Asia; (ii) trans-boundary haze in Southeast Asia; (iii) conservation of regional seas and international rivers; (iv) protection of migratory animals; (v) promotion of trans-boundary nature reserves; and (vi) strict regulations governing the movement of hazardous wastes across national borders. As the overall pressure on the environment continues to increase in the region, more trans-boundary problems are likely to emerge in future, which will in turn necessitate more regional environmental agreements.

Many environmental problems of a trans-boundary nature feature cross linkages either in their root cause, their impact or the way in which they should be addressed. This inter-relationship among trans-boundary environmental problems makes a strong case for an integrated approach to policy responses. A new approach to concluding environmental agreements is therefore proposed to optimise resource use and create mutually-supportive mechanisms to address different but related environmental problems facing the region.

A framework agreement would address major issues common to all trans-boundary environmental problems by working out a sound basis upon which all stakeholders could take proactive action, as new problems emerge. Such a framework agreement would define common and specific responsibilities of stakeholders, including business and civil society. The principle of differentiated but common responsibility would be a major element in allocating functional responsibilities among countries and subregions.

B-R5. Regional Agreement on the Right to Access Environmental Information

Environmental democracy requires stakeholder participation in complicated trans-boundary issues. Such participation is only possible when stakeholders are granted access to environmental information, and the rights to participate in environmental decision-making and to access the judicial

system. In European countries, the Aarhus Convention developed by the United Nations Economic Commission for Europe (UNECE) provides these rights (Box 16). The Aarhus Convention represents a challenging example of real progress towards a global understanding of what the rights of access are, and how they can be manifested in national laws and practices. Despite some reservations from certain countries, there is growing interest in endorsing the Aarhus principles in other parts of the world. Therefore, an agreement similar to the Aarhus Convention is proposed for the Asia-Pacific region.

Few countries in the region have fully developed a system comparable to that advocated by the Convention. While diversity in terms of politics, culture, history, and religion could make it difficult for the region to introduce such a convention in the immediate future, a gradual shift in that direction is possible. After all, the region's largest resource for promoting sustainable development is human resources, which can be drawn upon only through active participation. The basic rights prescribed by the Aarhus Convention are essential, in that respect.

It is also important to note that the Convention specifically refers to "access to justice." Given the increasing need to resolve environment-related conflicts in a swift and equitable manner, some encouraging initiatives have been taken by South Asian countries (see "*National Mechanisms and Initiatives*" on p.45-47). Indeed, judicial institutions should take an active role, where appropriate, in promoting participatory decision making for sustainable development.

Box 16: The Aarhus Convention

The United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters Convention (the Aarhus Convention) is an environmental treaty that turns the principles of access into specific legal obligations. Since its adoption in 1998, 24 nations in Europe and Central Asia have become parties to the convention, and 40 have signed it. It entered into force in October 2001, and is now open to signature by all nations of the world. The Aarhus Convention establishes a number of rights of the public (citizens and their associations) with regard to the environment. Public authorities (at the national, regional or local levels) are to contribute to allowing these rights to become effective. The Convention provides for:

"Access to environmental information": the right of everyone to receive environmental information held by public authorities. This can include information on the state of the environment, policies or measures taken, or the state of human health and safety where this can be affected by the state of the environment. Citizens are entitled to obtain such information within one month of the request and without having to say why they require it. Public authorities are obliged to actively disseminate environmental information in their possession.

"Public participation in environmental decision-making": the right to participate from an early stage in environmental decision-making, which includes citizens and environmental organisations to comment on, for example, development proposals affecting the environment, or plans and programmes relating to the environment. These comments must be taken into due account in decision-making, and information provided on the final decision and the reasons for the decision need to be provided.

"Access to justice": the right to challenge, in a court of law, public decisions that have been made without respecting the two aforementioned rights or environmental laws in general.

Source: <http://www.unece.org/env/pp/>

B-R6. Participatory Environmental Agreements

Based on the framework agreement and the definition of commonalities and particularities of trans-boundary environmental problems in the region, issue-specific environmental agreements

should be developed. The agreements should set detailed mechanisms for addressing target environmental problems, with timelines and necessary financial and human resources to be allocated.

The issue-specific environmental agreements should have two new features: participation and results-orientation. Future environmental agreements should be open to all stakeholders. They should provide a framework within which key stakeholders could play their own roles to achieve the goals and objectives of the agreement. Participation of non-state stakeholders as observers in negotiation, implementation, and evaluation will make government commitments more solid. Each agreement should have quantitative objectives, whenever possible, timelines for implementation, and a mechanism for regular monitoring of progress. Without these, progress cannot be regularly monitored, nor can problems be addressed in a timely fashion.

Initiatives for the Asia-Pacific Knowledge Centre for Sustainable Development

B-R7. Environmental Statistics

Consistent and accurate data and information related to the environment are essential to comprehend the seriousness of problems, to assess the progress of counter-measures, and to develop appropriate policies. Environmental statistics are most useful if presented, using quantitative indicators, in a manner linked to policy objectives including facilitation of securing funds from international organisations. It cannot be over-emphasised that without trustworthy statistics no policies can be implemented in a consistent and flexible manner. Collection of statistics should be undertaken periodically over many years, so that long-term gradual change can be detected. Common indicators as well as harmonised measurement techniques and methodologies must be developed so that international comparisons are practicable.

Modern technologies, such as remote sensing and Geographic Information Systems (GIS), should be fully used, as they often provide the most cost-effective and accurate information. SoE reports prepared by almost all countries in the region regularly compile available environmental information. SoE reports should be collected, data and information systematically stored, and general trends over time or differences among areas analysed. Thematic assessments prepared by international organisations and government agencies, such as the Millennium Ecosystem Assessment and the Global International Waters Assessment, are a third source of information. Environmental statistics should be presented electronically through the Internet, but in other forms as well so that anyone can have easy access.

Data networks should be strengthened, with national focal points for environmental statistics appointed. Further standardisation of data and information should be promoted, and objective international comparisons should be made possible. Capacity building for national staff involved in environmental statistics is also important (Box 17).

Most of the reporting of regional environmental statistics has been undertaken by international organisations such as UNEP and UN-ESCAP. Improved usability, accessibility and objectivity of data and information are needed not only for governments but also for the private sector and civil society. If environmental statistics become one of its core functions, KCSD could complement what has been already done by these international organisations. It can expand the scope of data sources, involve more stakeholders, and increase objectivity of data and information, with a view to enhancing the trustworthiness of the environmental statistics of the region.

**Box 17: Institutional Strengthening and Collection of Environment Statistics
in Selected Developing Countries in Asia-Pacific**

From 1995-2000, ADB organised a regional technical assistance project for enhancing capacity in environmental statistics. The major objectives were to:

- (i) establish institutional linkages and strengthen institutional capacity for collection, compilation and dissemination of environmental statistics
- (ii) formulate a framework for the development of environmental statistics (FDES)
- (iii) assist in preparing compendia of environmental statistics (CES) based on country-specific FDES by organising environmental statistics already available through existing sources

ADB provided financial assistance amounting to US\$25,000 each to eleven participating countries, namely Bangladesh, India, Indonesia, Malaysia, Nepal, Pakistan, the Philippines, Samoa, Sri Lanka, Vanuatu and Viet Nam for developing environment statistics.

The project was successful in achieving its major objectives and has contributed to institutional building for developing environment statistics of selected countries. All participating countries established institutional linkages across various agencies responsible for data collection through the creation of high-level steering or inter-agency committees. They also established separate statistical units in their national statistics offices for the collection and compilation of environmental statistics. All participating countries prepared their country-specific FDES as well as the CES based on their frameworks. The compendia will be updated on a regular basis.

Source: ADB, 1999. Development of Environment Statistics in Developing Asian and Pacific Countries.

B-R8. Good Practice Databases

Good practice databases on innovative policies and practices to promote sustainable development for the region should be strengthened. APFED has started a database regarding BPP (Best Policy Practices) to collect encouraging examples at both policy and practice levels from the Asia-Pacific region. *(for details of BPP, see the Appendix 2 of this report)* The BPP database should be strengthened, updated and sharpened, in collaboration with NetRes. However, with so many good practice databases under development, it may be timely to discuss how the databases will relate to each other, and how they can be made mutually complementary. At a minimum, on-line databases should have hot links to other similar databases operating in the region.

Good practice databases constitute one form of lesson-learning practice or knowledge management. A series of workshops would be useful in order to share, among various stakeholders, lessons learned from good practice examples already implemented.

Databases must be regularly updated. Databases having the most updated information are accessed frequently, and can be considered as serving many stakeholders well. To enable effective and regular updates, introduction of an incentive system such as awards, formal recognition, and modest financial support could be useful. An incentive system may encourage stakeholders to contribute the most updated information to the database.

To ensure the quality of good practice cases, clear criteria should be established for inclusion in the database. In addition, some form of peer review process needs to be introduced to make sure all the listed practices are truly innovative and provide good lessons for others to learn. Cases should be classified according to, for example, type, scale, entity and country, for the ease of access for potential users.

C. Capacity Drive for Sustainable Development

C.1 Overview

Since the United Nations Conference on Environment and Development (UNCED) in 1992, sustainable development has been high on the political agenda. Much effort has been made to advance the new vision of education, public awareness and training as key prerequisites for achieving sustainable development, based on Chapter 36 of Agenda 21 (“Promoting Education, Public Awareness and Training”). UNESCO, as the designated Task Manager for Chapter 36 of Agenda 21, has played an important role in promoting education for sustainable development and is about to launch the decade of education for sustainable development. UNESCO launched the Environment, Population and Development (EPD) programme in 1993 to reshape formal education to become a major instrument of sustainable development and raise public awareness. In the Asia-Pacific region, UNEP has promoted environmental education in particular based on a coordinated approach at the regional, subregional and national levels. ADB, UNDP, UNCRD (United Nations Centre for Regional Development), UNU and the World Bank, among others, have also promoted capacity building towards sustainable development.

Approximately 60% of the world's population lives in Asia and the Pacific, and the population of the region continues to expand. Consequently, pressure on the already-overstretched environment of the region will deteriorate further, if lifestyles follow the path of unsustainable production and consumption patterns of the West. However, if perceptions can be changed by education and other capacity building activities, then more modest resource use, in line with the guiding principles contained in the Earth Charter, can be expected. If attitudes and behaviour can be changed, the huge population of the region could be turned into an agent for sustainable development. Thus, human resource development holds the key to building sustainable societies in the region.

The importance of environmental education has been widely recognised since 1977 when the first international meeting was held in Tbilisi. By 1979, Indonesia already started establishing environmental study centres in all public universities, for education, extension and research purposes. Australia has also promoted environmental education at all levels since the 1970s. Many countries in the region followed suit, and there were a number of educational initiatives in the region well before UNCED in 1992.

UN-ESCAP's Third Ministerial Conference on Environment and Development held in 1995 decided upon a five-year Regional Action Programme for Environmentally Sound and Sustainable Development. Responsibility for catalysing educational reform under this plan was given to UNESCO and UNEP. Several other entities, including international NGOs, also undertook initiatives. UNEP has, in partnership with relevant subregional intergovernmental bodies, assisted in the formulation and implementation of several subregional environmental education and training action plans, such as the five year Action Strategy for Environmental Education and Training in the Pacific Region, 1999-2003, the ASEAN Environmental Education Action Plan, 2000-2005, and the South Asian Action Plan on Environmental Education and Training, 2003-2008.

The first phase of educational reform after UNCED, namely, the reformulation of environmental education to include issues of sustainable development, was not a difficult task, as in Asia-Pacific the concept of the environment has always included the human element. In many cultures, nature is seen as a mother or as a teacher, and since life in most Asian societies is organised around the seasons, the predominantly rural people can easily see that the quality of their lives is related to the sustainability of the natural world. Thus, environmental education could readily integrate the rhetoric of sustainable development.

However, the reorientation of educational practices, systems and structures is not yet completed in this region, and several outstanding issues and problems remain. Several countries still lack national policies or guidelines on environmental education, and even in countries that have them, very few have successfully incorporated broad social, economic and political, as well as conservation aspects of sustainable development. Such problems are intensified by a general lack of awareness and support for environmental education by many education policy-makers, school administrators and academics in teacher-education institutions.

During WSSD in 2002, education for sustainable development was given a decisive boost and commitments were made to promote education for sustainable development. The Global Higher Education for

Sustainability Partnership (GHESP) was launched as a Type II Partnership. UNU took the lead in bringing together a group of scientific and higher education institutions for the Ubuntu Declaration, which unites the best of science and research with the world of education and will help to ensure that state-of-the-art knowledge has an impact on educational programmes. The Global Virtual University on Environment Issues was presented by the Norwegian government, Norwegian universities, UNEP and UNU. A proposal by the Government of Japan that the United Nations adopt the Decade of Education for Sustainable Development (DESD) was incorporated in the Johannesburg Plan of Implementation (JPOI). Accordingly the United Nations General Assembly (UNGA) adopted at its 57th Session a resolution to designate 2005-2014 as DESD, with UNESCO as the lead agency.

Following the UNGA resolution, UNESCO developed a framework for the draft International Implementation Scheme for DESD, released in August 2003 for comments by potential partners. Taking into account significant numbers of comments on the draft framework, UNESCO developed the draft International Implementation Scheme for consideration by UNGA. According to UNESCO, the vision of education for sustainable development (ESD) is a world in which everyone has the opportunity to benefit from quality education and learn the values, behaviour and lifestyles required for a sustainable future and for positive social transformation. Key perspectives should cover not only environmental issues but also socio-cultural and economic ones, e.g., human rights, gender equality, cultural diversity, international understanding, health, HIV/AIDS, poverty reduction, and corporate social responsibility. This reflects the broadening of the scope advocated by UNU in its interlinkages project and accepted for the organisation of the WSSD. The JPOI included “education for sustainable development,” taking into account comments by potential partners, in particular with regard to the education systems in most countries.

Ongoing international educational initiatives to promote basic education, such as Education for All (EFA) and the United Nations Literacy Decade (UNLD) need to be linked to education for sustainable development. Education for sustainable development will reinforce these initiatives by reorienting current systems and improving the quality of education. The concept of sustainability should not be a new, separate subject of teaching but should be integrated into all existing subjects in all forms of education. At university level, educational systems need to be “greened” in two ways: greening of teacher training and educational curricula on the one hand, and greening of the entire operation of educational institutions on the other. GHESP is taking the initiative to develop an ICT-based resource project for these purposes, which should be disseminated among the countries in the region and used with modifications appropriate to local conditions.

Some key elements for successful implementation of DESD may include the following:

- (i) Reorientation and transformation of education for sustainable development require strong political leadership and effective formulation and implementation of essential policy reform, in particular with regard to the education systems in most countries.
- (ii) Sustainable development is important both in developed and developing countries. Fundamentally it is a challenge to reorient economic theory and practices in line with the goals of sustainable development. Some countries may start from education for environmentally sustainable development, and gradually expand it to a broader scope.
- (iii) Sustainable development can only be achieved through formal and non-formal education at all levels and in all sectors of society to facilitate transformation of society toward sustainable development. Ecological understanding is not simply another subject to be learned but should be integrated in all subjects in all forms of education in a transparent manner.
- (iv) Education for sustainable development may be seen as stimulating learning at the individual level; within organisations to transform their ways of working to be consistent with sustainable development; and to stimulate social learning to bring about the necessary conditions for society to move towards sustainable development.
- (v) Major objectives of the DESD should be to achieve the MDGs and promotion of Agenda 21, the JPOI, and other regional and global plans of action.
- (vi) Education for sustainable development should be promoted, taking into account the diversities in social, cultural and environmental conditions at local and national levels. There is no universal, standardised approach that can be applied to all.
- (vii) A variety of partnerships are required to involve as many stakeholders as possible for the success of formulating and implementing the DESD. Involvement of local administrations and communities should be emphasised.

- (viii) Visions for sustainable development should be clearly articulated by respective partners within the parameters of their own aims, concerns and programmes.

Training is also important for human resources development for sustainable development. Compared to education, training is a short-term exercise, but the target is generally the active work force, and the result of training, i.e., enhanced human capacity, is of immediate use in the workplace. As multi-stakeholder dialogues become more important for most environmental professionals, a future focus of training should be placed on fostering negotiation and communications skills. There are numerous training courses in the region at all levels targeting various groups and individuals. Many governments have institutes specialised in training for the environment and sustainable development for their staff, local government staff and others. Universities, NGOs, business, and international organisations such as the ILO have also conducted training courses in the region. At the regional level, the Network for Environmental Training at Tertiary Level in Asia-Pacific (NETTLAP) is an initiative of UNEP/ROAP, launched in 1993. NETTLAP targeted staff of tertiary institutions and successfully strengthened capacity in 35 developing countries in the region. Since staff at tertiary institutions often act as advisers to government and industry, the effects of NETTLAP are significant in promoting environmental conservation. It focused on three thematic areas: coastal zone management, toxic chemicals and hazardous waste management, and environmental economics. For the media, training has been conducted by NGOs and the media themselves, through workshops, study tours, and journalist exchange programmes. The Asia-Pacific Forum of Environmental Journalists has taken the lead in this respect.

The need for greater public awareness on sustainable development cannot be overemphasised. Tools for awareness-raising include guidelines, posters, radio messages, articles for newspapers, outlines of CD-ROM or e-learning packages, and more traditional tools such as story telling, theatres, and puppet shows. There have been initiatives to develop multi-media packages to promote education for sustainable development. It takes various forms, ranging from small inter-personal campaigns at the local level to mass media such as TV programmes. Awareness-raising has become far more important because the way that current environmental issues need to be dealt with has changed. Public understanding and participation are now essential to address many issues effectively. Building on the earlier efforts of NETTLAP and subregional environmental education action plans, UNEP has embarked on a regional project entitled “Environmental Awareness and Training in Asia and the Pacific” (EEATAP) since 2002. The general objective of EEATAP is to create awareness and equip target groups in the Asia-Pacific region with less wasteful and environmentally damaging lifestyles without losing their sound social and cultural values. It aims to create a regional mechanism for the documentation and dissemination of environmental education initiatives through demonstration projects. One of the demonstration projects specifically looks at enhancing environmental understanding and appreciation for journalists and media professionals in the region.

Science museums of all kinds, including zoos, botanical gardens, and others provide the public with up-to-date information and create learning opportunities for sustainable development. “Ecologic”, an exhibition on sustainability by the Powerhouse Museum in Sydney, is a good case. As the region becomes more urbanised, fewer people have the innate understanding of the principles of sustainable development that their rural ancestors had.

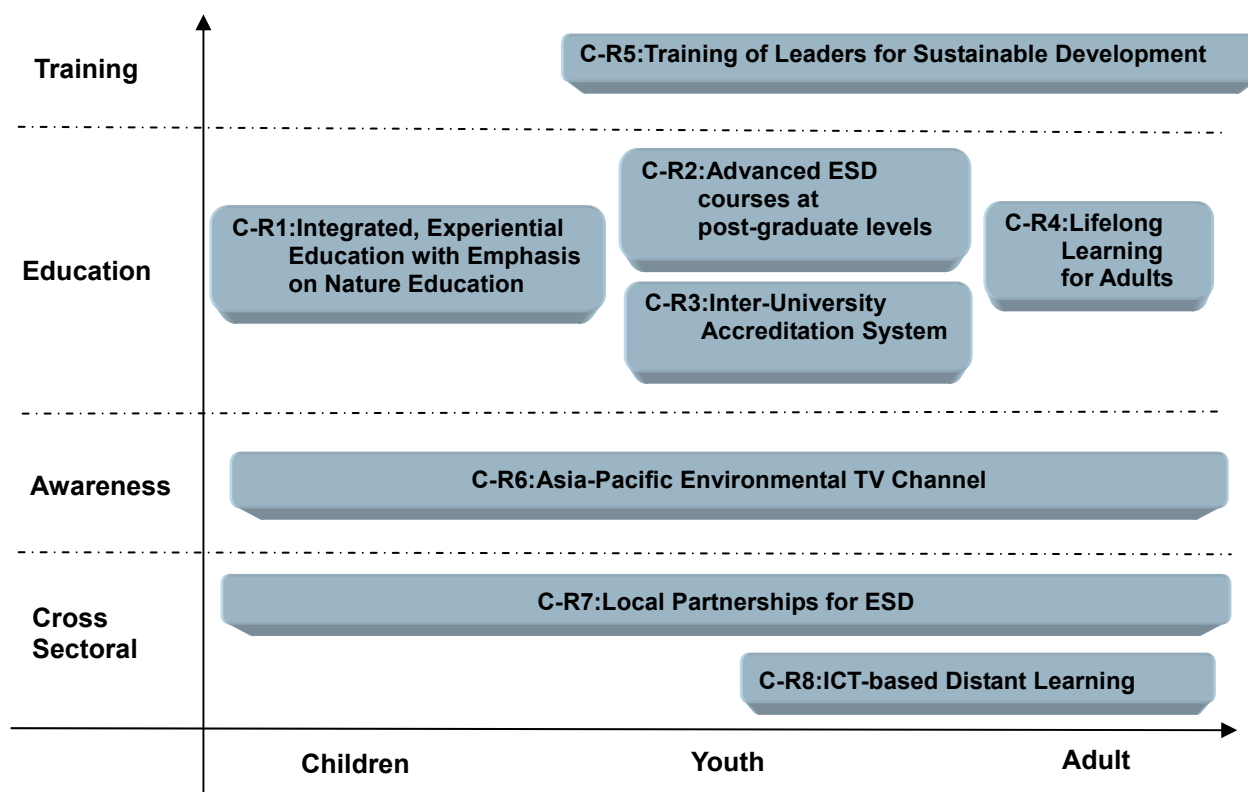
The role of the mass media in changing behaviour is significant, but environmental and sustainability issues are not yet adequately covered, mainly due to the media’s commercial orientation. In fact, most commercial advertisements aired by media have contributed to promoting unsustainable patterns of consumption among consumers. Certainly, it is a challenge to reverse this trend. However, as most people in the region will have access to electronic media such as TVs and radios in future, greater effort should be made to determine how this influential medium could be better used for promoting sustainable development.

C.2 Recommendations

With the launch of DESD in January 2005, effort should be intensified to strengthen human capacity towards sustainable development. Each country will be requested to develop an action plan to integrate ESD into its national education policies and programmes. The effort should cover not only education but also all forms of human capacity development, including awareness raising and training. The following recommendations are intended to be complementary to the important initiatives already taking place and are not intended to be comprehensive (Figure 25).

For the education sector, there are four recommendations: (i) integrated, experiential education with emphasis on nature education, (ii) advanced ESD courses at post-graduate levels, (iii) an inter-university accreditation system for higher education, and (iv) lifelong learning for adults. There is one recommendation each for training and awareness-raising: (v) training of leaders for sustainable development, and (vi) the Asia-Pacific environmental TV channel, focusing on the use of mass media. Additionally two recommendations, (vii) local partnerships for ESD, and (viii) ICT-based distant learning, are cross-sectoral and emphasise linkages between different sectors.

Figure 25: Capacity Drive for Sustainable Development



Education

C-R1. Integrated, Experiential Education with Emphasis on Nature Education

Enabling school children to realise the importance of the environment through direct experience has been practiced in various forms in the region. This is often referred to as experiential learning or even discovery learning. Environmental camps in Nepal, Malaysia, and open air education in Bangladesh and Myanmar (Burma) are examples of this type of education with an emphasis on nature education⁸⁵. Other types of experiential education include waste disposal, composting and recycling, and energy saving in relation to local communities. An initiative practiced in Kyoyama, Japan is one example (Box 18). Landcare and Coastcare projects in Australia are other good practices. Some countries in the region may wish to establish educational sites in outstanding places such as national parks and World Heritage sites, specifically aiming at this type of environmental education, where school children could experience the unique local nature and traditional lifestyles.

⁸⁵ UN-ESCAP and ADB, 2000. SoE 2000

Box 18: Kyoyama ESD Environment Project

People in Kyoyama District in Okayama City, Japan initiated in 2003 an integrated, experiential environment project, as a leading-edge education for sustainable development (ESD) project.

The Kyoyama ESD Environment Project is aimed at research on waterfronts by school children. The project was jointly undertaken by primary, junior high and senior high school students, local community people, NGOs, local enterprises, and the local government, supported by the Okayama UNESCO Association. Junior high school students were the primary actors carrying out the project. The outcomes of the project were mapped and presented to local communities through presentation sessions at schools and community halls. They were also reported to the local government and discussions were held with officials, including the mayor.

School children, through field investigation at rivers, gain experiential knowledge that cannot be studied in classrooms, and learn about the relationship between the river system and life in their community. Participants in this project had a better understanding of environmental education at different levels and established closer communication and collaboration with each other.

Source: UNU-IAS

Student exchange programmes or gatherings enabling them to share experiences, especially with students from different countries, may help to make them aware of the rich diversity of natural, social and cultural features found in other places. The Junior Eco-Club initiative started in Japan has a regional exchange programme once every few years (Box 19). Another example is the Club for Kids set up by the Australian Conservation Foundation.

Regional networking of practitioners of outdoor environmental education could be useful to share teaching methodologies, teaching materials, and good practices, and to improve the quality of such education. In addition, active participation of NGOs and civil society, with its innovative competence, networks and associations, should also be promoted, particularly in those countries where their role is not yet fully recognised.

Box 19: Junior Eco-Club Initiative

The Junior Eco-Club Initiative was established in 1995 to raise children's awareness and interest in environmental conservation. It is a voluntary nationwide "green" club activity. The Japan Environment Association (JEA) serves as the national secretariat to the Junior Eco-Club. The goals of the Junior Eco-Club are as follows.

- (i) To foster children's awareness of environmental conservation.
- (ii) To build a sustainable society that creates less environmental stress in the 21st century.
- (iii) To support children responsible for shouldering the next generation so that they can take the initiative in learning about their local and global environments.

A Junior Eco-Club can be set up whenever elementary and/or junior high school students in a group of three or more show interest in environmental conservation. When several children gather together and form a group, first of all they themselves discuss and decide their goals and activities for the year. The voluntary activities conducted in accordance with these goals are called "ecological action." These activities may include such actions as recycling programs, cleaning up refuse, publishing a newspaper on the local environment, or studies on wildlife and local forests, among others. This ecological action is the centrepiece of Junior Eco-Club activities. The activities differ from one club to another. Students' experiences and successes are shared with fellow students through a bi-monthly newsletter and national exchange meeting programs. Once every few years, by inviting children from Asia, regional exchange workshops are organised and many members of Junior Eco-Clubs can participate in this meeting.

Source: M. Takahashi et al, 2002. "The Path to Success", IGES

C-R2. Advanced ESD Courses at Post-graduate Levels

In addition to integration of ESD components into disciplinary graduate courses, universities may consider setting up sustainable development courses and departments so that post-graduate students can study sustainability issues in an interdisciplinary manner (Box 20). An important element of this example is its regional perspective, as well as an inclusive partnership based approach.

Box 20: UNEP Tongji Project on Sustainable Development Courses

Tongji University is one of the leading universities in China with a demonstrated track record on environmental engineering and related environmental disciplines. A new institute known as the UNEP-Tongji Institute for Environment and Sustainable Development (IESD) was established in May 2002. Objectives of this Institute include (i) the development of educational programmes to build capacity for research, technical and managerial skills among developing countries in the region; (ii) to contribute to UNEP's global and regional environmental assessments, and (iii) to disseminate information on best practices and technological developments.

A brainstorming meeting in September 2003 resulted in agreement that IESD would establish and host an inclusive regional university consortium on sustainable development; design and implement a leadership course on sustainable development; and start a graduate degree programme on sustainable development by 2005. The Regional Leadership Training Course on Environment and Sustainable Development, offered for the first time from 25-31 July 2004, focuses on developing a new breed of leaders, at the request of political leadership in the region. For the Masters degree programme on Environment and Sustainable Development, the following elements have been proposed to form the basis of a regional graduate degree programme in 2005:

- Methodology: problem-solving approaches covering different thematic areas
- Components: principles and processes; tools and assessment; benchmarking; policy and practice issues; implementation and monitoring
- Applied research: research agenda with a thesis requirement

Source: <http://www.rrcap.unep.org/uneptongji/>

C-R3. Inter-University Accreditation System

Student exchange programmes, especially for post-graduate students, are important and can be made more effective if a cross-border accreditation system is introduced among universities engaged in the same kind of multi-disciplinary sustainable development education. The cross-border inter-university accreditation system would be of particular importance in Asia and the Pacific, since there are significant diversities in environments and sustainability issues in the region, and students would be provided opportunities to learn about the rich diversity.

C-R4. Lifelong Learning for Adults

In future, employment opportunities will change quickly and significantly as economic globalisation and technological innovations advance. More people will have to change occupations once or more in their lifetime and the lifelong employment system once popular in this region has to change. Thus, lifelong learning will become far more important in future to retrain or re-educate the region's active work force.

As awareness regarding the environment continues to grow, job opportunities in the areas of environment and development are likely to increase, not only in business but also in civil society. Thus, the need for adult education on the environment and sustainable development is likely to grow.

Values and ethics towards a sustainable future need to be developed and disseminated widely among all sectors of society. The principles of the Earth Charter, such as respect and care for the community of life, ecological integrity, social and economic justice, and democracy, non-violence and peace, may provide a framework for such values and ethics.

Knowledge of cultural diversity and intercultural understanding of different cultures will become important in Asia and the Pacific because mobility of people will increase and may become the cause of conflicts among different cultures.

To deal with this challenge, partnerships between the government, civil society, businesses, and

universities are considered essential. Universities and other higher education institutes should be open to providing lifelong learning. Governments should build safety nets by which the costs and risks associated with upgrading skills for a change in employment will be dealt with appropriately. One effective measure could be the expansion of scholarship programmes to adult education or the use of pension funds to cover lifelong education.

Training

C-R5. Training of Leaders for Sustainable Asia-Pacific

To strengthen the engine for a sustainable Asia-Pacific, key persons such as policy makers, business executives, NGO leaders, journalists, and key staff from tertiary institutes have to be provided with opportunities for executive training. Ideally, each executive training course should involve leaders from different stakeholder groups and different countries, and maximise interaction between them. A network of interested training institutes in the region would jointly develop training materials, methodologies, and curriculum guidelines for executive training. The training would focus upon the most up-to-date information and knowledge on environmentally sustainable policies, planning and practices. Collaboration with NETTLAP and other existing training networks in the region would be important, as well as the Regional University Consortium on Sustainable Development, established under the aegis of the UNEP-Tongji Institute of Environment and Sustainable Development.

Awareness-Raising

C-R6. Asia-Pacific Environmental TV Channel

The need for awareness-raising, both for the public and decision makers, cannot be overemphasised. All means of awareness-raising, including public campaigns, exhibitions at museums, TV and radio broadcasting should be extensively used.

Among such measures, as one of the most effective means, a region-wide television channel focusing on environmental and sustainability issues is proposed. Considering the recent expansion of broadband, a web-based TV station with streaming technology may be financially feasible. The channel would broadcast, in an easy-to-understand manner, programmes on a wide range of environmental and sustainability issues, including nature and wildlife in the region, global environmental issues such as global warming, and community-based activities to promote sustainable development. Effective collaboration with existing programmes, such as the National Geographic Discovery Channel should also be considered.

Collaboration with existing media will be strengthened in parallel to or as a first step toward launching the regional environmental TV channel. A modest grant facility could be considered for the channel to encourage existing media and civil society organisations (CSOs) to produce quality films for the region. In addition, the channel would provide a variety of services for the media, including organising briefing workshops, establishing a media library, and setting up a system to provide real-time information services. Broadcasting slots on the channel should be made available to CSOs and the media on favourable terms. Given the importance of TV advertisements in promoting sustainable lifestyles, partnerships will be sought amongst the media, advertising experts and environment advocates, to air advertisements with ecological messages (Box 21).

Box 21: ECO TVC in South Australia

ECO TVC is a partnership initiative being implemented in Adelaide, Australia, during 2004-2005, which is supported by local environment groups, business, the media, and educational institutions, as well as the state government, and a network of relevant city councils. It is a competition among young and emerging film-makers to develop scripts and storyboards for a 30 second television commercial with messages for environmental sustainability. The four best scripts are to be selected and financially supported for actual commercial production. The winning TV commercial will be premiered at the local film festival, and broadcast on a local TV channel.

Source: <http://www.ecotvc.com>

Cross-Sectoral Approaches

C-R7. Local Partnership for Education for Sustainable Development

To promote ESD extensively in the region, locally-based, integrated, holistic approaches are necessary. Communication and coordination at all levels of formal and non-formal education especially at local levels should be strengthened, so that more systematic approaches for ESD can be attained. Local knowledge centres on ESD could provide a space where people in primary schools, secondary schools, universities, research institutions, science museums, non-formal education, community leaders, local government officials, local media and representatives of business communities get together, share their experiences in promoting sustainable development in their activities, and discuss how they can coordinate and/or collaborate their activities in an effective manner, taking into account local conditions, concerns and requirements.

Regional centres of expertise (RCEs), proposed by UNU, would create local groupings and networks to identify sustainable development challenges, integrate local knowledge and skills into ESD, and exchange ESD experiences and lessons for better practice.

A few demonstration projects should be undertaken to promote such local knowledge centres with the participation of local institutions of primary, secondary and higher education, non-formal education, research institutions, museums and local governments. Business should be encouraged to contribute to ESD, in particular, to community-based initiatives, through technical and financial cooperation, including personnel exchange.

Networking of knowledge centres at the national, regional, and global levels would provide DESD with a global network of such centres as one visible output. In the process, it would be possible to mobilise many stakeholders, learn from their creative ideas, build on their diversity and promote international cooperation in ESD. Such centres together with their networks would form the global learning space for sustainable development, the major outcome sought by the DESD.

C-R8. ICT-based Distance Learning

ICTs, and other modern technologies, are increasingly recognised as important components of strategies designed to promote distance learning on sustainable development. Such tools may include knowledge management (collection, storage, use and sharing of information and data and its translation into actual policies and implementation such as BPP), national or subregional clearing houses and databases, and online learning (including courses, learning objects, video documentaries, e-case studies, etc.). E-learning regarding the environment and sustainable development has been gaining popularity in the region (Box 22) and globally: see for example, the Global Virtual University (<http://www.gvu.unu.edu>), IUCN's World Conservation Learning Network (<http://www.iucn.org/themes/cec/wcln/>) and the Earth Council's Learning Centre (<http://www.earthcouncil.com>).

In relation to higher education, an OECD report on 19 case studies, including the Asian Institute of Technology (AIT) and Kyoto University, indicated generally positive impacts of greater use of ICTs

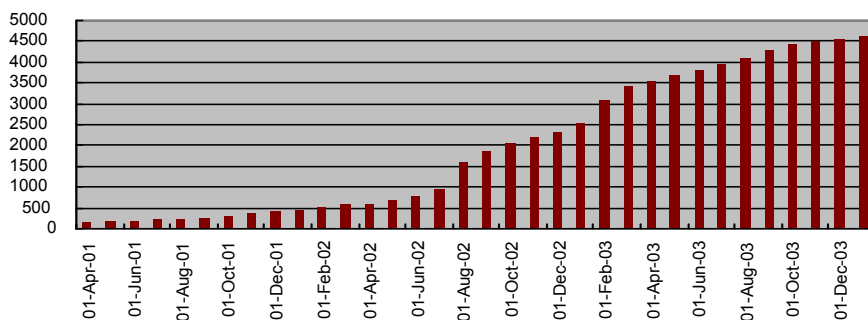
on teaching and learning, while some institutions pointed out a few negative concerns in relation to lack of suitable expertise and the additional burdens placed upon faculties. Other studies show that the online learning community is building upon the experience of the “early adopters” and is now trying to foster inter-institutional collaboration on content development, content sharing and joint course implementation, techniques that have proved to be highly effective in enhancing quality. Such examples include Universitas 21—a network of universities sharing learning objects, MERLOT (multimedia education resource for learning and online teaching - <http://www.merlot.org>), the MIT Opencourseware Initiative, and the GHESP resource project. The potential of online learning lies not in replacing existing capacity enhancement activities, but rather in scaling up existing capacities and extending the geographical reach of each training programme.

Among various measures to better use ICT-based technologies, expansion of e-learning in a way that local people can truly benefit from is recommended as the most powerful tool to promote ESD for this region. The implementation of virtual universities represents an important way forward and complements the emphasis on inter-university accreditation. The Global Virtual University on Environment Issues, a joint initiative between the Norwegian government, Norwegian universities, UNU and UNEP; the Water Virtual Learning Centre by UNU-INWEH; and the Asia-Pacific Initiative by UNU Media Studio are among initiatives heading towards this direction. All of these initiatives place importance on linking academic institutions in developed and developing countries, on the promotion of innovation with respect to use of new technologies and on the rigorous evaluation of the effectiveness of the online courses in bringing about the desired learning outcomes. In the case of the UNU, evaluations of online courses are implemented in collaboration with the students and tutors. The evaluation results are used in improving the course materials, and are also taken into consideration when designing new courses (for more information see <http://www.onlinelearning.unu.edu>).

Box 22: e-learning: An Attempt in Japan

The Institute for Global Environmental Strategies (IGES) has offered ‘e-courses’ on various environmental topics to the public on the internet for free (<http://www.iges.net/>). The courses, based on its research activities, have been designed to enhance the capacities of professionals in the Asia-Pacific region, especially mid-career decision makers. ICT-based learning is combined with face-to-face training to maximise educational impact for the participants. The number of participants has steadily increased, making it a leading web-based learning service in Asia and the Pacific.

Number of Users of IGES e-Learning System (FYs 2001-2003)



Source: IGES/Information and Outreach Programme

D. Innovative Financing and Market Mechanisms for Sustainability

D.1 Overview

Financing for sustainable development requires mobilisation of financial resources both from the public and private sectors. For Asia and the Pacific, ADB estimated the annual investment costs required to achieve environmentally sound development based on two scenarios. Under a business-as-usual scenario, the cost would be \$12.9 billion per year. Under an accelerated progress scenario—one under which developing countries in the region implement the best practices of OECD countries by 2030—the cost would be \$70.2 billion per year. A halfway point set between the high and the low estimates would be around \$40 billion per year⁸⁶. In addition, repairing the damage done to the land, water, air, and living biota was estimated at \$25 billion per year⁸⁷. Taking into consideration the total financial resources needed and the present level of spending, the financing gap to attain sustainable development is around \$30 billion per year⁸⁸. Comparatively, military expenditures in the same period (1997) for Central Asia, East Asia and Southeast Asia were estimated at: \$120.9 billion⁸⁹. This is not Mission Impossible.

At the national level, environmental spending has remained below needs, both in developed and developing countries. In 1997, few countries were spending even 1% of GDP on the environment. Despite substantial increases in some countries (e.g., 1.5% in China),⁹⁰ for the greater number of countries, government environmental spending remained relatively limited and was in fact further reduced along with general budget restructuring in the aftermath of the Asian financial crisis of 1997-1998.

Tax administrative systems are underdeveloped in many developing countries in Asia. Inadequate tax compliance and enforcement, low levels of public awareness and high levels of public resistance have resulted in a relatively low tax to GDP ratio. Many countries still rely on manual information collection and processing, inadequate and fragmented information systems, and poor communications and coordination. This has a significant impact on government revenue and subsequently the capacity to finance environmental and sustainable development. Some of the proposals for tax reform, which have been implemented in the region, include the expansion of indirect taxes by targeting the growing services sector, socially and environmentally undesirable activities, and the extension of the tax base to cover incomes from activities that are not currently taxed including the service and financial sectors.

As a means of generating additional resources, an increasing number of countries have introduced market-based instruments such as environmental taxes, levies and incentives as new policy instruments for mobilising financial resources for environmental protection (*See "I-R8. Internalisation of Environmental Costs" and "Box 46. Volume-based Waste Fee System in Republic of Korea" P.126*). While there has been little political enthusiasm for additional taxation, environmental taxes and levies have generated additional resources for sustainable development. In 1999, the revenues from environment-related taxes as a percentage of total tax revenue in Japan and Republic of Korea were over 6% and approximately 13%, respectively, generating over 1.5% and over 3% of GDP, respectively⁹¹. From a sustainable development perspective, environmental taxes not only raise revenue, but also increase efficiency of economic systems and motivate behavioural changes in businesses and consumers. However, such economic instruments have not been widely used in the Asia-Pacific region. Greater emphasis needs to be placed on developing mainstream tax and finance regimes for environmental sustainability, in addition to the supplementary funding sources that are mentioned in the recommendations below.

Micro-credit and community-based finance have been seen by many as the only forms of capital available to the large majority of people in rural areas of the region. For many of the basic human needs such as access to modern and environmentally less harmful fuels as well as electricity, micro-credit is becoming a promising

⁸⁶ UN-ESCAP, 2001. Regional Platform on Sustainable Development for Asia and the Pacific, 3rd Revision, 23 October 2001.

⁸⁷ Rogers et al. 1997

⁸⁸ *Ibid.*

⁸⁹ Aggregation from Stockholm International Peace Research Institute (SIPRI), SIPRI Yearbook 2004, appendix 10A, table 10A.1 and table 10A.3. Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; East Asia: Brunei, Cambodia, China, Indonesia, Japan, Democratic People's Republic of Korea, Republic of Korea, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar (Burma), Philippines, Singapore, Taiwan Province of China, Thailand, Viet Nam; South Asia: Afghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka.

http://web.sipri.org/contents/milap/milex/mex_wnr_table.html

⁹⁰ Tenth Five-Year Plan for National Economic and Social Development (2001–2005), the People's Republic of China.

⁹¹ Organisation for Economic Co-operation and Development (OECD), Environmentally Related Taxes Database, [<http://www.oecd.org/>] (12 December 2001).

form of local finance in places where necessary institutional support has been established. From the sustainability point of view, local finance would appear to be the most adequate form of capital as it is less subject to fluctuations associated with donor priorities, instability in currency markets and variations in the flow of Foreign Direct Investment (FDI). At the same time, local finance has been a less-developed form of capital both in terms of volume and sophistication.

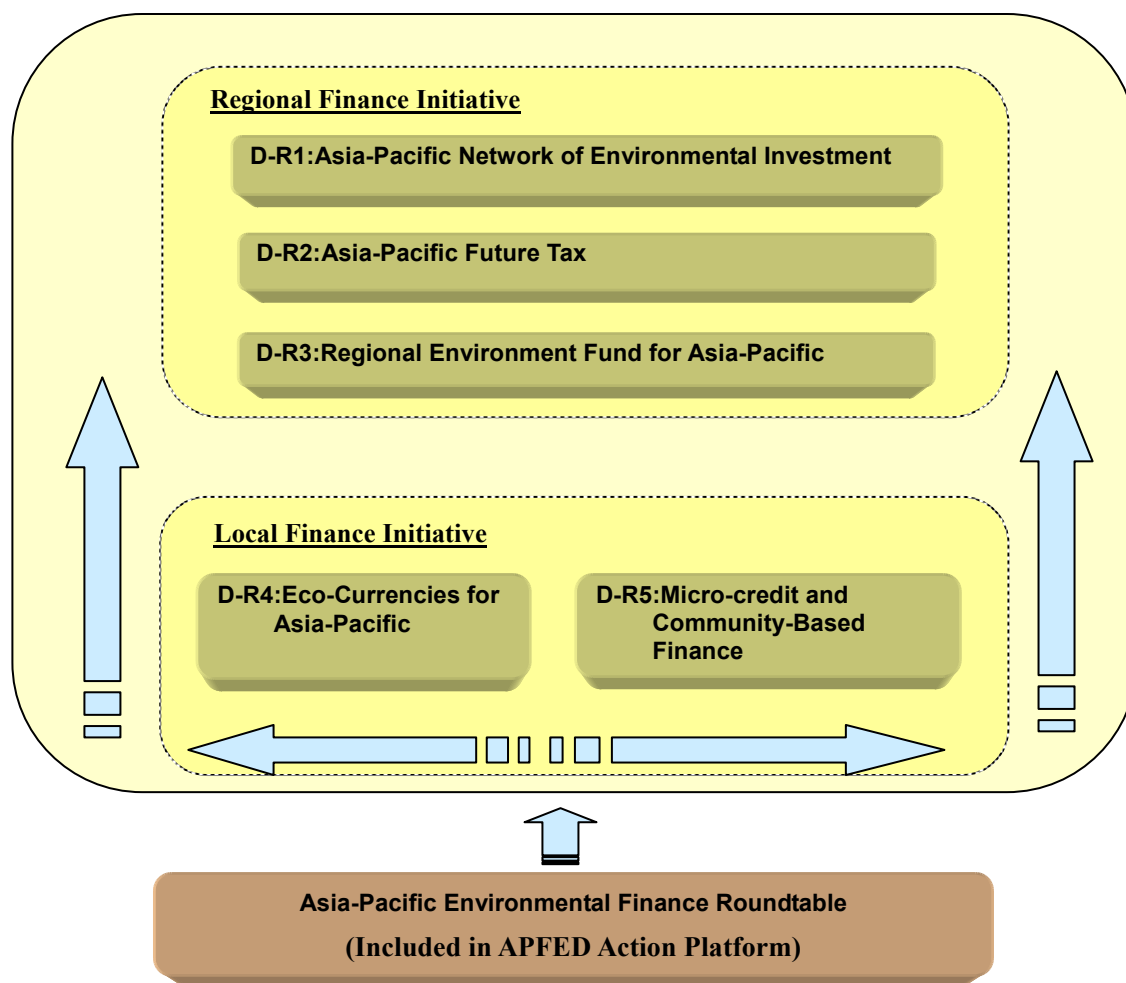
Over the last decade, the Asia-Pacific region has been characterised by a tremendous increase in financial flows. While official development assistance either stagnated or decreased in most countries, the opposite trend has been witnessed in private capital, with direct investment surging both within the region and into the region. Capital inflows have had some positive impact on countries in the region. However, the volatile nature of short-term capital flow, without adequate regulatory control, resulted in an unstable pattern of inflow and outflow, and led to the currency and economic crisis in Asia in 1997-98. FDI recorded unprecedented growth up to the year 2000 before falling worldwide, including in the Asia-Pacific region. While FDI declined in 1998 for the first time in 13 years, it remains well above the average annual flow recorded during the first half of the 1990s, reaching a record level of \$143 billion in the year 2000, although FDI tends to be headed to only a few countries in the region.

Despite an increase in overall capital inflows to the region, the environment has not been the main beneficiary of finance. At the global level, environmental funds such as the Global Environment Fund (GEF) were initiated, and brought some additional funding sources for environmental protection. The Clean Development Mechanism (CDM), one of the flexibility mechanisms established under the Kyoto Protocol to the United Nations Framework Convention on Climate Change, is another financing instrument. CDM provides opportunities to companies and other entities in Annex 1 countries to meet their greenhouse gas (GHG) abatement requirements under the Kyoto Protocol by investment in projects with the potential of reducing GHG emissions while contributing to other social and economic dimensions of sustainable development. While the Protocol has yet to enter into force, the CDM has already gained significant momentum and attracted much interest in both the public and private sectors as an innovative financing mechanism. The EU, in particular, is proceeding with CDM regardless of whether the Kyoto Protocol is ratified or not.

Nevertheless, global environment funds have not always been able to provide necessary financing for environmental problems that are regional in terms of root causes and impacts. This has left a range of subregional and regional environmental problems such as acid rain, trans-boundary haze and trans-national water problems without adequate financing mechanisms to support policy responses at the appropriate scale. Although there is a possibility that the flexible application of the operational programme (OP) 12 of GEF on Integrated Ecosystem Protection may have potential for such issues to be covered, the amount of funds available is likely to be very limited.

Devising new and innovative financing mechanisms needs to involve efforts that tap into opportunities at the regional, international and local levels. Recommendations presented below put forward three sets of proposals at the regional and international level: (i) Asia-Pacific Network of Environmental Investment, (ii) Asia-Pacific Future Tax, and (iii) Regional Environmental Fund for Asia and the Pacific. These are complemented by proposals for enhancing two initiatives which are local in nature: (i) Eco-Currencies in the Asia-Pacific, and (ii) Micro-credit and Community-Based Finance. As a first step to put these ideas into practice, an Asia-Pacific Environmental Finance Roundtable is proposed in the Action Platform attached to this main document.

Figure 26: Innovative Financing and Market Mechanisms for Sustainability



D.2 Recommendations

Regional Finance Initiatives

D-R1. Asia-Pacific Network of Environmental Investment

The Asia-Pacific Network of Environmental Investment would be aimed at expanding investment in private businesses that are environmentally friendly and socially responsible. The network would develop a set of criteria to be shared by its members. The criteria would include, among other things, environmental performance in developing countries and issues regarding unemployment, gender, and minority peoples, but they also have to take into account the social and environmental features of the region. Members of the network would not make investment in corporations having unsatisfactory records regarding the environment and other social issues mentioned above. Financial institutions, investment firms, insurance firms and pension funds, particularly those based in the region, would be encouraged to join the network. Membership would be sought not only from the Asia-Pacific region, but also from corporations in other parts of the world.

The network would contribute to attracting environmentally friendly businesses to the region. The network should keep good communications with NGOs, business, and governments to update their investment policies according to the changing situations. A modest part of the investment returns would be reserved by the network and channelled to support small sustainable efforts in the region. In establishing the proposed network, initiatives that have already been undertaken in the area of corporate sustainable investment and activities by the UNEP Finance Initiatives would be taken into consideration with the aim to benefit from and expand the reach of such initiatives in the

Asia-Pacific region (Box 23).

There are a number of similar networks in the West such as the International Chamber of Commerce Charter on Sustainable Development, the World Business Council on Sustainable Development, the Equator Principles⁹², and various socially responsible investment funds. One way of realising this proposal is to set up Asian charters of these organisations and adopt their criteria. Given the importance of this issue (i.e., to make investment environmentally and socially sound), however, it is quite important for this region to create its own internal mechanisms for that purpose.

Box 23: UNEP Finance Initiatives

The UNEP Finance Initiatives (FI) were set up to identify, promote, and realise the adoption of the best environmental and sustainability practices at all levels of financial institution operations. UNEP FI comprises the Financial Institutions Initiative (FII) for the banking sector and the Insurance Industry Initiative (III) for insurers, re-insurers, pension funds and asset managers.

UNEP FI supports signatory institutions in identifying and responding to social and environmental issues relevant to their profession. Three working groups have been established: the Asset Management Working Group, the Climate Change Working Group, and the Sustainability Management, Reporting and Indicators Working Group.

The FI operates through a network of regional partners in Africa, Asia and the Pacific, Europe, Latin America, the Middle East and North America.

Source: <http://unepfi.net/index.htm>

D-R2. Asia-Pacific Future Tax

A Future Tax is proposed to collect a portion of revenue from speculative currency transactions. The Asia-Pacific region has been characterised by high volatility of capital flows, which is believed to have been the cause of the 1997-1998 Asian financial crises. Countries adopting such a tax would allocate a part of the resulting revenue to a regional fund for environmental protection. Global estimates of the revenue potential of currency transaction taxes range from \$30-35 billion⁹³ to \$94 billion⁹⁴ annually.

The proposed regional fund would finance future-looking activities related to sustainable development, such as youth programmes, sustainability education, Research and Development (R&D) into future technologies, and restoration of endangered ecosystems in the region.

Alternatively, the proposed future tax could be made a voluntary scheme. Under a voluntary scheme, investment firms are requested to voluntarily deduct a portion of profits from currency transactions in regional capital markets. In return, contributors to the funds would be made known to the public, as a form of incentive for voluntary participation and advertisement of corporate social responsibility initiatives.

D-R3. Regional Environment Fund for Asia-Pacific (REF AP)

As stated earlier, there are a number of trans-boundary environmental problems such as acid rain and trans-boundary air pollution in the region. ADB and the World Bank are able to provide regional loans, if governments are prepared to borrow for trans-national environmental projects, and GEF

⁹² For further information on the Equator Principles, please refer to <http://www.equator-principles.com/>

⁹³ Machiko Nissanke estimates at 0.02% basic tax. Machiko Nissanke (2003), "Revenue Potential of the Tobin Tax for Development Finance: A Critical Appraisal". Available online:

<http://www.wider.unu.edu/conference/conference-2003-3/conference-2003-3-papers/Nissanke-2308.pdf>.

⁹⁴ James Tobin estimates applied to the volume of transactions in 1995 at a 0.1% one-way tax. In Machiko Nissanke, *ibid*.

grants can be added to the mix. However, loan conditions are clearly not equal to those for global environmental issues funded entirely by grants. The lack of regional environmental grant funds has deterred timely action by the countries concerned. Therefore, a Regional Environment Fund for Asia and the Pacific (REFAP) is proposed for consideration. REFAP would serve as the designated financing mechanism for subregional and regional environmental agreements. Once countries in the region, in principle, agree that REFAP will be the financial mechanism for regional environmental agreements, a strong signal would be given to those concerned to promote the conclusion of regional environmental agreements.

Contributions to the fund would be made in the form of financial commitments by governments, with regular replenishment. In addition, contributions from currency taxes as well as other voluntary contributions by governments and corporations would be channelled to the fund. REFAP would be modelled on the Global Environment Fund (GEF) and would cover only incremental costs incurred in dealing with trans-boundary environmental issues. The fund would be established and operated as a separate entity administered by, or in close coordination with ADB, just as the World Bank operates as the secretariat for GEF.

Local Finance Initiatives

D-R4. Eco-Currencies for Asia-Pacific

Eco-currencies are special forms of money that can be circulated only among members who are committed to local environmental activities in a city or designated area. Eco-currencies enable local individuals to obtain a certain amount of monetary value (in the form of an eco-currency) in return for his/her environmental activities, such as voluntary tree planting. Holders of eco-currency use it to receive local services such as childcare, nursing for the elderly, assistance to the physically or developmentally challenged, or private tutoring services, as examples of possible services offered. In this way, eco-currencies could stimulate voluntary environmental activities at the local level without a need for external funds. Eco-currencies have been used at the community level in some countries (Box 24). However, eco-currencies have seen limited use geographically, despite the advantages associated with this finance mechanism, partly because it requires a lot of trust among those involved.

A similar system could be applied to a multilateral enterprise that has offices and factories in several countries in the region. For instance, a certain amount of eco-currency could be given to a factory that successfully reduced its emissions of CO₂ through energy conservation or reduced its solid waste through recycling activities. There is even a possibility to introduce a similar currency at the global level as a private initiative to redress market imperfections embedded in the current monetary system.

Box 24: Community Currencies in Japan

Local currencies to promote community and environmental conservation activities have begun circulating in several parts of Japan since the mid-1990s. Community currencies are used to activate the local economy, support public activities, promote communication among local residents and facilitate a spirit of volunteerism within the community. Some see the appearance of local currencies partly in the fact that society is discovering the limits of the capitalistic economy and has begun searching for a different system. Indeed, often people ask a small favour of another and feel awkward paying money for it, but would like to be able to offer something in thanks other than money, which reflects a market value that may not suit the kind of social interaction involved in genuine mutual assistance or social volunteerism.

Community currencies are generally issued by non-profit organisations, in exchange for donations by corporations or citizens. One community currency called "future," pronounced "fuchu," was named after the western Japanese town of Fuchu in Hiroshima Prefecture and was issued by the Citizens' Council to Fight Global Warming. When local residents in Fuchu participate in activities for the environment or the community, they receive "future" in exchange for their services. The households in this town also receive "future" when reducing their consumption of electricity, gas and water. "Future" can then be used for shopping during local festivals. In this way, the "future" is used to promote saving of energy and natural resources.

Another community currency called "Earth-Day Money" has been used for promoting people's participation in environmental projects in the Shibuya area of Tokyo. It was launched by a not-for-profit organisation, the Earth-Day Money Association, in October 2001. People who participate in environmental projects such as cleaning rivers, introducing sustainable energy, or participating in zero-waste campaigns receive "Earth-Day Money", which can be used in return for social services. People and firms can indirectly participate in such environmental projects by purchasing "Earth-Day Money" as their contribution.

Yet another community currency known as eco-money system started with all the participants writing down what they can offer and what services they want to request in return. A booklet and a bundle of eco-money are then distributed to the members. People can then browse the service menu in booklet form or access it online to shop for services, then contact a coordinator to request those services. The coordinator arranges the best candidate for the requested service within three days.

In spring 1999, Kusatsu in Shiga Prefecture became the first city in Japan to use eco-money – a community currency, calling it the ohmi, which is what the prefecture was called in the old days. Several other cities followed suit with currencies of their own.



<Eco-Currency "Future", Japanese town of Fuchu in Hiroshima Prefecture>

Source: Long-term Perspective and Policy Integration Project, IGES

For further information on community currencies in Japan and other Asian countries see: Community Exchange Systems in Asia [<http://www.appropriate-economics.org/asia/>]

D-R5. Micro-Credit and Community-Based Finance

The Grameen Bank in Bangladesh started an innovative micro-financing mechanism targeting women in low-income families. Originating in the Asia-Pacific region, this system seems applicable

to many local settings in the region. It has proved to be particularly effective in empowering low-income earners and stimulating local environmental efforts. It is considered worthwhile to redouble efforts to spread this system to other parts of the region to encourage local action on poverty and the environment.

The experience with micro-credit funds has revealed that the potential of such funds can be greatly enhanced when linked with official development assistance and commercial finance. Indeed, the delivery of ODA through two-step loans has been regarded as an important form of support to the development of local finance. Foreign capital can contribute to the establishment of micro-credit schemes and members of the local community ensure the sustainability of the credit. Another form of support for the development of local finance could be the buying down of loan interest rates by international finance institutions, so as to provide extremely low-income people access to capital. However, distortions in financial systems through subsidies need to be carefully designed so that they do not benefit the wealthy or well-connected few.

There are a few encouraging developments on micro-financing for the environment. NGOs have started to set up small financial bodies on their own, getting funds from individuals, community groups and companies. They support micro environmental projects such as renewable energy developments. Their interest rates are lower than those from commercial banks. The Shiga Bank in Japan, a commercial bank, has started the same type of service on its own initiative, and several other commercial banks are also looking at off-balance sheet micro-finance operations.

E. International Trade for Sustainable Development

E.1 Overview

Following the failure to reach consensus on the implementation of the Doha Declaration at the Fifth Ministerial Meeting of the World Trade Organisation (WTO) in Cancun in September 2003, WTO members managed to reach agreement in Geneva on 1 August 2004 after a week of intense negotiations. The WTO has now adopted the “July Package” which is a package of accords in Annexes that would enable the Doha negotiations to continue beyond the end of 2004. The “July Package” is only a framework to move ahead in agriculture (in particular, to phase out subsidies) and non-agricultural market access (NAMA, involving mainly industrial goods), on the so-called Singapore Issues (where it was agreed that investment, competition policy and government procurement would be removed from the Doha negotiating agenda), services and the “development issues.” This package will form the basis for the next stage of negotiations that will finalise “modalities” (principles and figures, for example on how much to reduce tariffs).

In the interim, a number of note-worthy developments occurred. In February 2004, a 26-member independent World Commission on the Social Dimension of Globalisation, which was sponsored by the International Labour Organisation, launched its report entitled “A Fair Globalisation: Creating Opportunities for all.” This Report points out, *inter alia*, that global trade rules need to be reviewed to allow greater policy space for developing countries to adopt measures to accelerate their development in an open economic environment, and that the multilateral trade rules should be made more balanced and fair.

Then in June 2004, at its 11th session, the United Nations Conference on Trade and Development (UNCTAD XI) adopted the Sao Paulo Consensus, a Declaration which contains policy analysis and responses needed in relation to: (i) development strategies in a globalised world; (ii) building productive capacities and international competitiveness; (iii) assuring developmental gains from international trading systems and trade negotiations; and (iv) partnerships for development. By far the most important outcome was the show of solidarity among developing countries and their insistence on space and flexibility to carry out national development policies in the face of constrictive international rules. The right of developing countries to have sufficient policy space for development was recognised by UNCTAD XI.

Despite these calls, there has, simultaneously, been a renewed, reinvigorated interest in a rash of bilateral and regional Free Trade Agreements (FTAs). In addition to the existing bilateral and subregional FTAs (the ASEAN FTA, South Asian Association for Regional Cooperation Preferential Trading Agreement, Agreement between New Zealand and Singapore on Closer Economic Partnership, and Japan-Singapore

Economic Agreement for a New Age Partnership) even more FTAs are in the offing for the region and many are likely to be concluded in the next few years among countries in the region as well as with countries in other regions.

It is generally recognised that bilateral agreements, especially between a developing and a developed country, are not the best option, and that multilateral negotiations are preferable as they allow a better bargaining position for developing countries. The pace and speed of proliferation of such bilateral and regional agreements puts pressure on personnel and financial resources, and requires tremendous technical expertise which may not be available in many developing countries.

The expansion of trade liberalisation under an increasing number of FTAs, it is hoped, will bring more prosperity and dynamism to the region. However, trade liberalisation and FTAs have to be designed in such ways as to be equitable and to ensure that the weaker countries benefit and do not lose out. At the same time, however, economic growth propelled by international trade, coupled with relatively cheap labour, may exert more pressure on the environment in the region through greater exploitation of natural resources and an increase in polluting activities. For example, depletion of tropical forests due to timber exports is one of the issues particularly relevant to Asia, which harbours a large proportion of the world's tropical forests endowed with an invaluable diversity of species.

Another issue particularly relevant to the region is increasing industrial waste. It is estimated that industrial waste generation in the region is equivalent to 1,900 million tonnes per annum and it will double in less than 20 years if current growth rates continue. In addition, the large number of factories producing ICT-related products in the region is increasing the discharge of hazardous waste.

Asia is becoming a world production centre as trade and foreign investment are becoming more liberalised. A feature of international trade in the region is the large share of manufactured products (83%) among the region's total exports. The region accounts for 28% of the world's total exports of manufactured products, ranking second after Western Europe, which accounts for 44%. Another characteristic is the large share of intra-regional trade. The region is a major destination for all major product groups of the region's merchandise exports. Intra-regional trade accounts for 45% of exported manufactured products, 63% of exported agricultural products, and 83% of exported mining products. Intra-regional trade will be reinforced as the number of bilateral and subregional FTAs increase. Taking into account the potentially significant impacts of trade on the environment, the expanding FTAs could have considerable implications for the prospect of sustainable development in the region.

Trade liberalisation is also changing lifestyles in the region. Prosperity driven by increased trade volumes could result in a rapidly expanding middle class. Trade liberalisation could help satisfy the increased demand for goods and services from this expanded middle class, but at the same time it would reinforce the unsustainable system of mass production, mass consumption and mass disposal. Certainly, government interventions in the form of export subsidies and import tariffs are likely to distort the market as typically seen in the agricultural sector, but due attention should be paid to the fact that free trade tends to exacerbate environmental degradation as environmental externalities are not currently internalised properly.

Maximising the benefits from trade liberalisation, specifically economic prosperity, on one hand, while minimising the environmental costs on the other hand should be resolved before more FTAs are concluded in the region. Such efforts have been made in connection with the conclusion of several FTAs in the past. The North American Free Trade Agreement (NAFTA) is the first such example. Environmental implications of NAFTA were examined, complementary environmental agreements were developed, and a regional institution was set up to follow up on measures taken to address potential environmental effects.

At the global level Multilateral Environmental Agreements (MEAs) are good examples of global initiatives that regulate trade for the sake of environmental protection. MEAs include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (Basel Convention). However, even these MEAs are being scrutinised in the context of the Doha round of trade negotiations. The implementation of MEAs might potentially conflict with existing or newly negotiated trade rules, while the principles of free trade might, in turn, conflict with the implementation of MEAs. MEAs as treaties agreed upon by a large number of countries, must be regarded as powerful instruments to prevent the depletion of natural resources

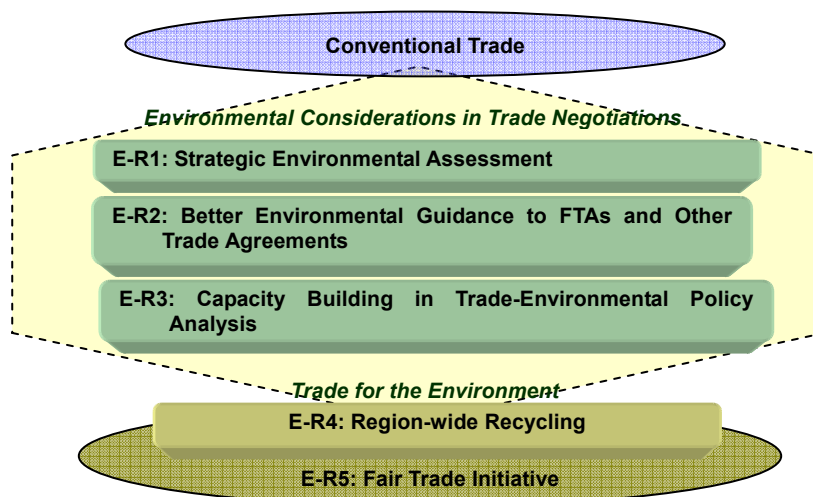
such as forests and biodiversity, or prevent trans-boundary shipments of hazardous waste. As such their strict compliance must be ensured in this region to eradicate illegal transactions as well as to ensure sustainability of resources. In this regard, it is worthwhile recalling Paragraph 98 of the Johannesburg Plan of Implementation which insists upon the “mutual supportiveness” of trade and environmental regimes. This is particularly important for Asia and the Pacific, whose economic development hinges upon trade with other regions, thus requiring environmental stability to sustain the economy.

Though negotiations on the linkage between trade and environment were launched at the Fourth Ministerial Conference of the WTO held in Doha, discussions focused on four major issues: (i) the need to clarify the relationship between the WTO rules and the trade obligations in MEAs; (ii) the exchange of information between the WTO and the MEA secretariats; (iii) the criteria for granting observer status to international organisations such as UNEP; and (iv) the liberalisation of trade in environmental goods and services. The last point is of particular importance for the Asia-Pacific region, as demand for renewable energy technologies and environmentally friendly vehicles, such as hybrid cars, is rapidly increasing in the region. In this respect, the reduction of tariffs imposed on hybrid cars in Thailand and Sri Lanka is encouraging⁹⁵. What is important for any trade agreement is agreed mechanisms by which price distortion is eliminated through the internalisation of economic, social, and environmental costs. As the issue of trade and environment was set apart from the major agenda at the Cancun Conference, it is uncertain how effectively the WTO will handle the issue of trade and environment at the global level. In this sense, it is highly recommended that the region take a lead in setting a sound precedent for harmonising trade and the environment.

Structure of Recommendations

Five recommendations follow. The first three relate to integrating environmental considerations into trade agreements. The first recommendation emphasises the need for strategic environmental assessment of trade agreements to be concluded in the region. The second recommendation extends that further, stating that environmental safeguards need to be integrated in the trade negotiations based upon strategic assessments. The third recommendation points out the capacity development needs in developing countries to analyse the implications of trade agreements for environmental policies. The last two recommendations touch upon types of international trade that will contribute to sustainable societies in the region. They are (i) the regional trade in recyclable materials, and (ii) the promotion of fair trade.

Figure 27: International Trade for Sustainable Development



⁹⁵ “Eco-friendly cars to qualify for tax break”, Bangkok Post, 15 June 2004.

E.2 Recommendations

Environmental Considerations in Trade Negotiations

E-R1. Strategic Environmental Assessment

Over time, FTAs could influence the industrial structure of countries joining such agreements. FTAs may lead to more environmental problems in countries where environmental governance, such as the enforcement of regulations, is weak. In other words, FTAs could trigger the trans-boundary movement of environmental problems, sometimes perceived as the “export of pollution” or a “race to the bottom.” To prevent this from happening, strategic environmental assessment (SEA), a form of EIA (Environmental Impact Assessment) applied at the policy, programme, or plan level, can be undertaken prior to conclusion of an FTA. An SEA could identify necessary adjustments to be made in the environment policies of the countries concerned. SEAs can also evaluate cumulative environmental impacts brought about by a series of FTAs. Insignificant impacts associated with one FTA could be transformed into something considerable, if combined with the impacts of other agreements.

Environmental issues should not be used as “behind the border” constraints on trade. A quasi-judicial mechanism could be considered to prevent and resolve trans-boundary conflicts pertaining to the environment, natural resources, and sustainable development. Ideas such as the establishment of an International Ombudsman Centre for the Environment and Development co-founded by the Earth Council and the World Conservation Union should be considered for incorporation into the negotiations of FTAs.

Box 25: APEC’s Initiative for Ensuring the Safety of Seafood

The project for the development and validation of phycotoxin analytical methods, standards and reference materials for seafood product certification and safety was launched in 2000 as a major initiative contributing to the implementation of the Action Plan for Sustainability of the Marine Environment initiated by the Asia-Pacific Economic Cooperation Forum (APEC). The project aimed to promote environmentally sustainable growth, harnessing technologies of the future, and developing and strengthening human capital so that it could facilitate the trade of seafood products among APEC economies and protect public health.

Specific actions included validating appropriate methods for routine monitoring of seafood for contamination by principal and emerging marine algal toxins; developing certified calibration standards for analysis of principal and emerging marine algal toxins; developing certified reference materials for quality assurance of marine algal toxin analysis; creating databases of analytical methodologies, biographic references, and APEC analytical expertise; and facilitating the introduction of validated analytical methods, supported by certified standards and reference materials, into seafood product testing and certification agencies of APEC economies.

This three-year project has strengthened trade in seafood products through an increase in the value, volume and diversity of seafood products that can be safely certified for export, while continuing to ensure the sustainability of these resources. In addition, the expertise and knowledge gained in the project have been shared to ensure the safety and quality of seafood product exports in other countries.

Source: APEC Project Database

<http://203.127.220.68/apcep1.nsf/websearch/B841E06835875CAC48256B1E000F5F9B?OpenDocument>

E-R2. Better Environmental Guidance to FTAs and Other Trade Agreements

The FTAs and other trade agreements recently concluded in the region, including the Japan-Singapore Economic Agreement for a New Age Partnership (JSEPA) concluded in January 2002 and the US-Singapore FTA concluded in May 2003 are changing the landscape of the interface

between trade and environment in the region. The JSEPA includes a general exemption that enables a Party to take measures, if the Party considers it appropriate, for protecting health, safety or the environment and for the prevention of deceptive practices. Going much further, the US-Singapore FTA specifically addresses environmental issues⁹⁶. Whether or how environmental policies should be reformed in conjunction with FTAs depends on the findings of the strategic environmental assessments mentioned above. A package of supplementary conventions to address potential environmental challenges associated with FTAs may be needed.

E-R3. Capacity Building in Trade-Environment Policy Analysis

For harmonisation of trade and environment in the region, it is imperative to strengthen the capacities of developing countries to assess the impacts of FTAs and other trade policies on the environment, as well as the impacts of MEAs and other environmental policies on trade. A regional mechanism pulling together resources to build institutional capacity to attain equal footing in trade dispute mechanisms, particularly on trans-boundary issues, must be promoted. First, a capacity building network on trade and environment is recommended. The network would link regional policy makers, experts and other stakeholders to set up databases and models for assessing impacts of trade liberalisation on sustainability, and to enhance capacity-building initiatives already launched by international organisations such as UNEP, UN-ESCAP, ADB, UNCTAD, World Bank and WTO.

Trade For the Environment

E-R4. Region-Wide Recycling

Given the expected increase in the intra-regional trade of goods and services, recyclable waste should also be traded at the regional level⁹⁷. Recycling should be widely promoted among countries in the region, ideally in proportion to the expansion of international trade among them. Non-hazardous waste in one country could be raw material in another. Access to recyclable waste that is cheaper than virgin materials benefits waste importing countries, while the use of recyclable waste reduces waste volume, and benefits waste exporting countries. Region-wide recycling could minimise the total amount of waste requiring final disposal.

Trans-boundary recycling has been taking place in large volumes for many years. Most common items traded include scrap metals, waste paper, used cars, and plastics including PET bottles. To promote region-wide recycling, an environmentally, economically and socially viable intra-regional market for recyclable waste is recommended. A Recycling Matching System, which would match generators and users of recyclable wastes across countries as well as within countries, could be a powerful instrument in enabling the intra-regional market to work effectively. The Extended Producer Responsibility (EPR) system is recommended to be applied to the exporters of the merchandise.

The full potential of region-wide recycling, however, is constrained by negative experiences with hazardous wastes falsely exported as recyclable waste. Eliminating these shady transactions, rather than preventing genuine, valuable trade in recyclable wastes, should counter the negative images associated with such illegal trade.

⁹⁶ In Chapter 18 on Environment (pages 213-217)

⁹⁷ Recycling should be carried out as close as possible to production, so as to reduce transport costs and transport energy. Thus, in principle, recycling at local level should be considered first. (for related information, refer to "M-R7. Urban Solid Waste Management" on p. 163-164.)

Box 26: Region-wide Recycling of e-Waste

The increasing volume of discarded personal computers, mobile phones, fax machines and other electronic equipment is causing concern. Some discarded devices are shipped across borders, where they can cause environmental and health problems in the recipient countries. If they are appropriately recycled, however, the practice could benefit both exporting and importing countries.

HMR Envirocycle Phils. Inc., located in Laguna, Philippines, is a company specialising in the recycling of personal computers. With twenty years' experience in this business, it handles both non-hazardous (e.g., surplus equipment) and hazardous (e.g., electronic waste or e-waste) materials and promotes the 3Rs—reduce, reuse, and recycle. The company de-manufactures used computers collected from offices and households in the country and then crushes monitors and segment circuit boards. These crushed monitors and segmented circuit boards are sold in the domestic market as recyclable materials. A part of the segmented circuit boards, which includes hazardous metals unable to be recovered due to the lack of appropriate technology, is shipped to countries such as Singapore, Malaysia or Republic of Korea, which have the appropriate recycling technology to recover hazardous metals from used circuit boards.

Through region-wide recycling like this, hazardous but reusable materials in e-waste which would otherwise be discarded and cause environmental problems are recovered and re-used. A case quite contrary to this example is outlined in Box 9 of Part I of this report.

Source: Research on Innovative and Strategic Policy Options (RISPO)/IGES

E-R5. Fair Trade Initiative

While liberalisation of trade has contributed to the economic development of the region, it has not necessarily benefited small producers in developing countries. Promotion of 'Fair Trade' is a promising approach that could provide low-income groups and small businesses in developing countries with fair returns from the expanded trading system.

Fair trade should be promoted for the sake of creating sustainable communities in developing countries. Participating communities become self-sustaining economically, and can deal with equity and environmental issues. With respect to the environment, many fair trade initiatives target local products, which are usually less resource-intensive and more environmentally sound. In Asia, a range of environmentally-friendly products is locally produced on a small scale. Pesticide-free agricultural products, for example, are likely to gain popularity among consumers as they become more conscious about food safety. Some good examples could be the "one-tambon, one-product" programme in Thailand, and the "Shade Grown Coffee Program" conducted by Starbucks Coffee in association with Conservation International. In the latter case, coffee produced in an environmentally sound manner, i.e., with water and soil conservation, crop diversification, and reduction of chemical fertiliser and pesticide, is served to consumers, and, in return, participating farmers get higher income and better access to credit and technical assistance⁹⁸.

The strength of fair trade lies in the strong linkage between producers and consumers, a role often usurped by middle-men. Networking between small producers in developing countries and consumer groups in developed countries should be strengthened. Strengthened networking of fair trade organisations will make fair trade in the region more stable and attractive.

⁹⁸ http://www.conservation.org/xp/news/press_releases/2000/051100.xml

F. Innovative Technologies for Sustainable Development

F.1 Overview

Technological change has far-reaching environmental, economic and social consequences. It has certainly contributed to the economic growth of the region, but at the same time it has in many cases increased pressure on the environment. Conventional technological development has been characterised by such factors as mass production, high speed, economic efficiency, central control and standardisation. Sustainable development may necessitate a paradigm shift in technology development. The new paradigm will be characterised instead by durability, environmental friendliness, reusability, easy maintenance, resource efficiency, decentralised control and diversity. This paradigm shift itself presents challenges for the success of sustainability, and requires concerted efforts among all key stakeholders.

Nowadays, some technologies that meet the needs of this new paradigm are increasingly available, for example renewable energy technologies and green chemistry. The effective use of residual biomass as energy could, for instance, significantly contribute to the creation of a recycling-oriented local community. How to make the best use of these technologies and how to ensure access to them are particularly relevant questions in this region, where increasing population, urbanisation and industrialisation are putting more pressure than ever on the environment. New and environmentally sound technologies can play a major role in building up sustainable societies in the region, in which the growing population is properly fed, modest lifestyles are extensively adopted, and industries are kept competitive internationally. Part of the dilemma, however, is how to distinguish between the environmentally sound technologies (ESTs) and those that make environmental conditions worse.

According to Agenda 21, ESTs “protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the conventional technologies for which they are substitutes.” ESTs are the total system, including “know-how, procedures, goods and services, and equipment as well as organisational and managerial procedures.” Certainly, ESTs are not totally new sets of technologies developed specifically for the new paradigm mentioned above. However, ESTs are gaining increasing importance in promoting sustainable development in developing countries. ESTs contribute to the efficient use of natural resources, cost reductions over the long term, and clean-up of polluted environments.

However, the transfer of ESTs to developing countries is encountering many obstacles. Some ESTs may not yet be well known or they may not be seriously considered as a viable means of production. In other cases, retrofitting costs to install ESTs may not be justified as the investment on such technologies may take a long time to recover. This barrier is more conspicuous with small and medium-sized enterprises (SMEs) and family-owned firms, which constitute the bulk of the industrial sector in the developing countries of the region.

R&D and the transfer of ESTs require the private sector to make significant contributions. The private sector develops technologies for pollution abatement, low emission vehicles, and renewable energy, and brings these technologies into the market. Moreover, it is the private sector that exports these ESTs across national borders and implements technology transfer in production facilities. Therefore, the role of the public sector, including international and regional organisations, should be catalytic in promoting efficient technology transfer of ESTs between private businesses by setting up enabling policy environment.

There have been many developments at the international level with regard to intellectual property rights. The Patent Cooperation Treaty was first signed already in June 1970. The World Intellectual Property Organisation (WIPO) provides assistance to developing countries to develop improved patent protection laws and to ratify the Treaty, as well as the Madrid system for the international registration of industrial designs and the Hague system for the international registration of industrial designs. In addition, the Trade in Intellectual Property Rights (TRIPS) Agreement was developed during the Uruguay round (1986-1994). TRIPS came into force in 1996 for developed countries, and in 2000 for developing countries of WTO. It is important to note that the Asia-Pacific region has been notorious for lax implementation of these international agreements. For example, the International Federation for Phonographic Industry estimated that one billion fake music compact disks were sold in 2003 valued at US\$4.5 billion. Of the top ten offending countries,

more than half are in the Asia-Pacific region⁹⁹. There are also concerns expressed, however, that the intellectual property system has resulted in misappropriation of traditional knowledge (a problem now being discussed in WTO, WIPO and CBD) and in the high and increasing prices of medicines and other essential products. Small farmers are also worried about the patenting of seeds whilst SMEs in developing countries may find it more costly or difficult to access technology that is patented. Therefore, an approach that appropriately balances the interests of private intellectual property holders and the public interest in general needs to be attained.

Information and Communication Technology (ICT)

The most important technological development in the last decade was the expansion of ICTs in both developed and, to a lesser extent, developing countries. Use of the Internet, along with the spread of personal computers among individuals and corporations, has drastically changed the way people communicate and work.

ICT has some positive implications for the environment. First, access to environmental information is vital for environmental democracy, and ICT has significantly improved this situation. In addition, the use of ICT has significantly contributed to strengthening advocacy power of NGOs, including those in developing countries. NGOs now can interact more frequently, and more internationally, and this has certainly improved their networking. The level of information disparity between large organisations such as governments and big corporations and small entities such as NGOs and individuals has been considerably reduced.

ICT also enables possibilities in reducing urban traffic demand by providing services through remote communications, in particular, through the Internet. People can communicate from their homes and offices with ease, with the Internet again playing a key role (see Box below). One possibility for future work styles is that of SOHO, or “Small Office-Home Office” which relies on the Internet for inter-office communications and therefore dispenses with the need to commute. Video conferencing is also among the emerging options for reducing not only traffic (including air travel) but also the energy demands of urban economic activities. Some cities have begun providing certain administrative services to their citizens through the Internet, thereby reducing traffic loads in the city centre around the city hall.

Box 27: Telecommuting

In Chula Vista, California, residents can drop into a neighbourhood telecentre and telecommute. Telecentres have computers, modems, telephones and other office support services to complete normal office activities. To avoid running around town filling in forms for urban services, e-government can also reduce inner city transport. Digital democracy, telemetric participation and citizenship and building an online interactive community is the key idea of Iperbole, and Internet-base citizens free-of-charge metropolitan civic network set up in 1995 by the city of Bologna, Italy. The Municipality of Bologna offers free email, direct access to its website, and free internet connections.

Source: <http://www.scienceblog.com/blogs/>

Furthermore, efficient transportation systems incorporating ICT, for example, those known as Intelligent Transportation Systems (ITS), have a great potential to reduce the severity of the traffic in urban areas. On-demand production systems applying ICT, such as Supply Chain Management, can reduce the materials and energy used in the production process through the efficient management of inventory.

However, ICT has not yet sufficiently reached many individuals or social organisations in developing countries. For example, 72.6% of Internet users are found in high-income countries. In low-income countries, the number of Internet users accounts for only 3.1% of the total population¹⁰⁰. To address this digital divide, innovative ideas are necessary so that people in developing countries can get necessary information when

⁹⁹ Source: <http://www.scienceblog.com/blogs/>

¹⁰⁰ ITU, 2002. “World Telecommunication Indicators 2002”

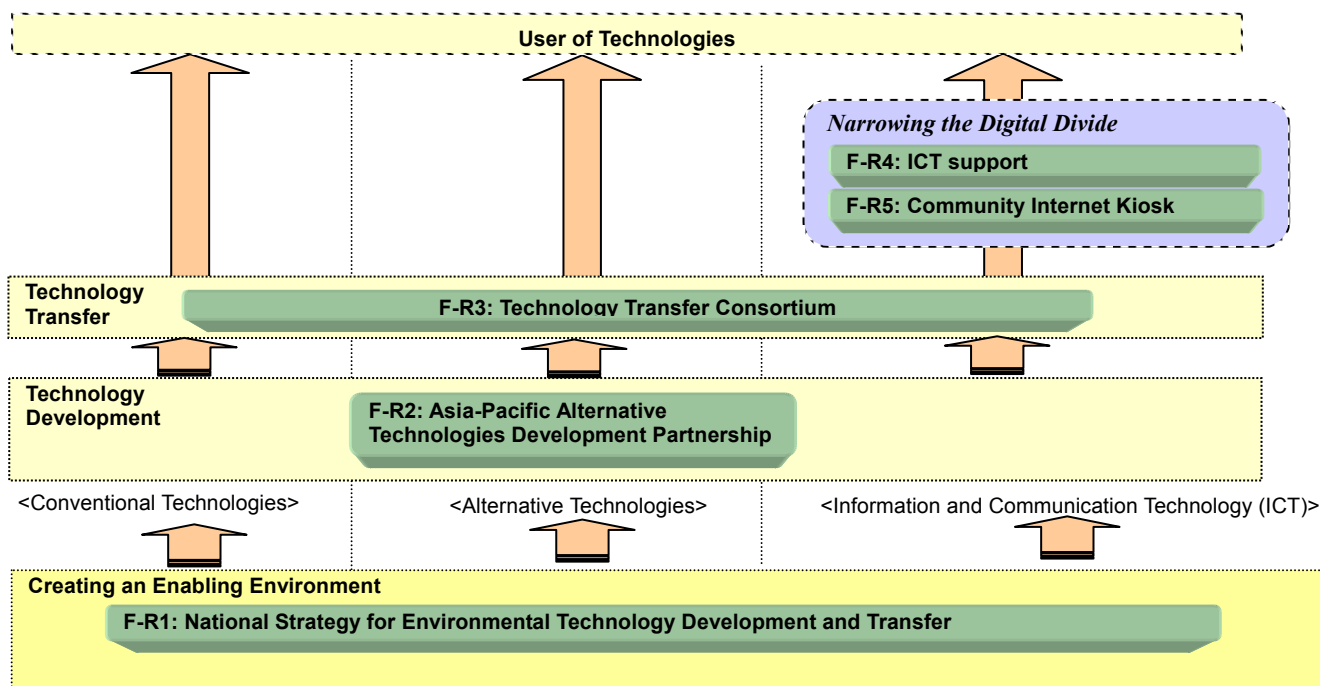
they need it, in a form that they can use. “Bytes for All” (<http://www.bytesforall.org>), a voluntary online initiative based in South Asia, is an example of how this challenge can be met. Originally an initiative of two people from India and Bangladesh, this was established to close the knowledge gap in Southern Asia and to work toward increasing the availability of information technology. Among other activities, this project involves organising campaigns for price reduction of software, for developing software for children in rural areas of South Asia, and for the use of freely available systems such as Linux.

Extensive use of ICT may be accompanied by negative environmental effects. As outlined in *Box 9 of Part I* of this report, e-wastes have become a serious trans-boundary issue in the region. Toxic metals contained in computers and other electronic appliances cause pollution if they are dumped illegally, and pose health risks to those working under appalling conditions to extract such metals from e-wastes.

Structure of Recommendations

The associated recommendations are five-fold. The first addresses putting in place an enabling policy environment for technology development and transfer. The two sets of recommendations that follow relate to institutional strengthening of the two important aspects of this section, namely (i) the development of technologies, and (ii) transfer of technologies.. The last two recommendations are intended to narrow the digital divide between the North and the South so that everyone in developing countries is able to access the benefits of ICT.

Figure 28: Innovative Technologies for Sustainable Development



F.2 Recommendations

Enabling Environment for Technology Development and Transfer

F-R1. National Strategy for Environmental Technology Development and Transfer

Conducive policies are necessary for ESTs to be developed and transferred. A national strategy to introduce such policies with a clear timeframe is considered necessary for the development and transfer of ESTs. The national strategy should consider the following.

First, environmental rules and regulations have to be properly implemented in such a way non-compliant companies do not benefit. Weak and inconsistent implementation of environmental policies tends to give disincentives for private companies to undertake investments that would

benefit the environment. Only determined political will or a critical survival issue will stimulate serious efforts on the part of the private sector to develop ESTs. Second, regarding intellectual property, due attention needs to be paid to the balance between financial returns secured by a private company and much broader social benefits shared by the general public. Third, fiscal measures to promote R&D could be useful. Government subsidies, joint private-public research, and tax exemptions are among the measures which have been practiced in some developed countries.

Still, technology development in some developing countries may not take place simply because the necessary expertise does not exist or because the market is not of sufficient size. Therefore, bilateral and multilateral cooperation among developing countries in the region will be of great value. Relevant expertise could be available in neighbouring countries and the market could be expanded, if neighbouring countries join forces.

Development of New Types of Technologies

F-R2. Asia-Pacific Alternative Technologies Development Partnership

Sustainable development in Asia and the Pacific is not possible without appropriate technologies. Some of these technology needs will be met by emerging global technologies such as biotechnology, nanotechnology, renewable energy technology, zero-emission technology and green chemistry. However, some technologies necessary for sustainable development in the region need to be tailor-made to local conditions and based on the new paradigm mentioned above, incorporating, among other things, durability, reusability and resource efficiency. The region's great diversity of natural, social, cultural, and economic conditions necessitates an equally diverse set of technologies, because future technologies have to be more in harmony with the dominant social and cultural practices of the locality. This means that the region needs to become more self-reliant in technology development.

Technologies are in a sense the physical manifestation of knowledge and wisdom. They are an extension of human hands and brains. The Asia-Pacific region has a huge body of indigenous knowledge and practices to draw from, handed down by preceding generations. As exemplified by the development of new medicines, the combination of modern technologies and indigenous knowledge could lead to the development of new technologies specific to the region.

The region already has many technical institutes, universities, and other bodies, both private and public, capable of conducting quality science and technology development. There have been numerous initiatives to develop ESTs and some are encouraging, as the Thai bio-fuel case demonstrates (Box 28). An increasing number of organisations, including NGOs, is involved in identifying, documenting, mobilising, and match-making indigenous knowledge and practices in this region. These existing arrangements should be fully tapped and made part of the partnership for new technology development. It should be obvious, however, that research capabilities are not equal among countries in the region. For example, both India and China are members of the International Partnership for the Hydrogen Economy, but no other developing countries are members.

To address these challenges, an Asia-Pacific Alternative Technologies Development Partnership (ATDP) is proposed. The partnership would catalyse internal capacity for technology development through the promotion of interactions among technical institutes in the region, by facilitating joint research and by providing research funds for promising technology development. Technologies to be catalysed could include, for example, bio-gas systems or wind energy technologies adapted to local conditions, wastewater treatment systems or composting systems for small households, and eco-rehabilitation techniques and practices based upon traditional knowledge.

Interested governments should support ATDP, but it should be financially independent to the extent possible by receiving a part of the royalties derived from technologies and practices developed. The partnership could use such revenue to replenish a part of research funds and to facilitate interaction among the institutes concerned and among possible users, such as through workshops or publications. Given that such royalties may be quite limited, seed funding support from the public sector would be needed.

Box 28: Research & Development of Bio-Fuel in Thailand

Petroleum in Thailand is a scarce commodity and most fuel is imported. Thailand started an ethanol project in 1976, when a fuel crisis caused a rapid rise in fuel prices, producing bio-benzene using sugarcane as a raw material. Though the project was suspended in 1987 when fuel prices returned to normal, it was brought back again by the Government at the time of the economic crisis. The National Ethanol Committee was set up in October 2001 to study the possibility of producing ethanol and its future use. The bio-fuel produced from agricultural products such as sugarcane, cassava and coconut oil, known as gasohol, ethanol, and bio-diesel, can be applied to small farm trucks, light trucks and some passenger cars, and has lower prices than ordinary gasoline and diesel in the local markets.

In 2001 Bang Chak Petroleum Co. and PTT Public Co. started a pilot project on gasohol by using ethanol produced from three pilot distilling plants. In December 2003 Bang Chak Petroleum Co. put "Gasohol 95" on the market through its 99 fuel stations in Bangkok. "Gasohol 95" received a good response from car drivers as it costs 0.5 Baht/litre less than Octane 95 gasoline, which is regularly used in most cars.

Local communities in Thailand also contribute to the development of bio-fuel. Bio-diesel (diesel fuel + vegetable oil) is produced in the countryside as a "rural intelligence" with a different formula and different materials from area to area. Its main purpose is to help the local community to use low-cost fuel in farm engines, farm tractors and diesel-engine trucks.

The introduction of local resources into fuel production like bio-fuel has the potential to contribute to the reduction of CO₂ emissions and decrease fuel costs in agricultural production and transportation as well. As the Thai government subsidises fuel prices, it also helps the national economy.

Source: APFED BPP

Transfer of Environmentally Sound Technologies

F-R3. Technology Transfer Consortium

Technology Transfer Consortiums (TTCs) would be established as an intermediary body for technology transfer in various parts of the region, to simultaneously address financial, informational and other barriers to technology transfer. Since the bulk of new technologies are controlled by the private sector of developed countries, they are subject to intellectual property rights, which limit accessibility to such technologies, particularly by SMEs in developing countries. TTCs would broker affordable funds for individual private companies, groups of companies, particularly SMEs, and industrial associations in the region, to access new technologies. Soft loans, subsidies, and other innovative financial instruments, such as leasing, arranged by TTCs could help companies to overcome financial barriers associated with EST installation. Interested governments, both central and local, would provide part of the funds needed, but TTCs should be operated as much as possible on a commercial basis.

TTCs would provide tailor-made consulting services to meet the needs of individual users of ESTs. Extension services of local public technology institutes could be made available by TTCs. Indeed, close collaboration between TTCs and these institutes, and other existing organisations such as APRCP (Asia-Pacific Roundtable for Cleaner Production) would be essential in providing relevant technical expertise.

Networking with technology transfer clearing houses such as UNEP's International Environmental Technology Centre (IETC) would also provide appropriate information services. TTCs could catalyse a group of companies to purchase or lease certain technologies collectively. Furthermore, TTCs would help technology transfer clearing houses disseminate updated technological information to those concerned in developing countries. Training workshops, eco-technology exhibitions and

demonstration projects could be effective dissemination tools.

Narrowing the Digital Divide

F-R4. Information and Communication Technology Support

Information is the key to CSO activities. The ability to collect and disseminate information is a major factor determining the level of support CSOs can provide for the general public. ICT resources are significant tools in enhancing these activities. "ICT resources" include a web server (on which CSOs can have their own websites), database servers which CSOs can consult for environmental information, and web-mail systems with which CSOs can communicate by e-mail with people around the globe. CSOs often have to spend a considerable amount of their limited financial resources for these ICT tools. Additional support to obtain ICT tools would facilitate CSO activities. Training on ICT skills might also be provided for CSO staff.

Some existing good practices in the region provide useful lessons for such initiatives (Box 29). In addition, a campaign to donate used computers to CSOs in the region could be effective.

Box 29: Good ICT Practices

In Indonesia, services have been provided by a website portal called 'Terranet', which is financially supported by an international NGO called 'Leadership for Environment and Development' (LEAD). It posts a variety of up-to-date environmental information on its website, including issues NGOs want to publicise. In addition, it provides NGOs with website hosting and e-mail accounts free of charge. It has been a significant form of support for many Indonesian NGOs, especially those with small budgets.

Source: <http://www.terranel.or.id/>.

F-R5. Community Internet Kiosk

ICT has put a wealth of knowledge and information within easy reach of anyone with access to a computer and a telephone line, via the Internet. Furthermore, it has facilitated exchanges of information, experiences and ideas across and within continents and countries among various stakeholders, making it possible to organise electronic forums to discuss issues related to sustainable development at various levels, whether local, national, regional or global. ICT has become an empowering tool that has provided great advantage to those with access to it and a great disadvantage to those without, leading to the "digital divide" that has exacerbated inequality within and among countries. However, the majority of people in developing countries do not have ready access to the Internet. Bridging the digital divide requires conscious efforts to provide access to the Internet for every community. Programmes to establish community Internet kiosks in every village are already underway in parts of Asia (e.g., India, Thailand), and should be replicated widely across the region. These initiatives provide an excellent opportunity for partnership among the private business sector, who can help provide necessary equipment and software; local civil society organisations, who can provide training to community residents on use of the Internet; and local governments, who can provide the facilities to house the Internet kiosks.

Where access to ICT-based information cannot be provided, IT-based information (e.g., from websites and e-mail) may be converted to more traditional media (community newsletters and pamphlets, community bulletin boards, and community radio spots, etc) and made available in local environmental information centres established in communities. Information particularly relevant to the communities that the centres are serving should be selected and provided in a manner and form that local people could easily understand. Appropriate information provided by local centres could be used for education, for sharing and dissemination of technologies and business opportunities, or for communication on sustainable development at the community level.

2. RECOMMENDATIONS FOR MULTI-STAKEHOLDER PARTNERSHIPS

The world is undergoing rapid changes due to globalisation, democratisation, and political decentralisation. Attempts to cope with such rapid and complex socio-economic change have often resulted in unpredictable and adverse impacts to our society and the environment. In a globalised world, international policies become intimately linked with domestic issues and policies. Interactions of people become more frequent and complex. Information flows become more dynamic than ever.

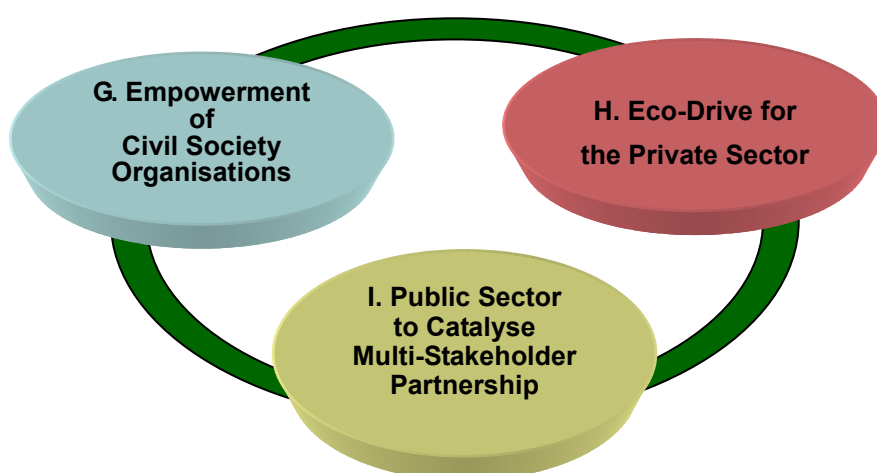
As the world has changed, the importance of partnerships among stakeholders has been emphasised in recent international political forums, such as WSSD. Following WSSD, 266 Type II partnership initiatives were registered, and 50 of them are specific to Asia. Recognising that individual activities and behaviour can influence the direction of our collective future, all stakeholders should understand their respective roles and then actively participate in the realisation of sustainable development. Empowerment of stakeholders and enhancement of their participation should be promoted to accelerate the shift to sustainable and equitable development.

Highly centralised political systems are often identified as a characteristic of governance in Asia and the Pacific, but this political situation has gradually changed as stakeholder participation has been promoted. Local governments have become more autonomous as a result of decentralisation. Civil society has been playing a more important role in agenda setting and implementing projects for sustainability at national, regional, and international levels. The private sector is increasingly taking responsibility for promotion of a sustainable society in the region. Accordingly, national governments have been gradually taking on a “catalytic” role in promoting sustainability.

Forms of participation cannot be uniform throughout the region. They need to be designed by taking into account such factors as culture, history, the social structure, the nature of the decisions in question, and the characteristics of decision-making systems. Effective participation systems need to be flexible enough to be applied to every corner of the region. One of the common principles governing participation systems of the region, however, could be “consensus building.”

Recognising the importance of participation, this chapter presents recommendations to promote actions of the primary actors, specifically civil society, the private sector, and the public sector.

Figure 29: Section of Chapter 2 “Multi-Stakeholder Partnership”



G. Empowerment of Civil Society Organisations (CSOs)

G.1 Overview

Civil society organisations (CSOs) are established for a myriad of reasons. Civil society refers to the association of citizens (outside their families, friends and businesses) entered into voluntarily to advance their interests, ideas and ideologies¹⁰¹. Civil society according to APFED includes: women, children and youth, indigenous peoples and communities, people's organisations (POs), NGOs, workers and trade unions, consumer group organisations, the scientific and technological community, and farmers. "Business and industry" are not classified as CSOs, while "community-based organisations" and "international NGOs" are included in the list. The diversity of CSOs has increased due to pluralised social needs. They are expected to play a significant role in democratic systems by representing the diverse values and opinions of civil society regarding sustainability.

The CSO sector has rapidly expanded in the last few decades in Asia and the Pacific due to democratisation, the influence of global and regional NGO movements, and the rise of the middle class as economies have grown. Although it is difficult to estimate the size of the CSO sector, governmental databases show a total of more than 14,000 and 8,000 CSOs in the Philippines and Thailand, respectively. In China, the legal status known as "*shetuan*", granted to social organisations, was held by around 90,000 organisations in 1991¹⁰². Significant numbers of NGOs have also been set up in countries without such official data. For example, more than 10,000 NGOs are operating in Indonesia. "Environment" is one of the main fields where the numbers of active NGOs are remarkable. A Japanese NGO directory includes more than 4,000 NGOs in the environment sector alone¹⁰³.

The ability of CSOs to create trans-boundary ties has become even more important in order to cope with emerging trans-boundary environmental problems. Also, the grass-roots activities of NGOs, people's organisations, communities, and individuals could be a safeguard for traditional values, lifestyles and cultures, which otherwise may be lost as a result of economic globalisation.

Decentralisation has also increased the importance of civil society organisations. However, rapid decentralisation has in many cases foundered against a lack of expertise and experience at the local government level. This in turn increases the need to promote the involvement of CSOs and other experts who can help local authorities to deal with local environmental issues. This is especially true with people's organisations since they tend to work at the grassroots level, with an emphasis on bottom-up, self-sufficient approaches that contribute to the development of rural communities. Local governments' capacities need to be strengthened as they are important stakeholders and are playing an increasing role for sustainable development in Asia and the Pacific.

Stakeholder participation has become a global trend since the 1990s, and it has increased the legitimacy of civil society's involvement in governance in the Asia-Pacific region. As emphasised at WSSD, concepts such as "partnership," "participation" and the "multi-stakeholder approach" comprise a global value for environmental governance. In order to address this global concern properly, participation of individuals and communities especially at the grassroots needs to be strengthened.

Thus, civil society has become an essential actor for building a sustainable society in Asia and the Pacific. CSO involvement in environmental governance and capacity building is considered vital in achieving sustainability. Sustainability at the national and indeed at the regional level can be achieved only by the participation of civil society, specifically, of grassroots communities and individuals.

Civil society has several roles to play in environmental governance. Gemmill and Bamidele-Izu¹⁰⁴ identify five: (i) collecting, disseminating, and analysing information; (ii) providing input to agenda-setting and

¹⁰¹ United Nations, 2004. A/58/817, The Report of Panel of Eminent Persons on United Nations-Civil Society Relations, We the peoples: civil society, the United Nations and global governance, 11 June 2004

¹⁰² Yamamoto, T. ed., 1996. *Emerging Civil Society in the Asia Pacific Community*, Institute of Southeast Asian Studies and Japan Center for International Exchange (co-publishers), Singapore and Tokyo.

¹⁰³ *Nihon Kankyo Kyokai* (Japan Environment Association), 2001. *Kankyo NGO Soran* (Environmental NGO Directory), *Nihon Kankyo Kyokai*, Tokyo.

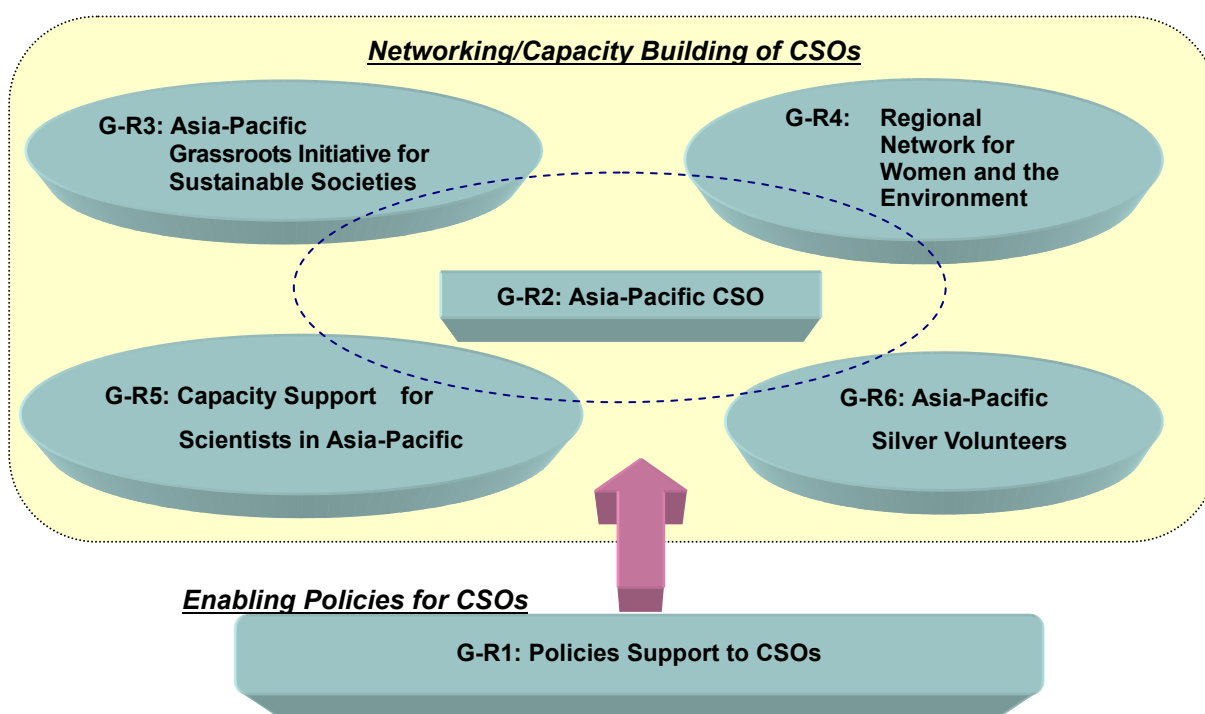
¹⁰⁴ Gemmill, B and Bamidele-Izu, A., 2002. 'The Role of NGOs and Civil Society in Global Environmental Governance', in D. Esty and M. Ivanova, eds, *Global Environmental Governance: Options & Opportunities*, Yale School of Forestry and Environmental Studies, New Haven.

policy development processes; (iii) performing operational functions; (iv) assessing environmental conditions and monitoring compliance with environmental agreements; and (v) advocating environmental justice. One key factor enabling CSOs to play these roles, by definition, is their non-political and non-business role. This status enables them to work at the community level as partners of the local people or to participate as opinion leaders in policy dialogues with governments and international organisations, regardless of their political orientations. Encouraging developments in this respect have taken place in Malaysia, where the government had recently recognised the usefulness of NGO involvement in policy making.

Structure of Recommendations

CSOs need further assistance to play these roles. First, an enabling environment should be created through institutional arrangements for promoting civil society activities. Second, capacities of NGOs and other civil society groups, especially people’s organisations and consumer groups, need to be strengthened, mainly through networking and modest financial assistance. An Asia-Pacific CSO Centre is proposed, which could be developed from the strengthened networking of various CSOs. The following recommendations emphasise the need for regional or subregional networking, and modest support of various civil society groups. Endogenous initiatives in the region could present models for sustainable societies for the rest of the world.

Figure 30: Structure of Recommendations for Empowerment of Civil Society Organisations



G.2 Recommendations

Enabling Policies for CSOs

G-R1. Policies to Support CSOs

Given the importance of CSOs in promoting sustainability, and their weak foundations, a sound political environment should be created throughout the region to help CSOs strengthen their capacities. Policies to promote financial independence from governments and businesses will strengthen their independent political status, which is a major asset of CSOs. Provision of legal status to CSOs and tax exemptions for business donations to CSOs are examples of necessary policies. Since the legitimacy of CSOs lies in their ability to reflect different (especially marginalised people’s) viewpoints, legal barriers on membership may prevent those CSOs representing marginalised populations from obtaining legal status. At the same time, information

disclosure should be furthered by governments and international organisations so that CSO participation in the policy making process will be meaningful and partnerships will be strengthened. Each government in the region is advised to review its policies concerning CSO activities and take necessary actions to create a sound policy environment for CSO activities.

Networking/Capacity Building of CSOs

G-R2. Asia-Pacific CSO Centre

A network of CSOs is a source of comparative advantage over other actors¹⁰⁵. Asian CSOs have formed loose forums with CSOs from other regions when participating in several international dialogues such as the Global Civil Society Forum of UNEP's Governing Council. At the regional level, some issue-based networks or loose forums of CSOs have emerged, but to date no established network or linkage of CSOs in the region has been formed. The European Environmental Bureau (EEB), consisting of 134 environmental NGOs from 25 countries in Europe, has acted as a bridge between civil society and environmental policy dialogues at regional levels, especially in the European Union (EU). Lacking a supranational body like the EU actually increases the need for this kind of regional CSO body, as it can link some subregional initiatives (which are often poorly coordinated) as well as connect civil society with regional policy dialogues.

Box 30: European Environmental Bureau (EEB)

The EEB is an independent international environmental association of NGOs in Europe. It consists of 143 organisations in 31 countries. Since its establishment in 1974, the EEB has played an important role in bridging policy decisions at the European level and NGOs at the national and local levels.

Member NGOs receive information on environment-related policies and dialogues at the regional level from EEB, and reflect them in their practices and advocacies at national and local levels. The EEB has more than 10 working groups, where a variety of expertise from member organisations, as well as their local/national level knowledge and opinions, are incorporated into its inputs to the regional policy process through position papers and lobbying. The EEB represents member NGOs when holding discussions with the EU. It also keeps close ties with major international environmental organisations, such as Friends of the Earth, WWF, and Greenpeace, to enhance its influence.

As the participation of citizens is promoted, the expertise, capacity and legitimacy of those citizens are increasingly required. By linking member organisations, the EEB has complemented its member organisations in these terms and contributed to the environmental policy process in Europe since its establishment.

Source: <http://www.eeb.org/>

To enhance capacity as well as to catalyse further interaction and collaboration among CSOs, a regional network could evolve into a regional CSO centre in future. The centre could conduct a range of activities according to the needs of the CSOs, including workshops, meetings, training, networking and policy research. A modest financial facility established by the centre could provide support for various CSO activities in a flexible and timely manner. Support could include provision of basic ICT equipment, given the importance of ICT for CSO activities. A prototype financial support facility for NGOs for the region established in Japan is outlined in Box 31. To replenish the financial facility, the centre would need to conduct fund-raising campaigns.

¹⁰⁵ See, for example, Princen, T. and M. Finger, 1994. *Environmental NGOs in World Politics*. London: Routledge.

Box 31: Support Fund on Environmental NGOs in Japan

As awareness-raising about the global environment has increased since the “Rio Summit” in 1992, recognition of the important role of NGO activities has also increased around the world. Against this background, the Japanese government established the Japan Fund for Global Environment in 1993 as a support fund for NGO activities on environmental conservation. Funds were comprised of investment from the Japanese government and donations from the public and private sectors. Funds are expended as subsidies for NGO environmental projects and activities in the Asia-Pacific region. For example, the subsidy can support practical activities in developing countries such as participatory forestry management and wildlife conservation, information dissemination for promoting voluntary activities, relevant research, and international conferences.

Source: <http://www.erca.go.jp/jfge/index.html>

Establishment of the regional network could be initiated with a regional CSO meeting, followed by national-level preparatory meetings. The regional network could be closely associated with the proposed regional multi-stakeholder dialogue. Aside from governments concerned, invitation to the first regional meeting should be extended to subregional bodies (e.g., ASEAN), and international organisations.

G-R3. Asia-Pacific Grassroots Initiative for Sustainable Societies

Endogenous grassroots social movements have been formed in many countries in the region. A notable example is the Sarvodaya Shramadana Movement in Sri Lanka (Box 32). Many of these social movements are based upon the traditional values of the Asia-Pacific region, which are quite different from dominant Western values. Modesty, simplicity, self-help, value of family, respect for the elderly, and respect for all other life forms are some of the typical values found in these movements. These basic values are close to the principles of sustainability and could form the basis of a new, sustainable economy. They could also serve as an example to CSOs in other regions to follow.

Even embedded in remote villages, these social movements cannot be isolated from globalisation and other dominant trends around the world. Calls for sustainable development may have influenced their activities in a synergistic way. Diverse local and indigenous knowledge, and beliefs and practices that are environmentally friendly may have received more attention; more environmentally sound rural development may have been promoted by these social movements than before; and poverty and environment issues may have been addressed in a more explicit manner. Promotion of eco-villages is a good example. The concept of eco-villages is diverse, but basically involves a participatory and bottom-up approach, and environmentally sound and sustainable activities e.g., activities that are energy efficient, emission-free, water conserving, and caring for nature. One notable example is that of the Bishnoi communities in India, which have been the largest contributor to the survival of wildlife in the western Indian State of Rajasthan. Examples such as these point towards the capacity of individuals and communities at the grassroots level in developing sustainable societies.

Box 32: The Sarvodaya Shramadana Movement in Sri Lanka

The Sarvodaya Shramadana Movement (SSM) is the largest NGO focusing on people's development in Sri Lanka. Established in 1958 as a small-scale educational programme for students in Colombo, led by Dr. A. T. Ariyaratne—a young high school teacher in those days—the SSM started its activities addressing the immediate needs of many under-developed villages by providing them with awareness raising, capacity building and volunteer labour to realise sustainable local communities with economic self-reliance. By 1974, there were already 1,000 villages involved in the SSM. SSM responded to local villagers' needs, such as collaboratively digging wells, building waterworks and roads, and planting trees, as well as providing micro-credit. The number of villages increased during the 1980s and by 1994 it reached 10,000—with nearly four million participants—out of a total of 23,000 villages in the country.

The philosophy of the SSM is embedded in its name. Sarvodaya and Shramadana mean “awaking of all” and “sharing of labour/energy” respectively. The movement aims to eradicate poverty and establish a society with equity based on sharing resources. The principle of its rural development work is self-help and mutual help among villagers. SSM facilitates this process by participating in both planning and physical work. Its five stage development model includes:

- (i) Introducing and encouraging functional leadership and community spirit through Shramadana camps;
- (ii) Forming functional groups and training programmes according to the needs of major groups such as mothers, youth, elders, and children;
- (iii) Assisting the community and its major groups in prioritising their needs, and discussing and launching projects, which may increase economic and employment opportunities;
- (iv) Income generation which helps to develop a more self-financing community as the social programmes continue; and
- (v) Self-financing continuing, and any surplus shared with other communities.

Source: <http://www.sarvodaya.org/rland.pdf>

Increasing awareness regarding environmental and sustainable development has stimulated new types of social movements focused on the environment. Such environmental movements in the Asia-Pacific region are diverse, depending upon the specific issues concerned and the political environment within which such movements operate. Some have been confrontational, and others have been synergistic with the government¹⁰⁶. Australia's Landcare programme is a good example of the latter. This community-based movement has been successful in mobilising 4,000 groups around the country and in building constructive partnerships with various stakeholders including the government and business (Box 33).

¹⁰⁶ Y.F. Lee and A.Y. So, 1998. *Asia's Environmental Movements—Comparative Perspectives*, M.E. Sharp Inc.

Box 33: Australia's Landcare Programme

Australia's Landcare programme is a voluntary community group movement for improving the country's natural resource management, with around 4,000 groups operating nationally, which successfully demonstrated that local voluntary initiatives adopting a bottom-up approach are highly effective in addressing environmental and sustainable development issues in rural and agricultural communities. The community, government, non-government organisations and the corporate sector have created partnerships to address the degradation of Australia's natural resource base: its soil, water and biodiversity. Awareness of natural resource issues and empowerment of individuals and communities to make a positive contribution to the environment have been the outcomes of Landcare programme activity. Government funding has been a catalyst for Landcare projects and these works have been implemented in line with national and regional natural resources and environmental management strategies. Bipartisan political support, park conservation and farmer group endorsement, community awareness and participation, and a national marketing and awareness campaign are the four "pillars" integral to the success of Landcare in implementing change to more sustainable natural resource use. It is a unique model for achieving positive environmental and farming outcomes, with social and economic benefits for whole communities—even nations.

Source: Michael Sutherland and Brian Scarsbrick, 1999. "Keynote: Landcare In Australia", Selected papers from the 10th International Soil Conservation Organisation Meeting held May 24-29, 1999 at Purdue University and the USDA-ARS National Soil Erosion Research Laboratory, <http://spc3.ecn.purdue.edu/nserlweb/isco99/pdf/ISCOdisc/SustainingTheGlobalFarm/K011-Suthe>

As indicated by the success of the Sarvodaya Shramadana Movement in Sri Lanka and the Landcare programme in Australia, self-help grassroots movements in the region exhibit the potential of such movements as an alternative to conventional top-down and centralised development planning widely seen in the Asia-Pacific region. Grassroots social movements in Asia and the Pacific present excellent learning opportunities for other development practitioners to learn from.

G-R4. Regional Network for Women and the Environment

The role of women in the development of sustainable and ecologically-sound consumption and production patterns and approaches to natural resource management have been recognised internationally in the United Nations Conference on Environment and Development, the International Conference on Population and Development, the Beijing Declaration¹⁰⁷, and at the first meeting of Women Leaders on Environment, Helsinki, Finland¹⁰⁸.

Women play a substantial role in the management and use of natural resources. Their role is crucial to the provision of food and nutrition, enhancement of the subsistence and informal sectors and preservation of the environment, as women are generally the main labour force for subsistence production, including production of seafood in many communities.

Moreover, women play an important role in promoting sustainable development through their concern for the quality and sustainability of life for present and future generations. Women, especially indigenous women, have detailed knowledge of ecological linkages and fragile ecosystem management. Women have often played leadership roles or taken the lead in promoting an environmental ethic, reducing resource use, and reusing and recycling resources to minimise waste and excessive consumption. Women can have a particularly powerful role in influencing sustainable consumption decisions.

¹⁰⁷ The United Nations. Beijing Declaration and Platform for Action, <http://www.un.org/womenwatch/daw/beijing/platform/index.html> (21 April 2004).

¹⁰⁸ Meeting of the Women Leaders on the Environment, Helsinki, Finland, 7-8 March 2002. http://www.iucn.org/info_and_news/press/helsinkideclaration.pdf

In light of this recognition, the number of women's non-governmental organisations working on the issue of women and the environment has been growing worldwide¹⁰⁹. The same trend has been observed in Asia-Pacific, and the Women Environment Preservation Committee of Nepal, a non-profit organisation based in Kathmandu, was awarded the United Nations Environment Award in June 2003 (Box 34).

To further promote such movements, cooperation among organisations for women and environment is crucial. Although such attempts have been started, including the Asia-Pacific Forum on Women, Law and Development¹¹⁰ and the Women's Conference on Environment in Asia and the Pacific¹¹¹, coordination between women's NGOs are still relatively weak. Region-wide support for those initiatives is very important for promoting a sustainable environment in the Asia-Pacific region.

Box 34: Women Environment Preservation Committee of Nepal Receives United Nations Environment Award

The Women Environment Preservation Committee of Nepal (WEPCO) is a non-profit organisation established in 1992 by a group of women from Lalitpur in response to a growing awareness that the environment in Nepal's Kathmandu Valley was in danger. WEPCO aims to enable the people of Kathmandu to have a clean and healthy environment through the initiatives of local women and students.

Faced with the growing volume of waste caused by an increasing population and excessive consumption in the City of Kathmandu, WEPCO has focused on 'disorganised garbage' as its priority. WEPCO specifically focused on kitchen waste, which comprises a large portion of waste. Women play a crucial role in this area since they are the ones in charge of the kitchen and the decisions on what, when and where to dispose of garbage. WEPCO has completed more than 100 training sessions on environmental awareness targeting community women and schools. It established demonstration sites for paper recycling and organic and worm compost and has supported many households to start their own composting. The programme was carried out in collaboration with several women's environment groups working in Lalitpur Sub-Metropolitan City. It has formed 90 clubs in schools, involving more than 6,000 students in six districts.

WEPCO has proved that applying the three "R" principles (Reduce, Reuse and Recycle) at the community level can control waste pollution problems in an urban municipality.

WEPCO had a staff of 15 women and 10 men as of May 2003. The basis of financial support of staff is the sale of recycled paper and garbage collection services.

Source: UNEP, 2003. Press Releases. <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=318&ArticleID=3995&l=en> (21 April 2004)

G-R5. Capacity Support for Scientists in Asia-Pacific

Scientific information lays the foundation for effective environmental policies, particularly for trans-boundary issues. As trans-boundary environmental issues emerge in the region, communication channels between policy makers and the scientific community will need to be strengthened. However, support to scientists in the region is very weak, leading to the best scientific minds migrating to the US and Europe. Capacities of scientists in developing countries need to be enhanced, and regional/subregional networks among scientists have to be strengthened with the aim of sharing

¹⁰⁹ Social Science Information Gateway (SOSIG), 2004. Women, Development and the Environment, <http://www.sosig.ac.uk/roads/subject-listing/World-cat/womendev.html> (21 April 2004).

¹¹⁰ Asia Pacific Forum on Women, Law and Development (WPWLD), 2004. Women and Environment Programme, <http://www.apwld.org/we.htm> (21 April 2004).

¹¹¹ Women's Conference on Environment in Asia and the Pacific, 2000. Women's Proposal for Solving Environmental Problems in Asia and the Pacific. Submitted to the UN-ESCAP Ministerial Conference on Environment and Development (MCED), 5 September, 2000, in Kitakyushu, Japan.

knowledge, experience and best practices (Box 35).

Box 35: APN Research Initiative for Asia and Pacific

The five-year CAPaBLE programme of the Asia Pacific Network for Global Change Research (APN) supports development and enhancement of scientific capacity in developing countries of the Asia-Pacific Region, mainly in areas related to climate change, and water and food security, directly linked to sustainable development. A two-track approach consists of (i) Capacity Enhancement for Experienced Leading Scientists, and (ii) Capacity Building for Young and Aspiring Scientists. Expected results include producing comprehensive scientific information on climate change impacts, vulnerabilities, adaptation and mitigation opportunities; enhancing availability of relevant information, experience and knowledge to policy makers; and eventually improving informed decision-making in developing countries.

Source: APN Website, <http://www.apn.gr.jp/>

G-R6. Asia-Pacific Silver Volunteers

Japan and several other developed countries have rapidly ageing populations. Some senior citizens are willing to volunteer their practical knowledge, experience and expertise to build sustainable communities in countries in the region. A silver volunteer system has already been established in Japan, but should be expanded and adopted throughout the region. A registration system for silver volunteers could channel them to where they are needed. Silver volunteer systems, if introduced at the local level, will also facilitate the use of traditional knowledge, which has often proven useful in environmental management. Governments at each level are encouraged to prepare an inventory of potential volunteers in a common format so that the data can be shared beyond jurisdictions. Modest financial support by the government will be necessary. It is expected that similar services could be provided at far less expensive costs than those required by consultants.

H. Eco-Drive for the Private Sector¹¹²

H.1 Overview

With increasing membership in the WTO and the global trend of trade liberalisation, economic interaction in the region is expected to be more intense than ever before. As the primary actor for economic development, the private sector is in a critical position to promote sustainable development, and actions taken by the sector have an enormous influence on the future of this region. Some companies have started taking environmentally friendly actions through independent initiatives and have been one of the driving forces towards sustainable development. Energy saving, annual environmental reporting, and the development of eco-products are a few examples. Yet, the private sector can deepen its role and responsibility for sustainable development, by interacting with other stakeholders.

The level of commitment to the environment by private companies is affected by sensitivity to social issues, market pressure, interest of the Chief Executive Officer (CEO), compliance with regulations, and availability

¹¹² References of this section

Business Environment Council, 2004. <http://www.bec.org.hk> (8 March 2004).

City of Kitakyushu, 2003. <http://www.city.kitakyushu.jp/~k2602010/sesaku/ecotown3b.html> (24 February 2004).

Cheng, Ching-Tsung, 2001. *Green Productivity Practice in Select Industry Sectors*. Tokyo, Japan: Asian Productivity Organisation.

Dhakal, Shobhakar, 2002. *Role of Government, private sector and civic society in promoting battery operated electric three-wheelers in Kathmandu, Nepal*. Working paper.

Kittappa, K., 2000. *Green Productivity Programs and Activities in the Asia-Pacific Region*. Tokyo, Japan: Asian Productivity Organisation.

Nakamura, Yasuhiko. *Water Business*.

Tagome, Chikayuki, 2001. "Environmental Industry in China" *Japan-Chinese Economic Cooperation Journal*.

Zhang Pohgyi, Yu Gang, 2001. "Chugoku Kankyo Hogo Sangyuo no Jyokuyou" *Chugoku Kankyo Business: Genjyou to Shouraiyosoku*, February 2001

of funds for the environment. A multi-national corporation (MNC) which produces consumer goods for developed country markets may have strong incentives to aim for advanced environmental performance, while a small family-owned firm in a developing country may not even be able to meet environmental standards set by the government due to poor access to relevant information and a lack of available funds.

Compliance with environmental regulations: initially, companies are typically motivated to carry out environmental measures to comply with government regulations. Responding to the traditional command-type regulation, companies tend to meet the requirement through the end-of-pipe approach. However, the emergence of the cleaner production concept highlighted the benefits of the pollution prevention approach (*for more information, see "Cleaner Production Technology" on p.37*). The pollution prevention strategies provide opportunities for companies to go even beyond the regulated emission levels and also to improve energy and material efficiency both in their production lines and products, and usually to save money.

Cost savings: As awareness about the environment increases, companies become more interested in reducing raw materials and the energy intensity of production, achieved through environmental and other measures such as reusing waste water, recycling raw materials and good housekeeping. As the primary interest of private companies is to maximise profits from their operations, the cost-saving effects of environmental actions attract their interests. Yet, financial constraints arise when new investment is considered for installing clean technologies and ESTs. The short-term pursuit of profits may preclude the long-term social benefits associated with new environmental investment, particularly for SMEs.

SMEs are a dominant force in developing countries and countries with economies in transition in the region. For example, as of 1998, about 98% of the firms in Taiwan Province of China were categorised as SMEs¹¹³ and they play an important role in supplying parts and semi-finished products to larger firms in the manufacturing sector. In India there are more than 3 million registered SMEs and their manufactured products account for 45% of the total exports of India¹¹⁴. However, the environmental performance of SMEs is far from adequate, resulting in negative environmental consequences. In China, small firms were responsible for 70% of total industrial solid waste in 1999¹¹⁵. Globalisation intensifies competition, especially for labour-intensive export industries. As a result SMEs in developing countries and countries with economies in transition find themselves in a more difficult situation to respond to increasing demand for environmental improvements.

In view of these difficult challenges facing the private sector such as constraints on finance and the human capacity to introduce necessary actions and technologies for the environment, governments offer support ranging from subsidies for the installation of ESTs, to development of guidelines for environmental reporting and consultation services. These public services generally fall short of private sector needs.

Environmental Management: Promotion of eco-efficiency has appealed to many companies, including those in developing countries. Business councils have incorporated environmental concerns into their charters, offering funds for nature conservation. Some companies set up an environmental section in their organisation, carrying out voluntary actions like planting trees and cleaning up coastlines. Moreover, some MNCs (multi-national companies) have applied the same high environmental standards of the developed world to their factories in developing countries, introducing advanced technologies and environmental management systems, which would otherwise not be available in host countries. Voluntary environmental management schemes such as ISO 14001 registration, environmental reporting, and internal environmental training have been introduced by many companies. However, the number of such companies is still limited in developing countries.

There are signs of positive environmental responses. Companies are now paying more attention to the growing interest of consumers in sustainable development and health consciousness. Demand for eco-products such as recycled paper products, clothes made from recycled plastic, non-toxic detergents and organic vegetables is on the increase, and an increasing number of entrepreneurs see business opportunities in that nascent shift in consumer thinking. The private sector, however, could play a more significant role in

¹¹³ Cheng, Ching-Tsung, 2001. Country Paper – Republic of China, *Green Productivity Practices in Select Industry Sectors*. Asian Productivity Organisation.

¹¹⁴ Kittappa, K., 2000. Country Paper – India, *Green Productivity Programs and Activities in the Asia-Pacific Region*.

¹¹⁵ Tagome, Chikayuki, 2001. "Environmental Industry in China" *Japan-Chinese Economic Cooperation Journal*.

increasing consumer interest in the environment. Companies producing consumer goods could package the concept of sustainable development to the public with their eco-products. Eco-labelling schemes could be helpful in stimulating this synergism, although some harmonisation of eco-labelling is needed.

Information as an Instrument of Environmental Management

OECD countries were the first to introduce information-related instruments in environmental management. Environmental labelling and the Pollutant Release and Transfer Register (PRTR) are representative of such measures. Environmental labelling is intended to indicate products having less environmental load throughout their life cycle, extending from production, through consumption, and into the disposal stage. A competitive edge can be given to products through this means by differentiating labelled products from other products. For consumers, purchase of an eco-labelled product provides an opportunity to make a small, indirect contribution to environmental conservation.

PRTR requires companies to submit to the competent authority a breakdown of the amount of hazardous chemicals emitted as waste from their operations. The information presented is made accessible to the general public, in particular to local communities. Social pressure resulting from this system has encouraged many companies in developed countries to drastically reduce their chemical emissions.

Environmental information has three important roles to play. The first is to serve as an important instrument in achieving environmental policy objectives (e.g., PRTR). The second is to provide trustworthy information as a basis for various stakeholders to make sound decisions. The third role relates to stakeholder input to policy and project formulation, which stems from modern information technology that has made it easy for various stakeholders to communicate even across national borders in a freer and less expensive manner. In the following section, new regional and subregional environmental institutions are proposed to enhance environmental governance in the Asia-Pacific region in a manner compatible with the plurality of environmental actors and the myriad of initiatives at the national, sub-national, and regional levels.

Eco-Industry

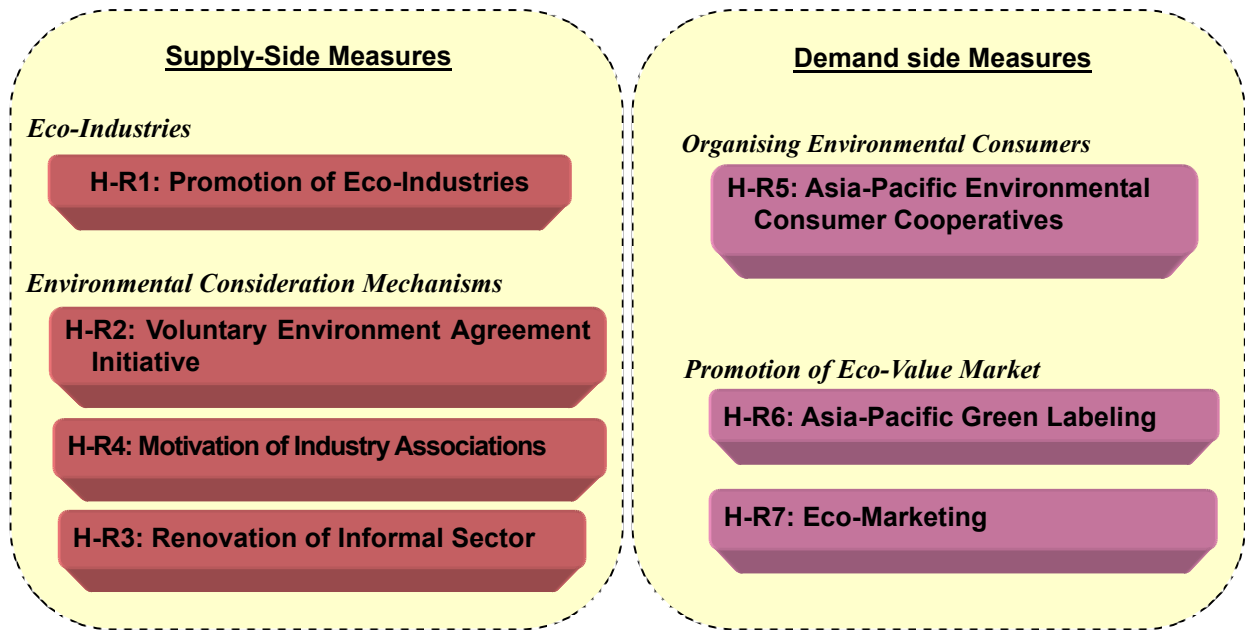
Many companies have realised that the environment is no longer a burden but rather a source of profits. Educated consumers are beginning to demand environmentally friendly goods, and this trend will push more private sector entities into the eco-industry market. Companies may enter this market after initial experience with enhancing their image by promoting environmental responsibility, or going beyond compliance with win-win retrofitting of production processes. Alternatively, they may be starting up companies developed by environmentally committed entrepreneurs. Moreover, creation of an enabling legal and institutional framework has assisted the push for development of eco-industries. In China, total sales of environmental manufacturing industries in 2000 amounted to 82.3 billion yuan, and 12,806 enterprises were involved in eco-industry¹¹⁶.

Structure of Recommendations

Recommendations for the private sector can be divided into the supply side and the demand side. On the supply side, there are four recommendations. Promotion of Eco-Industries and Renovation of the Informal Sector are intended to motivate industries to incorporate environmental consciousness into their operations, thus creating employment opportunities. Their practices would be backed up by Motivation of Industry Associations and Voluntary Agreement Initiatives. On the demand side, Asia-Pacific Green Labelling and Eco-Marketing are intended to appeal to consumers by differentiating environmentally-friendly goods and services (through green labelling) and by promoting eco-industries through e.g., creating environmentally positive brands. The Asia-Pacific Environmental Consumer Cooperatives are an effective way to make consumer preferences for environmentally-friendly goods and services heard in the actual market.

¹¹⁶ Zhang Pongyi, Yu Gang, 2002. "The State of Chinese Environmental Industry" *The State and Future Prospective of Chinese Environment Business*.

Figure 31: Structure of Recommendations on Asia Pacific Eco-Drive for the Private Sector



H.2 Recommendations

Supply-Side Measures

H-R1. Promotion of Eco-Industries

Eco-industries, namely those producing environmentally friendly goods and services, such as disposal of industrial wastes, conducting eco-tourism (see Box 36), and generating renewable energy, are on the rise in the region. Such industries are generally more labour-intensive than others, so successful development of environmental industries could generate significant employment opportunities. For example, eco-tourism creates opportunities to get income to local people e.g., through eco-friendly activities organised by local communities, such as tree planting, garbage clean-up campaigns, and traditional clothes-making. NGOs and the private sector can also participate in park management activities and as nature guides. Policies to promote eco-industries such as incentive systems (e.g., eco-labelling), and fiscal measures such as tax exemption and subsidies, are considered important.

More and more private companies are entering the eco-market, with environmentally-friendly goods and services ranging from agricultural and forest products to sophisticated industrial products such as automobiles. In the future, the number of such goods and services will increase. However, there are needless barriers (regulatory, fiscal, or informational) in the region preventing such goods and services from coming into the market. To help emerging eco-industries cope effectively with such barriers, the establishment of a national eco-industry association (such as the Barton Group in Australia) could be useful in addition to the government support mentioned earlier. The association could discuss common issues confronting the industry, and propose policies to the government to address them. A network of eco-industry associations could be developed at regional and/or subregional levels so that trade and other international issues could be discussed.

Box 36: Promotion of Eco-tourism

The Southern Right Whale is an endangered creature and it has been protected in South Australia since 1931. Now the population is believed to be recovering at around 7% a year (Sunday Mail, August 29, 2004) and people can enjoy watching the whale in the Great Australian Bight Marine Park. The Park is divided into some zones with different protection levels of natural environment, from sanctuary to general use zones, to harmonise well environmental conservation and human activities including commercial activities. In the management of the park, the local community plays an important role. For example, rangers from the local authority, the Yalata Community, extend various services for management of the park, including checking unauthorised activities, assisting research by counting whales, and providing information to visitors. A visitor centre was established in collaboration between the Yalata community, the South Australian Tourism Commission, and other stakeholders.

Involvement of the community is a key to successful eco-tourism. In the course of promoting eco-tourism, it is essential not to disrupt the lifestyles and traditions of local communities, and to ensure that part of the benefits generated by eco-tourism remains in local communities. Unless this is achieved, many protected areas in the region may suffer from continuous encroachment by local people, especially where they were not consulted in drawing up park boundaries. In the promotion of eco-tourism in the Ogasawara Islands, Japan, which are also known as whale watching sites, the involvement of usually not-well-represented local community members such as women contributed a lot to the development of eco-tourism.

Eco-tourism has high potential to enhance sustainable development in the region. In the promotion of eco-tourism, the code of conduct for environmentally-friendly tourism developed by the Pacific Asia Travel Association (PATA), for example, should be more extensively shared among relevant persons and groups in the region.

Sources: p.6-7 of Sunday Mail, August 29, 2004; Information on The Great Australian Bight Marine Park in the web-site of Department of Environment and Heritage of South Australia, <http://www.environment.sa.gov.au/coasts/gabmp/> (access date: September 13 2004); IGES/RISPO

H-R2. Voluntary Environment Agreement Initiative

Companies acquiring ISO 14001 have increased significantly, particularly in the export-oriented countries of the region. Some of these companies have published environmental accounting reports, outlining their environmental commitments and achievements. Often, but not always, certification was imposed by Western companies that purchase products from those companies. Other factors include the need to enhance corporate images in response to emerging green consumerism and the realisation that environmental initiatives could pay off in the long run.

Voluntary initiatives of this kind should be more actively promoted in the region, because they often provide more flexible and less expensive solutions to environmental issues than conventional regulations. An annual award system could be established for good corporate practices. Voluntary initiatives could be linked to the possibility of future regulations. If voluntary commitments do not yield sufficiently positive results, environmental regulations could consequently be strengthened. Involvement of local communities is also effective in making such voluntary initiatives successful (Box 37 and 38).

Furthermore some financial institutions have a policy to invest only in socially and environmentally responsible companies, and a few banks have started to provide loans with terms that are more favourable for companies whose environmental performance is good. The Equator Principles International, a financial sector initiative to integrate environmental concerns in loan terms for big projects, is a good example for promoting and enhancing ethical investment¹¹⁷. These new moves provide additional incentives for companies to take voluntary action.

¹¹⁷ By June 2004, the principle was adopted by 25 financial institutions located in 14 countries. For more information, see <http://www.equator-principles.com/>

Box 37: Prevention-of-Pollution Agreement as Local and Private Sector Initiatives

In 1964, the first voluntary agreement in Japan to prevent pollution was signed between the Yokohama city government and the Isogo power plant. Although the Electric Power Development Co., Ltd. of Japan planned construction of a coal-fired power plant at Isogo in Yokohama City, it met with strong opposition to the construction from local residents, on environmental grounds.

Yokohama City then requested examination of possible measures against pollution from four scientific organisations and the results were reflected in a voluntary agreement between the city and the electric company. The agreement prescribed various environmental measures worked out through discussions among the company, the local government and residents. Although not legally binding, this type of voluntary agreement became essential in order for the company to get *de facto* approval from the local community and local government. This example served as the precedent for other communities and local governments to follow, helping prevent pollution in Japan in 1970s.

Source: Development Bank of Japan, "Local and Private Sector Initiatives with Global Environmental Benefits"

Box 38: Voluntary Environment Agreement in the Netherlands

In the Netherlands, environmental agreements between the government and the private sector on targets and measures for the reduction of the environmental burden caused by private sector activities were adopted as a policy instrument, instead of traditional command and control measures. These agreements require each company to conduct voluntary initiatives for environmental management, to meet their share of the sector targets.

One of the major merits of this approach is to enable each company to incorporate environmental management activities in accordance with its own management strategy. In addition, it enables companies to plan long-term environmental management activities since the agreements assure policy continuity. For the government, the merits include more effective and more efficient implementation of environmental policies, since the government no longer has the burden of guiding technological innovation for the private sector, nor needs to constantly revise legislation in accordance with technological innovation.

A side benefit is that negotiations between the government and the private sector have generated an active information exchange and a stock of knowledge on environmental issues. Recent reviews confirm that some environmental targets stipulated in the agreements have been met, but some difficult ones have not (e.g., consumption). This may indicate the limit of voluntary agreements, and may require the introduction of an appropriate mix of various instruments. Nevertheless, the voluntary environmental agreements certainly have been appreciated as effective policy instruments since the 1990s.

Source: "Dutch Model", T. Nagasaka, 2000, (in Japanese)

H-R3. Renovation of Informal Sector

The informal sector plays a significant role in the urban areas of many developing countries. They provide such services as transportation (e.g., trishaws in Bangladesh and *tuk-tuk* in Bangkok), retailing (e.g., small street vendors), and waste disposal (e.g., plastic recycling). Their services are essential since they complement the formal sector by providing basic services, mainly to low-income persons. They also provide employment opportunities for the poor. On the other hand, negative cases from the informal sectors are also reported. For example, informal vendors of water to under-serviced slum dwellers provide water (often poor quality water) at a price 10 times higher than

the piped supply in wealthier suburbs.

The informal sector of developing countries is quite significant. In Mexico, for example, the informal sector owns 6 million businesses, 134 million hectares of land, and 11 million buildings. All of them together are worth US\$315 billion, which is 29 times the value of all foreign direct investments after its independence. In Egypt, 92% of buildings and 88% of businesses belong to the informal sector, amounting to US\$248 billion. This is 55 times all foreign direct investments after France left in late 18th century¹¹⁸. Similar situations exist in most developing countries in the region.

As the informal sector has both positive and negative impacts upon the environment, it is important to design and implement urban improvements by making the best use of the vitality inherent in services provided by the informal sector. Urban planners should capitalise on synergistic opportunities between the informal sector and local environmental actions.

Such synergies are not always immediately obvious. For example, Kathmandu has improved local air pollution by introducing electric three-wheelers, while at the same time creating the new business of manufacturing electric vehicles (Box 39). Similarly, there are many cases where local communities are empowered by organised, safe recycling and composting of waste. This again improves environmental conditions while generating jobs for poor communities.

To facilitate such synergistic opportunities in the informal sector, communities and local NGOs could play a critical role, because they can observe and coordinate social needs at the local level, in particular assisting marginalised people.

Box 39: Electric Three-Wheelers in Kathmandu, Nepal

Diesel-operated three-wheelers were introduced in the Kathmandu Valley in the late 1980s to early 1990s and became a popular transportation option for people as cheap public taxis. However, the air quality of the valley became increasingly polluted, resulting in serious health problems and damage to the world-famous Himalayan tourism, which is the primary source of income in the country.

Although the government banned the registration of new three-wheel vehicles in 1992, no immediate improvement could be seen because of a lack of supporting policies. Pressures from NGOs, the tourism sector and the public for anti-diesel three-wheelers got stronger, and they were finally banned in the valley in July 1999.

In the meantime, the Kathmandu Metropolitan Corporation requested a US-based NGO, the Global Resources Institute, to convert diesel-operated three-wheelers to electric three-wheelers. That pilot project was made possible with the support of the United States Agency for International Development (USAID) and US-Asia Environmental Partnership Program. The significant aspect of this project is that it valued equally the awareness and acceptance of the government, the private sector and the public.

In the project, the private sector played important roles. By 2002, private companies manufactured, sold, and operated more than 600 electric three-wheelers in the Valley. The electric vehicle (EV) industry now consists of vehicle manufacturers, vehicle owners, and electric charging station operators. Furthermore, the industry has established the Electric Vehicle Association, which lobbies for the EV industry with the government, the media and the public.

Source: Dhakal, Shobhakar, 2002. "Role of Government, private sector and civic society in promoting battery operated electric three-wheelers in Kathmandu, Nepal."

¹¹⁸ De Soto H., 2004. "Bringing Capitalism to the Masses", Cato's Letter, Vol. 2, No. 2, Summer 2004, CATO Institute, US.

H-R4. Motivation of Industry Associations

Peer pressure through industry associations can be a good catalyst for the encouragement of private sector environmental performance. As 70-80% of industries in Asian countries are SMEs, they must be drawn into a holistic approach undertaken by all stakeholders for sustainable development. Vulnerable SMEs will be better off taking actions as a group instead of struggling individually (Box 40).

Box 40: Shared Wastewater Treatment Facilities for Tanneries in Thailand

The tanning industry is one of the oldest industries in Thailand. According to the Department of Industrial Works, there are 146 tanneries in Thailand, over 90% of which are small and medium-sized enterprises. The industry employs over 150,000 employees. Tanneries in Thailand are concentrated in the Samutprakarn industrial area, near Bangkok.

The tanning process is generally comprised of three main stages, namely, beamhouse, tanning and finishing. As the process is chemical and water-intensive it produces a large quantity of wastewater. Wastewater discharges containing high levels of organic and inorganic substances can cause major environmental problems.

For managing wastewater and controlling pollution, shared wastewater treatment facilities were built in the tanning industrial area to serve 130 tanneries with a total daily discharge of 20,000 m³. The Thai Tanning Industry Association (TTIA) operates two wastewater treatment facilities in which TTIA members share the investment and operating costs. The investment cost about \$20 million while monthly electricity bills cost more than \$50,000. Shared wastewater treatment facilities can help increase overall economic efficiency through sharing the cost, personnel and other associated resources.

TTIA was established as a result of the tannery cluster development after the relocation of tanneries from Bangkok to the Samutprakarn tanning industrial area. The main reason for the successful establishment of the treatment facilities was the close relationship of the tanneries, supported by mutual trust.

Source: <http://www.thaitanning.org/environment.htm>

For broader industry associations, the World Business Council for Sustainable Development (WBCSD) has been active in promoting sustainable business practices globally, and it may be useful to establish an Asia-Pacific regional chapter of WBCSD. However, at the local level, local industrial associations are in an ideal position to bring small companies together and tackle problems collectively and effectively. Possible functions that industry associations might execute include the hosting of seminars and workshops for information dissemination regarding necessary technologies and financial assistance, the dispatch of consultants, translation services into local languages to support the introduction of advanced technologies, and facilitating communication between governments and SMEs by serving as a mediator.

Box 41: Business Environment Council in Hong Kong, China

The Business Environment Council (BEC) is a non-profit environmental organisation that aims “to advocate the business case for sustainable development and encourage the uptake of practices which reduce waste, conserve resources, prevent pollution and improve corporate environmental and social responsibility.”

As of March 2004, BEC had 67 member organisations, including industry associations and private corporations as well as universities. Membership has been increasing, especially among SMEs, which had a 500% increase since 2002.

By joining BEC, members are benefited by: (i) enhancing the network of business leaders not only in Hong Kong, China but also overseas; (ii) delivering business perspectives to governments; (iii) accessing environmental information through News Bulletins and news updates; (iv) participating in training courses; (v) receiving management consultancy and research services; and (vi) renting exhibition areas.

With this rapid growth in membership, these services will certainly be assisting companies’ environmental performance in broader sectors and geographical areas, and would be a model for other places.

Source: http://www.bec.org.hk/general/e_home.php

Demand-Side Measures

H-R5. Asia-Pacific Environmental Consumer Cooperatives

Green consumerism should be promoted more actively in the region through the establishment of networks and the strengthening of environmental consumer cooperatives to purchase environmentally-friendly goods (e.g., energy-efficient cars and appliances, and products not containing hazardous chemicals), and services (e.g., electricity generated by renewable resources, and eco-tourism). In the region, there are several such cooperatives, mainly promoting the sale of natural soap, safe milk and eggs, and pesticide-free organic agricultural products.

As consumers become more environmentally aware, activities conducted by such consumer cooperatives will have even greater impact. Campaigns to make consumers more aware of the environmental risks associated with certain products can have tremendous effects on the sales of such products. With modern information technology, environmental cooperatives could provide information on eco-goods and services more effectively.

H-R6. Asia-Pacific Green Labelling

Many countries in the region are adopting eco-labelling schemes. In Asia, countries such as China (China Environmental Labelling), India (Ecomark), Japan (Eco Mark), Republic of Korea (Environmental Labelling), Malaysia (Product Certification Program), Singapore (Green Label Singapore) and Thailand (Thai Green Label) have already established their own eco-labelling schemes. While eco-labels were intended to attract consumers looking for ways to reduce adverse environmental impacts through their purchasing choices, to date the Asian eco-labels have not been as effective as those introduced in the West. This may be because of less consumer awareness, less transparent criteria, and the plurality of labelling programmes.

To promote eco-labelling and labelled products in the region, and to remove barriers to environmentally sound production processes associated with separate national labelling schemes it would be more effective to create an Asian eco-label scheme (like Nordic Swan in Nordic countries) or to have a bilateral (or multilateral) agreement to recognise other national eco-labellings in their domestic markets (for instance, Taiwan Province of China and Canada have an agreement on

eco-labelling). To facilitate such regional or joint eco-labelling, it would be essential to discuss certification criteria on each product. Often different schemes apply different criteria even for the same product. In order to facilitate its promotion, harmonisation of certification criteria could be a first step. The joint scheme should apply not only to industrial products, such as automobiles and home appliances, but also to agriculture, forestry, and fishery products. The certification criteria would have to be developed jointly for the agreed goods and services. An independent certifying body should be entrusted to analyse each application.

For the promotion of the eco-labelling scheme, green labels could be linked to a point system. Whenever a consumer buys goods bearing green labels, he/she would gain points, based on the price, with accumulated points to be exchanged for shopping coupons, for example.

Box 42: Thai Green Label Scheme



The Thai Green Label Scheme was initiated by the Thailand Business Council for Sustainable Development (TBCSD) in October 1993. It was formally launched in August 1994 by the Thailand Environment Institute (TEI) in association with the Ministry of Industry. The Green Label is an environmental certification awarded to specific products that have minimal detrimental impact on the environment in comparison with other products serving the same function. The Thai Green Label Scheme applies to products and services, not including foods, drinks, and pharmaceuticals. Products or services that meet the Thai Green Label criteria can carry the Thai Green Label. Participation in the scheme is voluntary.

The scheme aims to provide reliable information and guide customers in their choice of products; create an opportunity for consumers to make an environmentally conscious decision, thus creating market incentives for manufacturers to develop and supply more environmentally sound products; and reduce environmental impacts which may occur during manufacturing, use, consumption and disposal of products.

Source: http://www.tei.or.th/bep/GL_home.htm

H-R7. Eco-Marketing

Establishing a brand image for an eco-company or series of green goods and services is one of the most effective approaches to attract environmentally-conscious consumers. Consumers are affected by the image of a product or of a company. For example, recycled goods have traditionally been regarded as “second-hand” products, and this kind of image has been a huge barrier to promoting recycled goods. However, as environmental perceptions have changed for the better, the attitude towards recycled goods has improved. People used to hesitate to use recycled paper because the colour was slightly brown. However, many people now have no reluctance in using recycled paper. Likewise, natural products are now often preferred over synthetic alternatives. Because of these trends, there are an increasing number of retailers in developed countries and, to a limited extent, in developing countries as well, selling only environmentally-positive goods such as organic agricultural products and environmentally non-destructive goods such as natural soap.

The Asia-Pacific eco-marketing initiative would be launched to help foster brand images for companies or product series that are environmentally sound and positive. A variety of activities will be implemented under the initiative, including, for example, an annual award to companies for marketing best-selling eco-products, special treatment in governmental green purchasing schemes, and the provision of promotional subsidies.

I. Public Sector to Catalyse Multi-Stakeholder Partnerships

I.1 Overview

As globalisation, democratisation and decentralisation progress, roles of non-government actors such as civil society groups and the private sector have significantly expanded in promoting sustainable development, as mentioned above. However, this does not necessarily mean that the role of the public sector has become less significant. The public sector—local and national governments, and international organisations—still plays a primary role in policy planning and coordination.

Many countries in Asia and the Pacific are known for their centralised system of development policy. Such a centralised system has contributed to economic growth but may have created barriers to sustainable and equitable development. In addition, corruption is a serious political issue in the centralised governance system in the region.

Globalisation trends, however, may be in conflict with a strongly centralised policy system, as it may not be able to cope effectively with the variety of environmental problems emerging at local to global levels. Collaboration and interaction with stakeholders across sectors and at all levels are considered essential for effective and efficient policy-making and implementation. Consequently, central governments have come to play the role of setting policy direction, establishing frameworks for action, and coordinating implementation, rather than being directly engaged in execution.

As central governments delegate responsibilities, local governments will need to formulate their own local policies, taking into account their particular economic, social and environmental conditions. Policy implementation and monitoring are also a part of their emerging responsibilities. In that way, the role of local governments in sustainable development has increased. Unfortunately, the long history of centralisation has resulted in local governments without adequate human and financial capacities, and local governments are not necessarily free from corruption. Therefore, they face considerable difficulties in carrying out their expected roles.

International organisations play a central role in international agenda setting. They also support central and local governments so that the international agenda can be translated into concrete actions within each country. Many MEAs have been created under the United Nations system. Support from international and regional organisations is essential in promoting the sustainable policy agenda at national and local levels in developing countries.

An example is the 3P (or public, private and people) partnership approach that Singapore adopted for the Singapore Green Plan 2012. To mobilise resources effectively, capacity building of non-public sectors should be supported by the public sector. It is also important that the public sector further develop its own capacity to cope with complex issues in sustainable development.

Box 43: Singapore's 3P Partnership Strategy

Singapore has an environmental masterplan that it calls the Singapore Green Plan 2012 (SGP2012). The SGP2012 calls for a close partnership with the People, Private and Public (3P) sectors, to nurture an environmentally aware and responsible people that believe in co-ownership of the environment by every individual. Long-term environmental sustainability can only be achieved if the community and industry are more “possessive” of the environment.

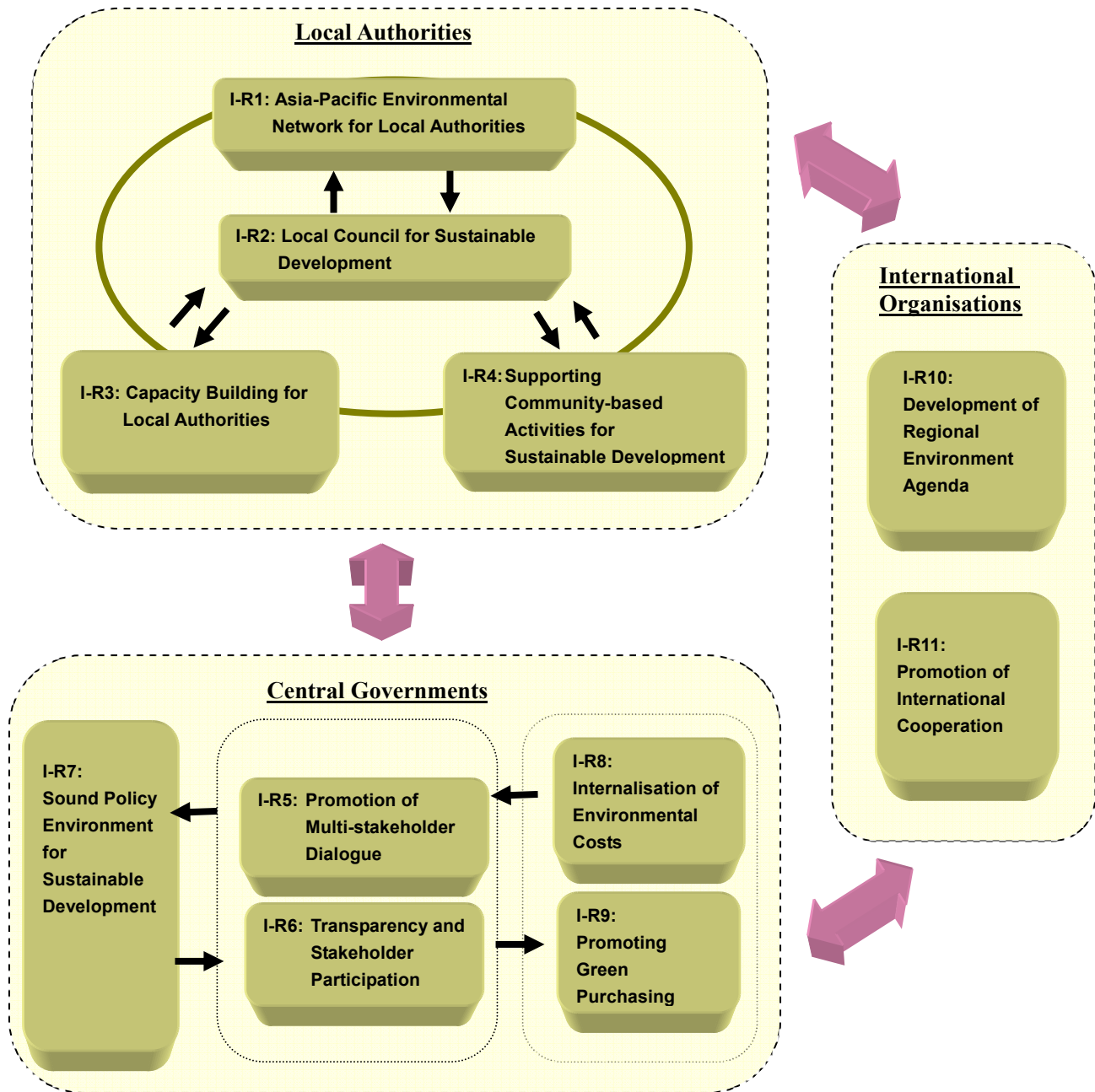
The rationale for using 3P partnership to develop a sense of co-ownership of the environment is the realisation that it is not possible for the government to attain and continue to maintain a sustainable, quality environment all by itself. The government needs to engage and empower the people and private sector to work with the government to bring about environmental sustainability by tapping on the collective know-how, expertise and resources of its partners. By leveraging on the network and infrastructure of its partners, the government is better able to reach out to specific target audiences like schools, industry, community, etc. For example, working with grassroots bring the environmental messages closer to the general population while working with the industry associations helps to reach out to the industry players at large.

The engagement of the 3P partners started right from the beginning when the SGP 2012 was being developed. Representatives from the 3P sectors came together to identify environmental challenges, formulate strategies and set targets to attain the shared vision of a sustainable environment. This bottoms-up approach helped to make the SGP2012 targets more practical and acceptable to the community. The private sector also took ownership of the environment and demonstrated commitment by participating in the development and implementation of the action programmes drawn up to achieve the SGP 2012 targets. The public was invited to comment and provide feedback on the SGP 2012 and its action programmes before they were finalised. In this way, all sectors of the population were given the opportunity to participate in and provide feedback on the SGP 2012 and its action programmes. This created a sense of ownership among the 3P partners and ensured that there would be a better chance the SGP 2012 action programmes would be successfully implemented and their targets met.

Source: The Singapore Green Plan 2012, Ministry of the Environment, Republic of Singapore

Given the above, four recommendations for local governments deal with strengthening their capacities through networking, training, stakeholder participation, and empowerment of communities. Five recommendations for national governments centre on their catalytic role in providing a framework within which other actors such as civil society organisations, businesses, and local governments can operate with their own initiatives. Two recommendations for international organisations are also along the same line. Their role as advocates for trans-boundary issues as well as facilitators of international cooperation should be further strengthened. All the recommendations below are schematically presented in the figure below.

Figure 32: Public Sector to Catalyse Multi-Stakeholder Partnership



I.2 Recommendations

Role of Local Authorities

I-R1. Asia-Pacific Environmental Network for Local Authorities

Networking of local authorities committed to the environment should be strengthened to reflect the increasing variety of issues to be addressed by local authorities in the region. For example, local action and cooperation is the most effective way of addressing urban air pollution problems¹¹⁹. City governments are well placed to directly improve poor air quality hotspots and report the state of local air quality to the public.

There are two types of cooperation: (i) among city authorities to share their successes and failures in

¹¹⁹ Haq, Gary, Wha-Jin Han, Christine Kim and Harry Vallack, 2002. *ibid*.

a wide range of environmental issues; and (ii) among various stakeholders including not only city authorities, but also industry, commerce, public transport providers and the public. In the Asia-Pacific region, networks of local governments include the Kitakyushu Initiative of a Clean Environment, CITYNET (the Regional Network of Local Authorities for the Management of Human Settlements), the International Council for Local Environmental Initiatives (ICLEI), and the Sustainable Cities Project of ASEAN. Sister-city arrangements popular in the region are also another example of this type. Networks of the second type include the Clean Air Initiative for Asia, funded by ADB and the World Bank, which has been actively networking city governments, national government agencies, NGOs, international development agencies, and private companies, including automobile manufacturers and oil companies.

Through networks, experience with local initiatives should be actively exchanged for mutual learning. Trans-boundary interactions among local authorities, with the involvement of citizens will boost citizens' participation, which in turn will strengthen the commitment of local authorities to the environment and to sustainable development.

Existing networks, such as those mentioned above, should be used and strengthened whenever possible, with support from central governments and international organisations. In addition, more bottom-up type networks may need to be created, reflecting the diverse issues to be discussed among local governments, communities and other stakeholders.

I-R2. Local Councils for Sustainable Development

Rapid decentralisation in the region has yet to be followed by established political channels at local levels between local governments, businesses, and CSOs (especially community organisations). Together with their limited capacity and resources, the lack of political outlets has been a constraint on local governments, despite the need to mobilise different stakeholders at the local level in promoting sustainable development. Promoting local multi-stakeholder dialogue by creating a local council for sustainable development is therefore recommended. To ensure sound operation of such a mechanism, appropriate funding is essential.

I-R3. Capacity Building for Local Authorities

Many national governments are transferring part of their environmental mandate and corresponding funds to local authorities, so that local governments can address sustainable development issues in a more comprehensive manner. Decentralisation is not limited to the environmental sector. Decentralisation will mobilise, rather than suppress social, cultural, and environmental diversities. Decentralisation is also likely to create employment opportunities in areas other than the national capital.

Unfortunately, there are many bottlenecks in promoting decentralisation. Lack of know-how and experience is one of the most serious constraints, together with lack of funds and clear mandates. Training programmes for local government officers should be strengthened, especially through on-site training that will facilitate the problem-solving capacities of trainees. One objective of such training could be to empower local authorities to develop and use performance indicators to monitor the progress towards meeting MDGs as well as the relevant recommendations in the Johannesburg Plan of Implementation (JPOI). (*refer to M-R10. Enhancing Local Governance in Land Use Management Section on p.166*)

I-R4. Supporting Community-Based Activities for Sustainable Development

Local governments can play a vital role in promoting local voluntary actions for the environment and sustainable development. Local governments can encourage voluntary actions by individual citizens, community-based organisations, businesses and social groups through day-to-day communications, campaigns and information dissemination in combination with various policy tools. Policy support could include financing, tax exemptions, and provision of technologies and information.

Community-based activities and other voluntary actions could deal with a wide range of environmental issues that are often closely connected to everyday lives (Box 44). Coordination of issues such as energy conservation, solid waste management, water supply, wastewater treatment,

land use planning, and forest conservation should be facilitated by local governments.

Activities at the local level have multiple merits. For example, through empowerment of local communities, they make local governments and their policies more participatory and transparent. Participation of local people in local activities will enhance their understanding of economic, social and environmental conditions in their neighbourhood, which will result in more collaborative activities in the long run.

Box 44: Make It Happen – Cool Communities in Australia

“Cool Communities” is a programme conducted by the Australian government for the reduction of greenhouse gas emissions at the community level. The programme is implemented in partnership among communities, industry and government. The programme is to encourage communities to make themselves “cool (*cool* means *excellent* or *superlative*)” by their positive voluntary actions for climate change mitigation. In the first round of the programme in 2002, 22 Cool Communities with geographic and cultural diversity around the country participated, and each community has its own activities for promoting public awareness and facilitating community actions. For example, nine metropolitan Adelaide councils (Adelaide, Burnside, Marion, Mitcham, Holdfast Bay, Onkaparinga, Unley, West Torrens, and Norwood Payneham and St Peters) are working cooperatively on Cities for Climate Protection™ based greenhouse gas reduction activities. The Councils plan to achieve an increased uptake of energy-efficient products and practices by households in their communities. They plan community workshops with family-friendly entertainment to get more participation, and the sale of subsidised energy and water-efficient products such as efficient showerheads, compact fluorescent lights, sensor lights, and compost bins. Such community-based activities have strong bonds with community people and thus greatly enhance public awareness for a sustainable society and practical action at the individual level.

Source: Australian Greenhouse Office of Australian Government.

Information available at <http://www.greenhouse.gov.au/coolcommunities/index.html>

Role of the Central Government

I-R5. Promotion of Multi-Stakeholder Dialogue

Many countries established, in the wake of the Rio Summit in 1992, a National Council for Sustainable Development (NCSD). NCSDs were intended to promote dialogues between various stakeholders for sustainable development. The NCSD was typically composed of representatives of governments, both national and local, the private sector, NGOs and other civil society groups. Typically, NCSD was the central engine for developing a National Agenda 21 and responsible for monitoring the progress of commitments contained in the Agenda. In the Asia-Pacific region, NCSDs were called upon again to make preparations for WSSD in 2002.

A few NCSDs have been quite effective in bringing stakeholders together and have generated visible progress (Box 45). However, many NCSDs have lost much of their initial energy and enthusiasm. Continued multi-stakeholder dialogue at the national level is vital and APFED would like to see NCSDs re-mobilised through, among other things, regional and subregional networking as proposed in the section on “Institutions for Environmental Democracy” (*See p.62 -66 of this report*).

Box 45: The Philippines Council for Sustainable Development

Since its establishment in 1992, the Philippines Council for Sustainable Development (PCSD) has been active in the implementation of the country's commitments made in the United Nations Conference on Environment and Development and also in the establishment of guidelines and mechanisms to put the sustainable development agenda into operation. Under the initiative of PCSD, the Philippines Agenda 21 (PA21) was formulated with the participation of various stakeholders. Development of PA21 started from the local level, where common problems and approaches for resolving the problems were identified by participants from various backgrounds. Consultations with NGOs, business sectors, youth groups, and other sectors such as health, labour, and the urban poor were held in parallel.

The PCSD consists of representatives from governmental agencies and civil society to ensure multi-stakeholder participation. Representatives of civil society are selected not by the government, but according to principles designed by each group. In 1996, the membership of the PCSD was expanded and two members from labour and business joined the PCSD. PCSD is active in the localisation of PA21. A framework for localisation was developed under a project called "Harnessing Multi-Stakeholder Mechanisms to Promote Global Environmental Priority at the Local Level," introduced in 1999. Localisation took several steps, i.e., multi-stakeholder constituency building (recognition of common issues, identification of possible courses of action, awareness raising), consensus building and partnership development, integration of sustainable development concerns in key development planning, institutionalisation and then facilitation of advocacy. Local Councils for Sustainable Development (LCSDs) were established in several parts of the country.

PCSD also plays a key role in reviewing and monitoring the progress of sustainable development in the country. Sectoral and local reviews were conducted, with the secretariat of PCSD facilitating. Under PCSD, the executive committee and sub-committees worked on specific areas to facilitate the deliberations of the Council. Such institutional mechanisms are strengths in promoting activities of the Council.

Source: Jesus Vicente Garganera, "Animating a Living Document: Localizing the Philippine Agenda 21," NCSN Report 2001, Earth Council 2001 (downloaded on 25 March 2004 at <http://www.ncsdnetwork.org/knowledge/nscreport2001.pdf>)

I-R6. Transparency and Stakeholder Participation

The transparency of national policy setting should be promoted. National environment performance reviews should be conducted periodically and released for public review. The OECD methodologies developed for country environmental performance review have been applied to several countries in the region, including China and countries in the Greater Mekong subregion. Green GNP estimates, incorporating environmental satellite accounts, and sustainable development indicators should be more extensively adopted. All relevant data and information should, in principle, be open to the public. A participatory process should be introduced to ensure full involvement of stakeholders such as NGOs, civil groups, and scientists in the environmental policy cycle, ranging from planning, through implementation, to evaluation. Such efforts will raise awareness and eventually lead to more environmentally sound behaviour.

I-R7. Sound Policy Environment for Sustainable Development

To achieve sustainable development goals, environmental concerns should be integrated into key development sectors such as industry, energy, agriculture, forestry and transport. For example, each government should re-examine in those sectors the subsidies and institutional arrangements which could lead to a wasteful use of natural resources. The environmental impact assessment system should be strengthened and strictly implemented. Central governments should make more efforts to develop their capacity as the facilitators of policy implementation. For example, in developing environmental infrastructure, central governments should provide an enabling policy environment to mobilise other stakeholders rather than execute projects by themselves. A consistent institutional

system needs to be developed to promote the integration of environmental factors in other sectors.

I-R8. Internalisation of Environmental Costs

Economic instruments such as environmental taxes, emissions trading, emission charges, and deposit and refund systems should be introduced, in combination with regulatory and other instruments, so that environmental costs associated with production and consumption are properly internalised into product prices, thereby stimulating the sale of environmentally-friendly goods and services. Economic instruments are often more appropriate than regulation-based instruments for developing countries, since they can be designed without a heavy bureaucracy for implementation and compliance monitoring. Such instruments can contribute to environmental goals by using, for example, existing systems for tax collection or extension services.

Box 46: Volume-based Waste Fee System in Republic of Korea

The Volume-based Waste Fee System was launched in January 1995 to reduce waste generation at source while encouraging recycling activities nationwide. Based on the discharger-pays principle of 'pay for what you discharge,' this policy mandates the purchase and use of special garbage bags. The Volume-based Waste Fee System replaces the fixed fee imposition, which allowed for unlimited waste generation by setting a fixed fee based on the level of property tax and the building's total area.

This system is applied to household waste and portions of industrial waste that can be collected, transported, stored and treated in a manner and standard consistent with that of household waste. While household waste is collected and discharged in a standardised bag designed and sold by local governments, recyclable items like paper, scrap iron, glass and plastic are collected free of charge by local governments on a specific date and place. As for end-of-life furniture and electric appliances, separate fees are levied in the form of stickers that must be placed on them for collection.

By providing effective economic incentive, the Volume-Based Waste Fee system cut down per capita waste generation between 1994 and 2002 by 22%, from 1.33 to 1.04 kg/day. Additionally, the volume of landfill and incineration waste fell by 43 per cent in the same period (49,191 to 27,953 tonne/yr), whereas the volume of recyclable items rose by 146% (8,927 to 21,949 tonne/yr).

Source: Ministry of Environment, Republic of Korea, 2004. Environment White Paper.

I-R9. Promoting Green Purchasing

Central governments should conduct green purchasing of goods and services, thereby setting a good example for others to follow. Governments could develop guidelines for green purchasing which could promote the purchase of fuel cell cars, hydrogen vehicles, recycled paper, and energy-efficient electrical appliances, among other things. Governmental green purchasing policy could help improve the price competitiveness of eco-friendly products, by increasing economies of scale.

Role of International Organisations

I-R10. Developing Regional Environment Agenda

International organisations have been taking the lead in identifying emerging environmental problems and setting the international environmental agenda. In particular, since the 1980s, international organisations have been successful in setting, as major international agenda, global environmental problems such as ozone layer depletion, climate change, and loss of biodiversity. Environmental problems that require international responses will continue to increase in the future. As stated in Part I of this report, regional environmental issues also require multilateral cooperation to be coped with effectively. International organisations should identify and develop regional environmental agenda in consultation with governments and other stakeholders in the region. The

Asia-Pacific region has several existing forums for agenda setting, ranging from official bodies such as the UN-ESCAP Ministerial Conference on Environment and Development to informal gatherings at the ministerial level such as the Eco Asia Conference. For effective agenda setting, coordination among international organisations and relevant conferences should be strengthened.

I-R11. Promotion of International Cooperation

International organisations should play a catalytic role in working out an international framework for cooperation, including MEAs. Further discussion on interlinkages among MEAs and with FTAs should be facilitated for the effective coordination and promotion of international cooperation. To deal most effectively with specific environmental problems, a framework of cooperation in which countries and other stakeholders can collaborate should be developed by international organisations.

3. MAJOR SECTORAL RECOMMENDATIONS

APFED conducted a series of consultative meetings in different parts of the region. At each meeting, APFED listened to local experts espouse a broad range of opinions regarding local efforts to achieve sustainable development. In addition to suggestions for the improvement of overall environmental management and the development of policy integration, APFED received a variety of ideas for effective strengthening of various measures to be taken by the following five specific sectors, namely Freshwater Resources; Marine and Coastal Resources; Energy and Clean Air; Land Use Management; and Chemical Issues. This chapter presents the suggestions received during the APFED process, which have been developed into a series of recommendations, aiming to integrate the environmental principles underlying sustainability into sectoral policies. Each of the following sections consists of a sectoral overview and specific recommendations.

In certain cases, the basic ideas underlying relevant suggestions may overlap the proposals set forth in the previous chapters of Part III—“Recommendations for Integrated Approaches to Sustainable Development” and “Recommendations for Multi-Stakeholder Partnerships.” This reflects the linkage between suggestions relevant to the five specific sectors and those in the previous chapters.

J. Freshwater Resources

J.1 Overview

Freshwater resources, both surface and groundwater, should be used in a sustainable way within the limits of their recharging capacity. Not only must we respond to human demands, including those for agriculture, industry and drinking water, but we must also secure sufficient freshwater to maintain rich natural ecosystems such as wetlands and estuaries.

Freshwater issues have been discussed internationally over the past three decades. The first intergovernmental meeting devoted exclusively to water was the 1977 Mar del Plata United Nations Conference on Water. The main agenda involved water supply and sanitation, and this Conference provided the impetus for the International Drinking Water Supply and Sanitation Decade of the 1980s. A greater portion of the population was able to access a clean water supply and sanitation system by the end of the decade. But in absolute terms, a significant number of people still remained without access. The United Nations Millennium Declaration established a target to halve the percentage of the population lacking access to safe and affordable drinking water by 2015. This goal was reaffirmed at WSSD with the added goal to halve the percentage of the population without access to improved sanitation systems.

Discussions in the Mal del Plata conference focused on “water for people” rather than “water for the environment.” It was the International Conference on Water and the Environment held in Dublin, Ireland in 1992 that integrated environmental aspects into water development. In Dublin, the concept of Integrated Water Resource Management (IWRM) was introduced, and since then it has been a core concept in freshwater management. By the alerts about critical conditions of water resources presented at the second World Water Forum (WWF2) by the World Water Vision, the international community increased its awareness of water issues in development and environmental agendas. The JPOI set a target for the

development of integrated water resources management and water efficiency plans by 2005, and the Jeju Initiative at UNEP Governing Council/Global Ministerial Environmental Forum held in March 2004 highlighted the importance of ecosystem approach in achieving the water and sanitation goals (Box 47).

Box 47: Jeju Initiative

Environment ministers from over 150 countries and representatives of various international organisations met for the Eighth Special Session of the UNEP Governing Council and Global Ministerial Environment Forum in Jeju, Republic of Korea, in March 2004 to discuss ways to boost water and sanitation services for over two billion people around the world. Noting the severity of global water problems, particularly in Africa where women walk six kilometres a day on average in search of water, ministers adopted the “Jeju Initiative” to promote successful water and sanitation schemes. The Initiative identified key environmental dimensions in water targets stemming from the Millennium Declaration and WSSD, and emphasised that such environmental dimensions are fundamental in achieving such goals.

The Initiative includes a list of water and sanitation case studies that have been tested and tried in one country and can be replicated elsewhere in the globe. The case studies range from rainwater harvesting in the dry lands of Kenya to an innovative land management scheme in New York that has saved the city council as much as \$5 billion in water treatment costs. It is expected that the Jeju Initiative will accelerate the international efforts toward halving by 2015 the proportion of people without access to safe and sufficient drinking water and basic sanitation facilities.

For more information, 8th Special Session web-site of UNEP (<http://www.unep.org/GC/GCSS-VIII/index.asp>)

Major Freshwater Issues in Asia-Pacific

Freshwater resources are subject to huge geographical and seasonal variations. The Asia-Pacific region is no exception. Some areas suffer from serious water shortages, as observed in Central Asia and the Yellow River Basin, while other areas, such as Bangladesh and the Yangtze River Basin, regularly suffer from heavy flooding. Besides these natural phenomena, human-based activities and their environmental impact affect accessibility to freshwater resources. For instance, the Pacific Island countries (PICs), who depend on groundwater as their main water source, face a reduction in the total available freshwater resources due to sea level rise induced by climate change. Overuse and pollution of freshwater resources result in water shortage, even in countries with sufficient water. Such phenomena are observed and intensified especially in urban areas in the region. Population pressures also contribute to the decrease in available water resources in many parts of the region.

Increased Water Demand: Growing economies and populations have increased the demand for water in all sectors. The majority of people in the region depend on rice cultivation, which requires large amounts of freshwater. Nearly 80% of total water use in the Asia-Pacific region is for agricultural purposes. At the same time, water demands are increasing for industrial and domestic use. Conflicts of interest among multiple water users over limited water resources may become a serious social problem. To cope with these growing demands as well as to mitigate the risk of flooding and droughts, numerous dams have been constructed. However, such dams, in particular large dams, may negatively impact both local communities and ecosystems; the drawbacks often exceed the benefits. Furthermore, building a dam is not always the best choice for generating a new source of water. The key to coping with such growing water demands could be the promotion of demand-side management and the establishment of flexible water distribution systems. Various economic measures are also now being taken to promote the efficient use of water resources, and minimise their wasteful use. Such measures include water trade markets, water user charges, wastewater charges and review of subsidies.

Surface Water Conflicts: Often, there are conflicts of interest between upstream and downstream users. At

the river basin level, local committees have been established in many parts of the region for better management of river basins, with the participation of relevant stakeholders. To ensure sufficient quantity and quality of freshwater resources, forest conservation and compliance with strict effluent standards have been imposed for sound environmental management, especially in upstream areas. Insufficient financial resources are often a constraint on the promotion of such necessary actions. Therefore, various economic measures, such as river basin taxes, have increased in importance.

Conflicts over International Rivers: In the case of international rivers, there is the possibility that upstream and downstream issues could develop into physical confrontations between the countries concerned. A recent study has shown that competing interest in international watercourses often promotes cooperation between relevant countries rather than conflict. Multilateral consultation processes, as exemplified by the Mekong River Commission, could be instrumental in facilitating peaceful settlements rather than physical means of resolution. Under the concept of “from potential conflicts to cooperation potential (PC=>CP),” UNESCO and other partner organisations study how to prevent and resolve water conflicts, and enhance cooperation for water security¹²⁰.

Degradation of Freshwater Resources: Water pollution is a major issue in the region. In urban areas of Asia, untreated wastewater and water leakage from illegal dumping of solid wastes have polluted both surface and ground water resources. Pollution by heavy metals from industrial activities such as mining is a serious problem, especially in some Southeast Asian countries.

Groundwater, a major water source for irrigation and drinking water in the region, is also in danger. As the result of overexploitation of groundwater resources, groundwater pollution by arsenic and fluoride has been observed in some areas in the region. Saline intrusion and ground subsidence have also been problems in urban areas. Nitrogen contamination by fertiliser, livestock manure, and human waste are threats to groundwater. An increased volume of fertiliser has been applied in many countries in the region, in order to increase the productivity of agricultural land and provide more food for the increasing populations. However, overuse of nitrogen fertiliser increases the volume of nitrates found in groundwater and, ironically, may result in a decrease in agricultural productivity. Regarding human health, high concentration of nitrates in drinking water may cause methaemoglobinaemia (blue baby syndrome), an increase in miscarriages, and possibly digestive tract cancers.

Degradation of both surface and groundwater quality aggravates water shortages and results in negative impacts to both human health and ecosystems. Environmental services provided by water resources are not always appropriately considered. Pollution control measures for freshwater resources, including the establishment of water quality standards, have been introduced in many countries in the region, yet not all measures have proven to be effective. For the proper implementation of such measures, regular water quality monitoring practices should be strengthened and improved. The issue of endocrine disruptors and persistent organic pollutants, such as PCBs and DDT, is serious in the region. However, capacity to cope with such chemical pollutants is not sufficient enough to plan and implement effective countermeasures in both the developed and developing countries of the region. (*for international efforts to cope with emerging chemical issues such as the Stockholm Convention, refer to the “Overview” of the Chemical Issues Section, p.170*).

Degradation of ecosystems due to water shortage and pollution is also a problem in the region. For example, polluted water destroys wetlands and rich biodiversity there. Big water development projects such as dam construction could have irreversible negative impacts on the local environment. Environmental services provided by water resources should be more considered in water development and management policy, including the water pricing system.

Water Supply and Sanitation System: Regarding safe drinking water, considerable progress in water supply and adequate sanitation has been made. However, the region still contains the largest population in the world without access to proper sanitation and water supplies. Insufficient or improper sanitation systems pollute freshwater resources and reduce the availability of clean and safe water, endangering people’s ability to lead a healthy life. There is an urgent need in the region to attain the international targets to halve the percentage of the population lacking adequate water supply and improved sanitation by 2015. Dialogues involving the private sector concerning the effective and efficient provision of water supply and sanitation have been made.

¹²⁰ for further information, please refer <http://www.unesco.org/water/wwap/pccp/index.shtml>

However, there is a strong concern that private sector participation cannot help the poor access necessary water services.

Virtual Water

The concept of virtual water has been highlighted frequently in recent international dialogues. Virtual water is the water necessary to produce commodities and services, in particular agricultural products. In general, the production of meat requires more water than the production of crops does, as shown in the example of Japan in Table 7. This indicates that more water is necessary as the population eats more meat. It also means that countries importing agricultural products consume water from the exporting countries. In the Asia-Pacific region, Sri Lanka, Japan, and Republic of Korea are ranked as the largest virtual water importing countries¹²¹, primarily because they import a significant amount of agricultural products. It may seem strange that eating habits affect not only domestic water use but also water consumption in other countries. Recognition of the virtual water trade is closely related to the issue of domestic self-sufficiency in water and the global economy. Further study should be promoted on this issue (*see also "M-R15. Production Information System for Sustainable Agriculture," on p.169*).

Table 7: Required Water Resources to Produce Agricultural Commodities in Japan

(m³/t)

Rice	Wheat	Soybean	Maize	Chicken	Pork	Beef	Eggs	Milk
3,600	2,000	2,500	1,900	4,500	5,900	20,700	3,200	560

Source: Taikan Oki, et al, 2003. "Virtual Water Trade to Japan and in the World" Abstract Volume of the 13th Stockholm Water Symposium, p. 341-344, Stockholm International Water Institute: Stockholm

J.2 Steps towards Solutions

Water is related to various aspects of human activities and the natural environment. All water problems are interlinked, and therefore devising solutions for water-related problems is complex. As seen above, several issues and problems in the region have been identified:

- Increase in water demands will intensify water stress in most of the region
- Serious water pollution endangers water availability and accelerates water shortages
- Inadequate water supply and sanitation systems are dominant
- Environmental services of water resources are not fully considered in water management
- Coordination and resolution capacity for water conflicts are lacking

Freshwater resource management affects various areas (such as land use, agriculture, forest, urban management, chemicals, etc.) and involves a wide range of actors and stakeholders. Therefore, policy integration at all levels and between sectors is the key factor in successful freshwater management. During the entire policy process (from design to implementation, evaluation and modification), such integration is the core to creating comprehensive freshwater management policy. To promote such integration, current fragmentation of water-related institutions should be improved.

In response to the current situation, the following issues should be prioritised:

- **Enhancing participation of key stakeholders at all levels**
Water resources affect people at many levels, from the local to regional and international levels. Therefore, water issues vary from personal daily life to trans-boundary conflicts. To promote the wise use of water resources with consideration to local social, economic and environmental conditions and to prevent serious conflicts, mechanisms for stakeholder participation should be established or enhanced. Awareness raising, the creation of incentives for participation, and capacity development are key elements in promoting stakeholder participation;
- **Promoting demand side management**
Sustainable management of water resources cannot be realised unless water management systems change from the currently dominant supply-side management to a demand-side one. To encourage

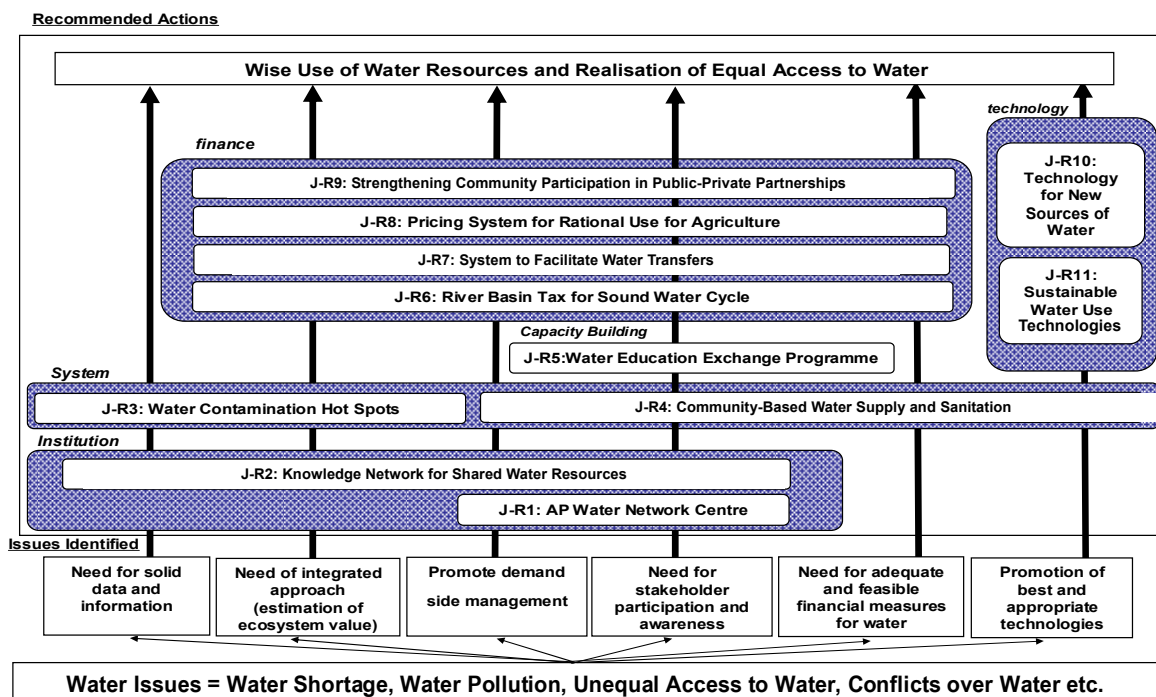
¹²¹ Chapagain, A.K. et al, 2003. "Virtual Water Trade: A Quantification of Virtual Water Flows in Relation to the International Trade of Agricultural Products" *Abstract Volume of the 13th Stockholm Water Symposium*, p. 345-348, Stockholm International Water Institute, Stockholm.

sustainable water consumption, economic instruments such as water-pricing systems should be developed, such as charges and levies on water use. However, such options should not hinder equal access to water resources for all at an affordable price;

➤ **Promoting best and appropriate technologies**

Promotion of best technologies is also a key issue in the region, in order to use water resources at an optimal level. For instance, rainwater-harvesting technology can provide water for use in stock water, gardening, and toilets. Rainwater-harvesting systems can not only create additional water resources, but also contribute to flood control. Treated urban wastewater could be reused for peri-urban irrigation and even domestic uses such as laundering and cooking. On small islands and places suffering from serious water shortages, seawater desalination technology is becoming an option.

Figure 33: Recommended Action on Freshwater Resources



J.3 Recommendations

Institutions

J-R1. Asia-Pacific Water Network Centre

Many organisations are working on water issues in Asia and the Pacific, but coordination is not always sufficient. It would be useful to consolidate the activities of the various stakeholders, including international organisations, national governments, local authorities and NGOs. To this end, an “Asia-Pacific Water Network Centre” should be established as a platform to facilitate the exchange of information, experience, and know-how; to coordinate the variety of ongoing initiatives in the region. Regional networking and cooperation initiated in the process of organising the Third World Water Forum could be the basis for such a network. Considering the differences in water issues faced by the subregions in the Asia-Pacific, the establishment of subregional network centres involving existing organisations would also be desirable.

J-R2. Knowledge Network for Shared Water Resources

Due to growing conflicts between countries sharing watercourses, the need for collaborative

management is essential. All countries sharing watercourses should establish a river basin commission similar to the Mekong River Commission¹²², to manage water resources in a collaborative manner. Such a commission could: (i) promote sound discussions on the use of international watercourses; (ii) accumulate scientific data and knowledge, and share them among members; and (iii) conduct common projects to resolve (or even prevent) conflicts between users within a shared watercourse. The active participation of relevant stakeholders should be encouraged and promoted for successful collaboration. A regional network of such commissions should also be established to enhance collaborative work in the region. Such collaboration and networks could prevent potential conflict and enhance cooperation.

System

J-R3. Water Contamination Hot Spots

Deterioration of water quality has resulted in serious damage to both human health and natural ecosystems. Often risk assessments are undertaken particularly on water pollutants such as pesticides, chemical fertilisers, and heavy metals. To facilitate water pollution control and proper countermeasures, monitoring and modelling of water quality should be promoted based on comprehensive risk assessment data.

Areas in the region with particularly serious pollution could be designated as water contamination hot spots, and prioritised for remedial action. Remedial measures could include reductions in harmful wastewater emissions, bans on the use of hazardous pesticides, and the elimination of subsidies.

J-R4. Community-Based Water Supply and Sanitation

Community participation should be encouraged in the process of developing drinking water supply and sanitation systems. Entrusting the management of such systems to the community would enhance the sense of ownership among local residents. In some cases, neglect of local social, cultural, religious, and environmental conditions has resulted in failures in water management. Community participation could reduce such failures by reflecting the unique and traditional local customs and knowledge in water supply and sanitation planning and management. Thus, community-based water supply and sanitation systems would promote the efficient use of resources and facilitate sustainable management. By applying this concept to slums and rural areas, it would be possible to generate employment and provide clean water to residents at reasonable costs.

Capacity Building

J-R5. Water Education Exchange Programmes

Mutual understanding among stakeholders can promote collective efforts and encourage synergy in sustainable water management. Exchange programmes and joint training should be conducted for university students, water experts, government officials, local people and other stakeholders in specific river basins. There is also a need to create cross-sectoral exchange programmes to generate awareness regarding different issues involved in water management. Such interaction among participants could increase the opportunities for further collaboration, while facilitating the incorporation of different interests. It could help to create a good information system of appropriate technologies and methods, know-how, and traditional knowledge of problem solving. Equally important is the need to generate awareness through education on the importance of water in the context of its contribution to ecology and society at large.

Finance

J-R6. River Basin Tax for Sound Water Cycle

One of the many functions of forests is to retain and purify water. A sharp decrease in and degradation of forests in the region has resulted in a reduction of available freshwater. To promote the restoration of the water retention and purification capacities of forests, a river basin tax could be considered to raise financial resources for forest and water environmental conservation.

¹²² For details on the Mekong River Commission, refer to http://www.mrcmekong.org/about_us/about_us.htm

In most cases, two or more administrative districts share a river basin. Thus, coordination among authorities to charge and collect such a tax should be facilitated from the planning stages. Expenditure from the river basin tax should be limited to purposes such as the rehabilitation of forests, including tree planting and thinning. Taxation methods should be well-planned to minimise transaction and administration costs. For example, the tax could be added to an existing water use charge or municipal tax. For the long-term security of a river basin, a “water-saving fund” could be established to save part of the tax revenue for emergencies, such as droughts or floods. The same mechanism could be considered for river basins shared by two or more countries.

**Box 48: Special Tax and Charging Systems for
Increasing Water Retention Capacity of Forest in Japan**

In 1993, Toyota City Council in Aichi Prefecture, Japan reached a decision that 1 yen/m³ was added on water charges for the purpose of conservation of water resources. The Fund for Conservation of Water Resources for Water Works was established in 1995 to save the collected money. The fund is used for forest conservation activities in the upper stream of Yahagi River, the main source of water for the City. Formed on basic agreements between Toyota City and six towns and villages in the upper Yahagi River Basin, forest conservation activities, in particular the thinning of man-made forests on behalf of forest owners, are implemented by the upper stream local governments using the funds.

Okayama and Kochi Prefectural Governments, in 2004, introduced a local tax for conservation of forests, recognising their essential ecological functions for flood control and as natural reservoirs of freshwater resources. In both the Okayama and Kochi cases, 500 yen per capita/year is added to prefectural tax. The rate of tax was decided, taking fully into account the comments from citizens collected through questionnaires and meetings. Special funds were established for the appropriate use of tax collected for, among other things, forest conservation activities such as thinning and public awareness projects. Currently more than twenty other local governments in Japan consider that they could introduce such tax systems for forest conservation.

In introducing charge/tax systems of this type, fair burden sharing and minimisation of transaction costs should be well considered. The charge system per fixed amount of water use in Toyota City has been operated well, and has good understanding among citizens. On the other hand, in the Okayama and Kochi cases, they choose to add a fixed amount to the prefectural tax based on the idea that tax should be paid for all water beneficiaries including those who do not use public water supply systems (e.g. groundwater users). The governments reported that introduction and maintenance costs are less than the charges to the water bill. However, proper taxation systems differ according to local social and economic situations. It is also important to keep transparency and ensure the participation of local people in both planning and use of tax.

Source: Web sites of Toyota City Government
(<http://www.city.toyota.aichi.jp/suidousugenhozenjigyoku/main.htm>), Okayama Prefectural Government
(<http://www.pref.okayama.jp/somu/zeimu/sinzei-gaiyo1226.pdf>) and Kochi Prefectural Government
(<http://pref.kochi.jp/~zeimu/jyorei.htm>). All documents were written in Japanese.

J-R7. System to Facilitate Water Transfers

A system for establishing rights to access water should be considered on either a river basin basis or a nationwide basis. The system would facilitate the transfer of water from areas in surplus to those facing shortage. It would help resolve regional disparities in water availability and promote the rational use of water resources. To facilitate this, water rights should be identified and clarified. However, negative impacts on other environmental issues resulting from the introduction of water transfers should be considered. Such impacts could include the destruction of aquatic ecosystems and carbon emissions generated from water transfer.

The trading of water rights themselves may ossify the market structure and hinder the optimal use of water. Thus, the trade should be limited to short term water usage rights. The intention of the water trade is to enable the actual transfer of water through a flexible system. Governments should prepare appropriate legal frameworks to ensure the fairness and equitability of such a flexible system. The introduction of a market for water trading could also be considered on a cross-border basis.

J-R8. Pricing System for Rational Water Use for Agriculture

As the agriculture sector is the biggest user of freshwater resources, it is often criticised for wasteful water consumption. Therefore, rational use of water in the agricultural sector should be promoted. A full cost-pricing system is said to be a measure to facilitate effective and efficient use of water. However, the economic value of water can fluctuate according to seasonal variations in the amount of water available. Thus, it may be difficult to determine rational charging systems. In addition to economic value, the ecological and social benefits of certain agriculture practices should also be considered. For example, rice paddy farming is often criticised as being a very water-consuming agricultural method, but paddy fields have important functions in flood control and groundwater recharge. Pricing systems should be established based on the socio-economic, cultural, and natural environmental conditions of each area.

J-R9. Strengthening Community Participation in Public Private Partnerships for Water Supply and Sanitation Systems

Provision of safe drinking water and sanitation is one of the highest priorities in water management. In the past, the public sector was responsible for developing and maintaining water services. However, financial constraints on developing new water utilities, as well as poor performance and inefficiency associated with public water services, have initiated private sector participation as an option to resolve these financial and technical difficulties (Box 49).

In any discussion of a possible system of trading of water rights, it should be recognised that such trade may hinder the optimal use of water, given the structure of the market. Thus, a consideration of the water trade must take into account the goal of transfer of water and the need for appropriate frameworks that ensure fairness and equity.

Box 49: Effective Financing for Sewage Construction in Republic of Korea

In 1992, Republic of Korea introduced legislation to secure enough funds for sewage construction. A fixed proportion of the national liquor tax has been earmarked as financial support to local governments to build sewage treatment facilities. As a result, a total of US\$6.2 billion has been provided to local governments between 1992 and 2003. At the same time, the national government took measures to attract private investment in local sewage development by systematically ensuring financial returns for such private investment. As of 2003, a total of US\$1.17 billion has been contributed by the private sector.

With these financial measures, Republic of Korea has successfully doubled its sewage treatment capacities in just 10 years, from 38% in 1992 to 76% in 2002.

Source: Ministry of Environment, Republic of Korea

Technologies

J-R10. Technologies for New Sources of Water

To meet increasing demands for water, technology for creating non-conventional water resources should be developed and introduced. In this respect, water harvesting and sea desalination technology have potential in the Asia-Pacific region. For water harvesting, porous paving in city areas and small-scale water harvesting should be encouraged. Rain water harvesting technology should be applied at the community and individual household level, because such technologies are low in cost and can be managed by the community. In the Maldives a roof-top rainwater harvesting

programme has been successfully implemented by incorporating modifications in the building codes and the approval system by the local government.

In areas with severe water shortages like islands, desalination of seawater is an option. The cost of desalination has dropped substantially, but there still remain many issues to be resolved, such as high energy consumption in the process of desalination, and transfer of desalinated water. R&D should be promoted to make such technology less expensive and more environmentally sound by combining the use of renewable energy sources. Any possible negative impacts of seawater desalination on seawater and ocean ecosystems should be investigated. Desalination can increase the total water resources available, but water is neither free nor an infinite resource.

Box 50: Rainwater Harvesting
A Traditional but Innovative Option for a New Source of Water

Rainwater harvesting has been practiced in Asia and the Pacific for centuries, from arid and semi-arid areas to the areas in the monsoon climate. As water stress is increasing in many countries in the region, rainwater harvesting is re-acknowledged as a useful option for water supply and conservation at low cost and with simple technology.

One example of success in the introduction of rainwater harvesting systems in the community is Thailand's "National Jar Programme" which was launched in Thailand in response to United Nations Water Supply and Sanitation Decade (1981 -1990). The programme aimed to promote the use of jars in rural households and was implemented with involvement of local people. At the initial stage, local people's participation was limited to provide in-kind labour because they could not pay the cost, and therefore the government provided financial support for the selection of suitable technology, training, and construction materials. In the course of implementation, however, government interventions have been phased out. The operation and maintenance costs of jars were paid by their users, and a market for jar production was created, which eventually rendered the government's subsidies unnecessary. A recent survey revealed that the rainwater harvesting reduced the amount of money a typical household spends on clean drinking water to \$8.50/m³/year, which is more than 75 times cheaper than bottled water.

Water quality issues of rainwater use: The use of rainwater for drinking purposes is not without health risks. Coliforms particularly thermotolerant varieties can be detected, and *Campylobacter*, commonly excreted by birds, has been recorded from rainwater. Leaves, insects, and vermin which eventually enter water tanks could deteriorate water quality. Insect breeding in rainwater tank may increase risks of insect vector diseases. A technical note on rainwater harvesting by the Intermediate Technology Development Group indicated some examples of simple methods of water treatment before drinking. Such methods include "boiling water", "slow sand filtration" and "solar disinfection."

Guideline on the use of rainwater tanks: In Australia, because of potential health risks, the use of rainwater tanks was not actively encouraged in some major cities until recently. Under the auspices of the National Environmental Health Forum, a joint venture between the Directors of Environmental Health from each State and Territory and the Commonwealth, a monograph, *Guidance on the use of rainwater tanks*, was prepared in 1998. It provides valuable advice regarding water quality and pollutant, tank construction, the size of tanks in relation to roof catchment area and rainfall, appropriate installation and maintenance, means of disinfection, mosquito control, and the use of alternative sources of augmentation if required. It should be encompassed in the National Water Quality Management Strategy Guideline series.

Source:

UNEP, "Rainwater Harvesting – The Thai Rainwater Jar" from *Sourcebook of Alternative Technology for Freshwater Argumentation in Some Countries in Asia* (<http://www.unep.or.jp/ietc/publications/techpublications/techpub-8e/jar.asp>);

Intermediate Technology Development Group (ITDC), *Water Harvesting (a technical note)*, http://www.itdg.org/html/technical_enquiries/docs/rainwater_harvesting.pdf;

Australian Academy of Technological Sciences and Engineering, "Water Recycling in Australia" (May 2004) (<http://www.atse.org.au/index.php?sectionid=597>)

"Guideline on the use of rainwater tanks" (2004) (<http://www.dh.sa.gov.au/pehs/publications/rainwater-tanks.pdf>)

J-R11. Sustainable Water Use Technologies

Domestic and industrial wastewater discharges have become major causes of water pollution. Low-cost, efficient wastewater treatment technologies should be developed as appropriate to local conditions. Such technologies could use renewable energy sources in operating the system, promote the use of natural resources such as plants for water purification, and use natural ecosystems such as

wetlands. In agriculture, water saving technologies, such as drip irrigation, are effective. In principle, technologies to be developed should be low-cost, small in size and easy to maintain. Wastewater reuse and recycling technologies could be another focus of R&D as a promising water conservation technology.

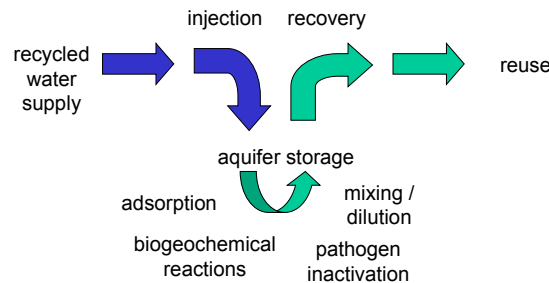
Box 51: Aquifer Storage and Recovery in Australia

Technologies play an important role in dealing with water problems. In Australia, water stress has been increasing due to rising water demands and changes in the natural environment. Declining groundwater levels and increasing salinity resulted in the reduction of available groundwater resources and became a constraint on farming practices.

To address such problems, a project currently under implementation uses a technology that cycles water that would otherwise have been wasted into an aquifer for further passive treatment during storage. In Adelaide 1 M m³/yr of storm water harvested and reused grew to 4 M m³/yr in three years. Subsurface storage provides irrigation water as well as significant water treatment. Clogging problems were greatly improved and pathogens were inactivated. The project also suggests high potential for the recharge of storm water to produce drinking water from nearby wells.

For other areas in the Asia-Pacific region where many rural dwellers depend on groundwater, this technology has potential to mitigate the shortage and deterioration of groundwater resources. In accumulating experience in Australia, a series of new measurement methods has been developed which will be used during future application in other countries in the region.

Subsurface water treatment processes



Source: APFED BPP

K. Marine and Coastal Resources

K.1 Overview

The Asia-Pacific region has a longer coastline than any other region in the world and boasts rich coastal and marine resources, such as fisheries, mangroves, coral reefs and sea grasses. People’s lives in many of the countries are closely related to such coastal and marine resources. For example, fishery resources are important both as major sources of protein intake and foreign trade income; mangroves are home to various species; and sea grasses provide important habitats and food for a wide range of marine fauna including commercially important species. Such marine and coastal resources, both living and non-living, should be developed on a sustainable basis and within the carrying capacity of marine and coastal ecosystems.

Due to the expansion of human activities, however, marine and coastal resources have been under threat. Reflecting the threats to marine and coastal resources, the JPOI specifies four major targets related to marine

and coastal resources, namely fisheries, land-based activities affecting the marine environment, sea-based marine pollution, and the role of assessment and sciences. The United Nations Convention on the Law of the Sea (UNCLOS) provides an overall legal framework for the sustainable use and development of marine and coastal resources. Other international, regional, and bilateral agreements on specific issues regarding marine and coastal resources have also been developed.

Fishery Resources under Threat

The Asia-Pacific region accounts for 38% of the world's marine fish catch, and eight countries in the region are among the world's top fishing nations. The scale and range of fisheries vary among countries, but the introduction of modern fishing to replace regional traditional fisheries has accelerated the overexploitation of fishery resources, resulting in threats to fishery resources as well as to ecosystem integrity and functioning¹²³. (see also "Box 4: Fishery Resources in the Northwest Pacific" on p.32)

In response to this threatened condition of fishery resources, international and regional agreements and initiatives have been developed. Such agreements include the Code of Conduct for Responsible Fisheries, the United Nations Agreement for Conservation and Management, and Straddling Fish Stocks and Highly Migratory Fish Stocks, as legal instruments to support UNCLOS. Regional initiatives include the FAO Fishery Commission for Asia and the Pacific and associated fishery organisations such as the North Pacific Marine Science Organisation, the North Pacific Anadromous Fish Commission, Forum Fisheries Agency, Pacific Tuna Commission, and the International Pacific Halibut Commission. Bilateral fishery agreements have also been established in the region. Sustainable fishery operations are a genuinely trans-boundary issue, and thus international and regional cooperation in research and management needs to be further promoted.

Land-Based Activities Affecting the Marine Environment

Expansion of human populations and economic activities in coastal areas has led to degradation in the region's coastal and marine environment over the last 30 years. Domestic and industrial wastewater discharges without proper treatment are often associated with marine litter, pathogens, and hazardous chemicals, including POPs, in coastal waters. Coastal and marine pollution may result in contamination of marine foodstuffs, which may then provoke negative impacts to human health. Increased use of agrochemicals, for example, has led to the transport of pesticides into the Bay of Bengal, where they reappear as toxic residues in finfish and shellfish¹²⁴. Aquacultural activities and changes in hydrological profiles of rivers connected to mangrove areas have destroyed mangroves in many parts of the region. Aquaculture also causes pathogenic contamination and provides excessive nutrients.

The destruction of coastal areas leads directly to the degradation of unique, fragile and vulnerable habitats such as mangroves, coral reefs and sea grass beds. (for more details, see "Degradation of Marine and Coastal Environment" on p.31-32). Such habitats can potentially provide valuable ecosystem services, such as water purification, sediment traps, protection of coastlines, and provision of materials, yet they are being either lost or degraded at an alarming and accelerating rate. The ecosystem services they provide should be properly incorporated into national and regional development policies and programmes.

Sea-Based Marine Pollution

Ship-based oil and chemical pollution is also an issue in the region. The primary route of marine transport from the Persian Gulf is across the Arabian Sea and through the Strait of Malacca. Accidental spills have been reported frequently along this oil transport route and at points of discharge. The northern Indian Ocean is particularly vulnerable to sea-based oil pollution. In the Pacific, marine pollution from ships is an increasing threat as trade and economies develop. Another sea-based source of pollution is associated with organotin compounds used for ship antifouling. Such organotin compounds cause cumulative toxic effects in marine molluscs and their larvae.

Ballast water used in maritime navigational vessels is disposed of at port reception facilities. It may contain invasive species with potential impacts on the ecosystem balance in the receiving coastal environment. Recognition of the risks of introducing exotic species through ballast water transport has resulted in the

¹²³ For example, modern trawling techniques can rapidly catch the target fish species, but also have a large number of untargeted species (known as by-catch which dies and is thrown away), as well as damaging corals and sponges that are important as sea-bottom habitats. Such destruction of sea-bottom plants and animals harm sound marine ecosystems and thus may cause the decline of total fishing stocks in total. (see UNEP, World Bank and World Resources Institute, World Resources 2000 – 2001, p. 69 – 85)

¹²⁴ UN-ESCAP and ADB, 2000. State of the Environment in Asia and the Pacific 2000

negotiation of a new international legal instrument that will require contracting parties to treat ballast water before its disposal.

International and Regional Responses to Land-Based and Sea-Based Pollution

Regarding land-based pollution, the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA), although not a legally-binding instrument, provides an overall pragmatic basis to address land-based activities that affect marine and coastal environments. Regarding sea-based pollution, existing international agreements such as the London Convention 1972 (the International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter), the MARPOL 1973/78 Convention, and International Convention on Oil Spill Preparedness can serve as a basis for developing national or local capability in addressing such pollution. A convention banning the use of tin-based antifouling coatings has now been concluded within the forum of the International Maritime Organisation (IMO).

In response to the increasing need to address concerns and issues relating to marine and coastal resources in Asia and the Pacific, the region has adopted a number of initiatives. These include the APEC Marine Environment Working Group and the ASEAN Strategic Plan of Action for the Environment (1999-2004), which contains, as one objective, the development of a Regional Action Plan for the protection of the marine environment from land-based and sea-based activities by the year 2004. In the South Pacific, a number of legally-binding instruments have been concluded, such as the Forum Fisheries Convention, the Wellington or Driftnet Convention, the Apia Convention, the Noumea Convention, and the Niue Convention. Subregional environmental cooperation has also been fostered through subregional programmes, such as UNEP's Regional Seas Programme (the Northwest Pacific Action Plan, the East Asian Seas Action Plan, the South Asian Seas Action Plan hosted by SACEP and the SPREP Convention). Within the framework of the Global Environment Facility (GEF), water body-based projects are being implemented, and Strategic Action Programmes outlining the policy targets and programmes to address identified trans-boundary and international waters issues are being developed or are in preparation. These projects cover the South Pacific (14 PICs), the South China Sea, the Yellow Sea and the Bay of Bengal, and a partnership project has been established to cover the marine environment of East Asia.

International and regional monitoring programmes are underway to accumulate the scientific basis for the conservation of marine and coastal resources. Under the auspices of the Global Ocean Observing System (GOOS), a subregional Northeast Asian Regional GOOS (NEAR-GOOS) has been created as a pilot programme. The East Asia Acid Rain Monitoring Network also provides monitoring information on atmospheric deposition. The countries in the region have also initiated coral reef monitoring activities under the Global Coral Reef Monitoring Network (GCRMN).

Climate Change and the Marine Environment

Climate change is also affecting the marine environment. Observations showed that levels of dissolved carbon dioxide were abnormally elevated in the early 1970s, even though no detrimental effects were detected. Researchers argue that the elevated dissolved CO₂ and weak acid formed are slowing down calcium carbonate deposition in coral communities and possibly, by inference, in other marine organisms that secrete calcium carbonate during the formation of shells and exoskeletons.

The IPCC (Inter-governmental Panel on Climate Change) estimates the average sea level rise caused by climate change will be 0.3-0.5m by 2100. Low-lying coastal areas, particularly deltas and small island states could be affected. Changes in sea temperature might affect coral reefs and migratory marine species, and changes in the frequency and magnitude of natural meteorological events, such as typhoons, cyclones and unusual rains, are likely to affect coastal and island countries which are vulnerable to such natural phenomena. The role of the ocean in storing carbon requires further investigation, and proposals to use the ocean as a dumping ground for surplus carbon dioxide could be quite dangerous. The impacts of climate change on ocean temperature, currents, and the marine ecological balance must also be clarified scientifically.

K.2 Steps towards Solutions

Traditional economic development plans for marine and coastal areas have been dominated by targeting short-term direct economic benefits. Environmental, social and economic values of the services provided by

ecosystems have not been incorporated in traditional planning practices. Another factor of poor resource management is that marine and coastal resources are exploited by many sectors without adequate coordination or dialogue. These practices have resulted in serious resource degradation, while disturbing ecosystems and threatening the lives of people who depend highly on marine and coastal resources. For example, people who live in mangrove areas are suffering from the negative impacts of conversion of mangrove forests into shrimp farms. Therefore, ecosystem services in marine and coastal ecosystems should be appropriately evaluated and incorporated—that is, internalised—into economic planning and resource accounting.

To develop sustainable marine & coastal resources management, the following critical strategic areas are suggested:

➤ **Establishing Integrated Coastal Area Management (ICAM) or Integrated Coastal Zone Management (ICZM)**

In policy planning and implementation for marine and coastal resources, Integrated Coastal Area Management (ICAM) or Integrated Coastal Zone Management (ICZM) should be firmly established, focusing on the three pillars of sustainable development: environmental, social and economic development. Strategies or policies based on ICAM would enable governments, private companies and local communities to understand the integrated vision of coastal development and conservation of coastal resources, as well as to address the threats to coastal and marine environment, such as pollution, degradation of important habitats, and over-exploitation of the living resources mentioned above. An important issue is to ensure effective coastal economic development, while maintaining the functioning of coastal ecosystems and their services, so that these ecosystem services can be wisely used in addressing poverty in coastal areas;

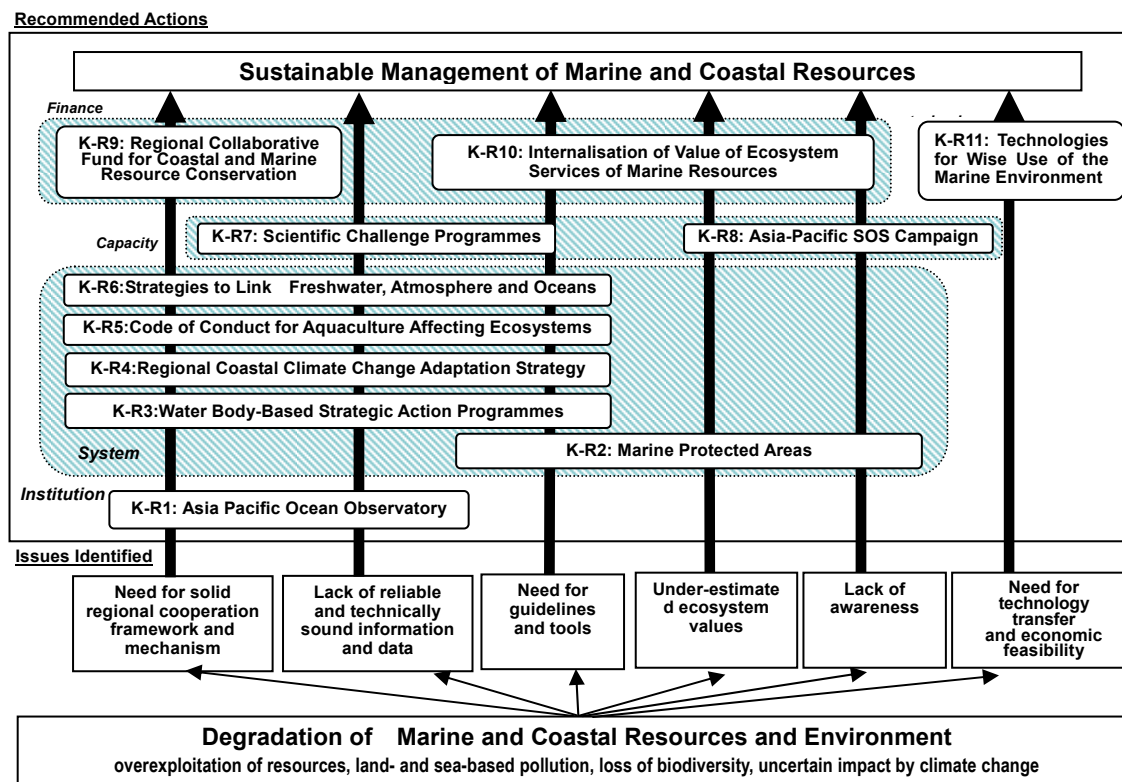
➤ **Enhancing stakeholder coordination and participation among governments, scientists, experts, public, NGOs**

Stakeholder participation is a key to successful marine and coastal resources management. Due to the complexity of marine and coastal processes, the role of scientists and experts is essential in providing a sound understanding of marine and coastal ecosystems and sufficient information for policy design. In addition, NGOs can play a role in amplifying the public voice, especially on behalf of those people who have suffered from the negative impacts of poor management. To improve stakeholder participation, capacity-building and awareness-raising should be conducted through various educational programmes;

➤ **Strengthening regional cooperation on marine & coastal resources**

Coordination and cooperation among many organisations such as United Nations organisations, inter-governmental organisations, NGOs and national institutions have not been adequate. Region-wide cooperative work has been limited to a handful of initiatives. Strengthening regional cooperative work would bring benefits such as increased mutual understanding of commonly shared resources, and environmental effects and impacts; creation of common interests; and facilitation of conflict resolution;

Figure 34: Recommended Actions on Marine and Coastal Resources



K.3 Recommendations

Institution

K-R1. Asia-Pacific Ocean Observatory

As indicated above, many ocean issues are trans-boundary in nature. In addition, marine environmental conditions and resource availability are changing rapidly. To plan the wise use of marine resources, close attention should be paid to the acquisition, assimilation and collation of monitoring data, to cover physical, chemical and biological parameters, particularly in critical ecosystems and habitats. NEAR-GOOS has already initiated such an observation system, targeting the physical conditions of the seas of Northeast Asia. Under the auspices of the UNEP Regional Seas Programme, a pollution monitoring system has been established for the Northwest Pacific. Such efforts should be extended to the other subregional water bodies to enable the design of a data system on a regional scale, and ensure future data compatibility and quality assurance.

System

K-R2. Marine Protected Areas (MPAs)

Marine Protected Areas (MPAs) should be established, particularly biodiversity rich areas such as coral reef and mangrove forests at both national and regional levels. MPAs, on the one hand, serve as a buffer against man-made disturbances on marine ecosystems by restricting human activities, while they sustain fishing activities over the long period through sound management of fishery resources. MPAs are also useful in protecting the social and cultural heritage of marine life. As a result, purposes of an MPA could vary¹²⁵ from place to place, which has been reflected in the difference of

¹²⁵ Definitions of MPAs vary. IUCN has defined MPAs as “any area of the inter-tidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment. (IUCN and the World Conservation Union, 1988, Resolution 17.38 of the 17th General Assembly of the IUCN)

levels of protection provided by individual MPAs, i.e., from areas of total restriction of human activities to areas where controlled fishing and other human activities are allowed. Levels of protection should be carefully designed in consideration of harmonisation of the marine environment and life of local people. (see the example of the Great Australian Bight Marine Park described in “Box 36: Promotion of Eco-Tourism” on p.114)

K-R3. Water Body-Based Strategic Action Programmes

Several strategic action programmes have been established to address the environmental and resource-use issues identified in specific water bodies in a cost-effective and cooperative manner. Strategic Action Programmes have been prepared under some of the GEF projects in the region, such as those for the South China Sea (including the Gulf of Thailand), the Yellow Sea, the South Pacific, and the Bay of Bengal. The UNEP Regional Seas Programme has also established regional Action Plans for the Northwest Pacific, East Asian Seas, South Asian Seas and the South Pacific. For the implementation of these Action Plans, existing regional bodies (SPREP, SACEP, etc.) and UNEP Regional Coordinating Units are being employed or new bodies are being established. Strategic action programmes need to be developed for other water bodies in the region in order to promote subregional coordination based on scientific assessments.

K-R4. Regional Coastal Climate Change Adaptation Strategy

According to the IPCC forecasts, low-lying coastal areas and islands could be faced with serious danger as sea-levels rise (see also the section of “Climate Change” on p.35). As water temperature increases, the amount of dissolved oxygen may change, and ocean and coastal currents may also be affected. For coastal communities and ecosystems to adapt to such changing aquatic environments, a regional adaptation strategy for climate change should be established. The regional adaptation strategy could plan for climate change adaptation measures focused on low-lying coastal areas, island countries, and critical ecosystems such as coral reefs. Concepts for developing such an adaptation strategy could be sought in the Integrated Coastal Area Management approach, and the strategy should be linked with sustainable financing mechanisms.

K-R5. Code of Conduct for Aquaculture Affecting Coastal Ecosystems

The ongoing trend of expanding aquaculture development poses increasing threats to important coastal ecosystems. Some countries have introduced regulations on aquaculture. For instance, India has established an Aquaculture Authority and Thailand has banned the conversion of rice paddies into shrimp farms. Nevertheless, a regional initiative is needed to reverse the regional trend of the increasing impacts of aquaculture on coastal ecosystems. A code of conduct for coastal aquaculture, based on existing voluntary codes of practices (such as the Code of Practice for Mangrove Protection by the Global Aquaculture Alliance) should be developed.

K-R6. Strategies to Link Freshwater, the Atmosphere, and Oceans

Traditionally, management of freshwater, the atmosphere, and marine issues have been assigned to different institutions. However, due to the inter-relationship among these sectors, integrated management should link these sectors. Without adopting a holistic approach, the management of each sector cannot effectively meet its objectives. Therefore, it is recommended that:

- Marine environmental monitoring systems are fully coordinated with freshwater and atmospheric monitoring programmes (particularly those conducted on a regional or subregional scale, such as GEMS/Water, EANET, etc.);
- A forum is established for dialogue and collaboration among those involved in freshwater, atmospheric and marine environmental management to discuss linkages;
- Cases of hinterland management that have clearly improved the adjacent coastal and marine environmental conditions are collected and presented.

Capacity Building

K-R7. Scientific Challenge Programmes

Further research is needed to elucidate oceanic (physical, geochemical and biological) processes. “Scientific Challenge Programmes” should be established, giving specific tasks as challenges to groups of scientists. Such activity could be fully funded by contributions from the communities that

would benefit from the scientific findings. Potential initial research topics include, but are not limited to, the following themes:

- The role of the ocean in carbon and nutrient cycling and deep ocean carbon storage;
- Contaminant (heavy metals and persistent organic pollutants) transfer within and through the marine environment;
- The economic values of environmental services in critical coastal ecosystems;
- Current fish stocks by species and development of baselines for sustainable fishery;
- The implications of the international shrimp trade on mangrove destruction;
- Environmental effects and feasibility of oil and other seabed mineral resource Exploitation.

K-R8. Asia-Pacific “Save Our Seas” (SOS) Campaign

The degradation of the coastal environment and marine resources is often associated with a lack of understanding of their values. Limited attempts to rectify this situation have been made by the international community. Public awareness campaigns and education programmes conducted to date have been limited to specific areas (such as beach clean ups and coastal bird surveys) and have not been conducted in a manner that creates a better understanding. Among littoral countries that share marine environment and marine resources, neither promotion of understanding nor cooperation on awareness-raising has been undertaken. Therefore, a ‘Save Our Seas’ campaign is recommended for the countries of the Asia-Pacific region to create mutual understanding between the beneficiaries of coastal development and those suffering from the negative effects of such development. Such a campaign could include awareness-raising programmes such as poster or photo competitions of the marine and coastal environment, and the preparation of education materials for school children.

Finance

K-R9. Regional Collaborative Fund for Coastal and Marine Resource Conservation

International and regional financing mechanisms to support the effective management of the coastal and marine environment have not been sufficient to tackle the most critical problems, and at the same time to develop sustainable and effective management on a long-term basis. Creation of a regional financial mechanism aiming at building a collaborative fund for coastal and marine resource conservation should take place. Such a financing mechanism should involve stakeholders such as government agencies, NGOs and the private sector, and stimulate them towards preparing financial plans and ensuring future financing. Establishment of secure financing can contribute to improved performance in coastal and marine resource conservation.

K-R10. Internalisation of Value of Ecosystem Services of Marine Resources

The degradation of important ecosystems such as mangroves, coral reefs, and sea grasses is continuing, partly as a result of the quest for short-term economic benefits. Economic instruments are proposed to promote the conservation and sustainable use of marine resources. National fishery and aquaculture policies should be renewed to incorporate the economic values of the direct use of ecosystem services. In addition, various economic instruments, such as high taxation for coastal development in critical ecosystems and trade agreements to internalise the costs and values of lost ecosystem services, should be implemented in an innovative way.

Technology

K-R11. Technology for Wise Use of the Marine Environment

Cost-effective and resource-efficient technologies must be improved if marine resources are to be used wisely. In addition, the identification of possible technologies, selection of appropriate technologies, and design of their appropriate applications are not easy tasks. Sufficient information is needed on the technologies available and the results of their applications to date. The following are examples of such technologies:

- Innovative pollution control measures, such as those for the collection, treatment and recycling of household and municipal sewage in coastal areas (particularly separate collection and treatment for grey water, urine and faeces, and treatment for purposes of efficient recycling);
- Hydraulic walls to prevent salt water invasion in coastal areas;
- Use of Global Positioning Systems (GPS) and GIS for maritime navigation safety and to avoid sensitive ecosystems;

- Multiple use of mangrove areas (e.g., for such purposes as fish nurseries, sediment traps and coastal erosion control areas).

L. Energy and Clean Air

L.1 Overview

Energy as a key issue for sustainable development

Energy has fundamental implications for sustainable development. Industrial development in the 20th century depended on high energy consumption, with fossil fuels as the main source of energy. Energy demand and consumption have increased as economic development in the region has progressed. In East Asia, for example, driven by the rapid expansion of its economies, commercial energy use grew at an average annual rate of 5.3% between 1980 and 2000. This growth rate is significantly higher than the 0.9% seen in OECD countries, or the 2.1% experienced worldwide over the same period. The total primary energy supply for the Asia-Pacific region is projected to double to 5,569 Mtoe (million tonnes of oil equivalent) in 2020, from 2,671 Mtoe in 1997¹²⁶.

Heavy dependence on fossil fuels and the high-energy consumption patterns in modern societies have resulted in serious environmental problems, including air pollution and climate change. For a sustainable future, energy use must be made more environmentally benign. Thus WSSD agreed on a comprehensive agenda on energy for sustainable development. Guided by the overarching objectives of sustainable development and poverty alleviation, governments agreed to improve access to “reliable, affordable, economically viable, socially acceptable and environmentally sound energy services and resources,” to increase the use of renewable energies, to enhance energy efficiency, and to provide cleaner liquid and gaseous fuels¹²⁷.

Disparity of Access to Energy

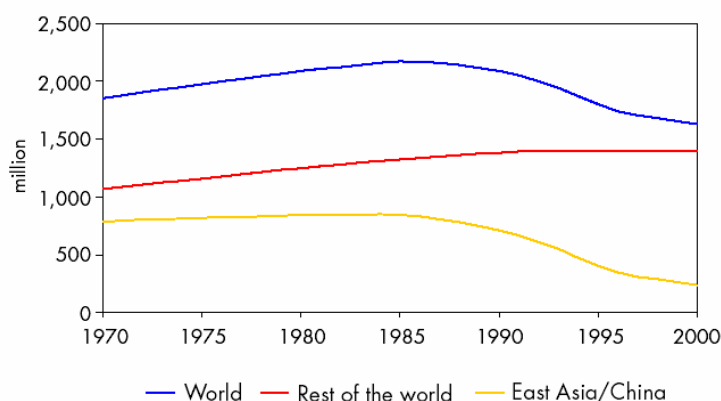
Access to electricity and other modern energy sources is a requirement for economic and social development. In 2000, 1.64 billion people, or around 27% of the world’s population, did not have access to electricity. More than 99% of people without electricity live in developing countries, and four out of five live in rural areas¹²⁸. In contrast, the average electrification rate for the OECD, as well as for transition economies, is over 99%. Average electrification rates in the Middle East, North Africa, East Asia/China and Latin America are all above 85%. More than 80% of people who currently have no access to electricity are located in South Asia and sub-Saharan Africa. Even though the total number of people in East Asia and China without electricity was significantly reduced between 1990 and 2000 (Figure 35), a large number of people in the region still face difficulty in accessing electricity.

¹²⁶ Data aggregated for the Asia-Pacific region from International Energy Association regional energy trends under the reference scenario. International Energy Agency, *World Energy Outlook 2000*. Asia-Pacific region in here includes OECD Pacific, China, East Asia, South Asia and India in IEA regional classification.

¹²⁷ Johansson, T. B., Fritsche, U. R., Flavin, C., Sawin, J., Abmann, D., Herberg, T. C., 2004. *Policy recommendation for renewable energies*. International conference for renewable energies, Bonn.

¹²⁸ International Energy Agency, 2002. *World Energy Outlook: Energy and Poverty*. [Online]. Available: <http://www.worldenergyoutlook.org/pubs/weo2002/EnergyPoverty.pdf>

Figure 35: Number of People without Electricity, 1970-2000



Source: IEA analysis

Another problem relating to accessibility to electricity is unauthorised power connections by low-income populations. Across India, for instance, unauthorised power connections represent as much as 20% to 40% of the total. A third of all power produced in India is stolen. Poor people in slums survive on stolen power. Poverty drives people to steal electricity and boosts the number of unauthorised grid connections. The expected rise in urban population numbers will exacerbate the problem. Unmetered and unauthorised connections lead to very high electricity losses in many developing countries, compared with OECD countries where losses are technical¹²⁹. Such connections are also highly dangerous and often cause loss of life during extreme weather events.

Access to electricity could enhance the quality of daily life, increase incomes and stimulate local economies in rural areas. Hence the current disparities in access to electricity and adequate energy sources are identified as critical barriers to sustainable development. Instead of expanding the national energy grid system, a decentralised energy system using local renewable energy resources can create a cost-effective and environmentally sound energy supply and improve energy accessibility. Due to its geographical conditions, the Asia-Pacific region has great potential to develop such a system by using abundant renewable energy sources like solar, biomass, wind, micro-hydro and geothermal energies.

Energy and Climate Change

Burning of fossil fuels for industrial, commercial and domestic energy use, as well as transportation, is the primary human source of greenhouse gases (GHG) (75% of all GHG emissions). There is a strong link between energy consumption patterns and climate change. In Asia-Pacific, 80% of energy generation is from fossil fuels, and energy consumption is rising rapidly along with industrial development. For instance, industrial use of fossil fuels is growing 60% faster than anywhere else. In addition, the heavy use of poor quality coal, the ever-increasing numbers of cars, extensive forest fires, and land clearance together have resulted in a huge rise of CO₂ emissions in the region¹³⁰.

The Asia-Pacific region includes many of the world's island and coastal nations that are most at risk from the catastrophic events brought about by climate change (*for related information, see the section of "Climate Change" on p.35*) and other fossil-fuel consumption related impacts. Various efforts to address energy issues under the climate change regime have been implemented. Internationally, the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, adopted in 1992 and 1997 respectively, have been stimuli for actions for the reduction of GHGs through the incorporation of a financial mechanisms. GEF, designated as the financial mechanism by the UNFCCC, provided support to energy efficiency

¹²⁹ International Energy Agency, 2002. World Energy Outlook: Energy and Poverty. [Online]. Available: <http://www.worldenergyoutlook.org/pubs/weo2002/EnergyPoverty.pdf>

¹³⁰ Earthsummit2002, 2002. Briefing paper on Climate Change and Energy. [Online]. Available: <http://www.earthsummit2002.org/es/issues/Climate%20change/climatechange.pdf>

improvement and renewable energy use in developing countries to reduce GHGs. Many countries in the Asia-Pacific region ratified the Kyoto Protocol, including countries with the highest levels of GHG emissions, such as China, India and Japan. With the ratification of the Russian Federation in November 2004, the Protocol finally comes into effect in February 2005. Measures to reduce GHG emissions will be further reinforced under the climate regime, and long-term price increases of fossil fuels will be applied in order to encourage the carbon-free economy in the region.

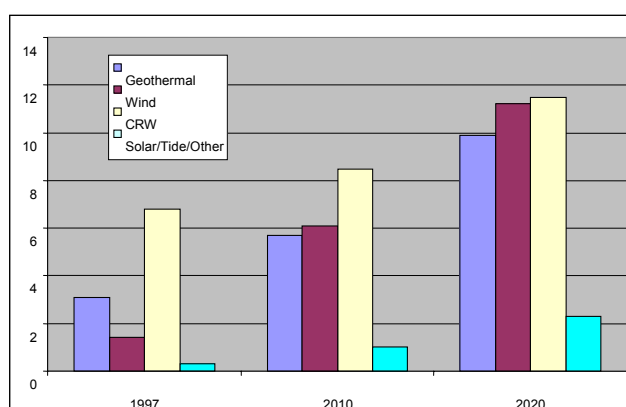
Measures to reduce motor vehicle pollution include diverting traffic away from heavily populated areas, converting high-use vehicles to cleaner fuels, improving vehicle maintenance, increasing the share of less polluting traffic modes, using more fuel-efficient vehicles, and installing catalytic control devices¹³¹. Such air pollution mitigation measures have also contributed to environmentally-sound energy use. In addition, the export of used cars with low fuel efficiency should be discouraged both by exporting and importing countries, which will contribute to reducing the share of vehicles in the total emissions of CO₂.

The automobile industry is making important progress in developing hydrogen vehicles. Major companies such as Daimler-Chrysler and Toyota have already commercialised fuel cell cars, and many other manufacturers are likely to follow. These initiatives of automobile companies will not only contribute to mitigating the effect of global warming and climate change, but also help ensure long-term access to petroleum in the future.

Renewable Energy Development

In the Asia-Pacific region, significant opportunities exist for using renewable energy sources. For a large proportion of the rural population, as well as for poor communities of the urban population, biomass in the form of firewood, charcoal, crop residues or animal waste is the main source of energy for cooking and heating. One significant approach to date has been the shift from the traditional use of abundant biomass resources towards modern biogas technologies. At the same time, new technologies such as photovoltaic generation from solar energy offer an economically and environmentally efficient way of providing electric power to rural communities not connected to the power grid. Wind power is already economically more efficient than fossil fuel power generation when introduced in sites suitable for wind power generation. For instance, in India, wind power generation plays an important role in the sustainable energy system.

Figure 36: Renewables Capacity (GW) in the Asia-Pacific Region



Note: Asia-Pacific region in here includes OECD Pacific, China, East Asia and South Asia in IEA regional classification. CRW stands for combustible renewables and waste.

Source: Aggregation from International Energy Agency, World Energy Outlook 2000. p. 103-104. Table 3.9

¹³¹ Haq, Gary, Wha-Jin Han, Christine Kim and Harry Vallack, 2002. Benchmarking Urban Air Quality Management and Practice in Major and Mega Cities of Asia Stage I (Prepared and published in the framework of the Air Polluting in the Mega-Cities of Asia Project). Korea Environment Institute. Seoul, Republic of Korea.

Renewable energy technologies are already at a significant stage of development and are becoming competitive in urban and rural markets. The Asia-Pacific region is already home to some of the leading countries in the use of renewable energy. India is among the world's top five countries in terms of wind energy generating capacity and accumulated know-how for the introduction of wind energy. New Zealand, Japan, Indonesia, and the Philippines rank among the main geothermal areas of the world. Japan is also a leading solar cell manufacturing country globally. There is a growing body of technical and operational know-how in the use of renewable energy in the region. (*see also "Box 28: Research & Development of Bio-Fuel in Thailand" on p.100*)

However, many barriers to large-scale penetration of renewable energy technologies and services remain. Major barriers relate to the lack of a strong institutional and policy framework; present market and price conditions, including subsidies to fossil fuel that create an uneven playing field between renewables and other sources of energy; inadequate financing to address high up-front costs; and lack of technological capacity.

Box 52: The Removal of Coal Subsidies in China and Its Impact

China is the world's largest producer and consumer of coal. Coal contributes 60% of its total primary energy supply (TPES). The huge quantity of coal production and consumption has resulted in serious damage to the environment. It is estimated that coal combustion is responsible for 85% of SO₂ emissions and 76% of CO₂ emissions. Production and consumption of coal have long been supported by subsidies from central and local governments.

Before 1996, coal from state mines was allocated at artificially low prices, and village mines sold on an open market. The coal price reform in 1996 raised the price for the state mines by letting prices float. This led village mines to expand production and undercut the state companies. The reform was part of a progressive reduction in aid to the state mines, which had fallen from 5.75 billion Yuan in 1992 to 0.6 billion Yuan in 1996.

In addition, the Chinese government introduced a tax on high-sulphur coal to encourage a switch to natural gas and renewable energy sources. Together these two measures contributed to reduce coal use in China by 5% between 1997 and 2001.

Source: International Energy Agency, 1999. *World Energy Outlook: Looking at Energy Subsidies: Getting the Prices Right*. Paris: International Energy Agency. Available online at [<http://library.iaea.org/dbtw-wpd/textbase/nppdf/free/1990/weo1999.pdf>] (10 September 2004).

Roodman, D.M., 1998. *The Natural Wealth of Nations*. New York: W.W. Norton & Company. Cited in Brown, L. R., 2003. *Plan B: Rescuing a Planet Under Stress and a Civilisation in Trouble*. New York: W.W. Norton & Co.

In response to these challenges, the International Conference for Renewable Energies, "Renewables 2004", was held in Bonn in June 2004. Initially designed as a formal intergovernmental conference, Renewables 2004 benefited from involving a wide range of participants, including official participation by the United Nations, other organisations, and a variety of other stakeholder groups, ranging from the private sector to rural development organisations. The conference produced a political declaration by 154 governments that affirmed the importance of renewable energy in meeting energy needs, reducing poverty, and protecting the world from climate change. In addition, an international action programme was produced, which contained 165 individual commitments by governments, international agencies, and private groups to promote the use of renewable energy, including important new initiatives on renewable energy. A conference highlight was China's pledge to increase its use of small hydro, wind, solar, and biomass power generation to 60,000 megawatts, providing 10% of its generating capacity by 2010¹³². The Philippines also announced major new goals, which would double the generating capacity from renewable energy sources by 2013¹³³.

¹³² WorldWatch Institute, 2004. *Renewables 2004 concludes successfully in Bonn*. [Online]. Available: www.worldwatch.org/press/news/2004/06/10

¹³³ Renewables 2004, 2004. *International Action Programme: lists of actions and commitments*. International conference for renewable energies, Bonn.

The Asia-Pacific region is committed to exploring and implementing sustainable energy development programmes that consist of (i) making clean energy more accessible to the people (ii) reducing price distortions between non-renewable energy and renewable energy through policy measures that internalise environmental cost into the cost structure of energy development, and (iii) developing clean technologies, energy saving systems and renewable energy use in the construction of buildings, transportation systems, urban development, trade and industrialisation that de-link their growth from energy use.

Hydrogen Gas as an Energy Source for the Future

There are increasing references to hydrogen in international dialogue on future energy scenarios. Hydrogen has great potential as a clean and efficient fuel to meet future energy needs, both for transportation and for stationary energy use. Hydrogen is a secondary energy source requiring primary energy production using either fossil fuels, or renewable sources such as solar, wind, biomass, micro-hydro or geothermal. Use of renewables results in almost no emissions other than water vapour and heat, whereas use of fossil fuels generates large amounts of greenhouse gases, particulate matter and other hazardous emissions.

Hydrogen technologies are developing, but there are still considerable technical difficulties in the storage and transport of hydrogen, insufficient infrastructure, and certain social concerns regarding safety. However, a number of countries are aiming to develop a hydrogen economy. Iceland, for example, has been already trialling fuel cell buses using hydrogen generated by electricity from their hydro electric network. There are similar bus trials in Perth, Western Australia, and a number of other cities of the world. In November 2002, Las Vegas, United States, opened the world's first hydrogen energy station featuring the co-production of hydrogen for vehicles and electricity using fuel cells. A network of hydrogen fuelling stations is planned in about every 20 miles on California's major highways¹³⁴.

The small island archipelago Vanuatu is the first country in the Asia-Pacific region to announce an attempt to base its entire economy on hydrogen-based renewable energy (*See "Box 64: Clean Energy Islands" p.193*).

The Japanese government has made a strong commitment to be a leader in hydrogen energy development, and developed ambitious scenarios for fuel cell commercialisation and popularisation as early as 2010¹³⁵. Hydrogen can be an all-encompassing clean secondary energy source in the long term future, which will have no detrimental effects on the global environment if produced using renewable energy sources.

Promoting Energy Efficiency

Energy efficiency is another important issue for sustainable energy use. Energy efficiency refers to the ratio between energy output (services such as light, heat and mobility) and input (fuels)¹³⁶. Despite the increasing use of renewable energy, fossil fuels are dominant and will be for some time in the future. Energy efficiency is one of the cheapest, fastest and safest ways to meet the objective of sustainable energy development. Due to various efforts to improve energy efficiency, the economy's energy intensity –the ratio of energy consumption to GDP–over the last 30 years has improved by around 1.8% each year worldwide. It means that without energy efficiency improvement, home heating, for example, would use more than twice the amount of energy it uses today¹³⁷. In terms of Asia-wide totals, energy intensity dropped 1.5% per year over the same 28 years. China improved its energy intensity by as much as 4.2% per year and Viet Nam also recorded remarkable improvements at an annual rate of 2.4% during the same period¹³⁸.

Most countries in the region have undertaken energy efficiency programmes of some sort in three main areas— the building sector, the industrial sector and the transportation sector. Programmes in the building sector aim to raise the efficiency of energy and electricity use in residential and commercial buildings through measures such as building codes, appliance efficiency standards and appliance efficiency labels. Programmes in the industrial sector include industrial equipment efficiency standards, energy audits, voluntary agreements and demand-side management focusing on reducing electricity consumption at the

¹³⁴ Further information can be found at [http://www.alternate-energy.net/hydrogen_highway04.html].

¹³⁵ Further information can be found at [http://www.ena.or.jp/WE-NET/organise/organise_e.html].

¹³⁶ International Energy Agency, 2001. *World Energy Outlook 2000*. Paris: Organisation for Economic Cooperation and Development/International Energy Agency. P. 57.

¹³⁷ Department of Trade and Industry (DTI) of United Kingdom, 2002. *Our energy future - creating a low carbon economy*. [Online]. Available: <http://www.dti.gov.uk/energy/whitepaper/>

¹³⁸ Fujime, K., 2002. *Energy Efficiency Improvement and Positioning of Renewables in Asia*. [Online]. Available: http://eneken.ieej.or.jp/en/data/old/pdf/0201_03e.pdf

peak time. Programmes in the transportation sector include vehicle fuel efficiency standards (i.e., mileage travelled per unit of fuel), taxation on vehicles and fuels, and promotion of fuel-efficient public transport modes such as trains and buses.

However, inefficient energy practices are still found, most seriously in many parts of developing countries in Asia. For instance, poor people in developing countries rely heavily on traditional biomass for cooking and heating. In most cases, such cooking and heating methods are very inefficient. In developing countries, some 2.4 billion people rely on traditional biomass for cooking and heating. In India and China, over half of the population rely on biomass. In Indonesia, most rural households use wood for cooking. In East Asia, the most inefficient biomass use occurs in the Philippines, Thailand, Myanmar and Viet Nam¹³⁹.

Energy efficiency improvement is an important avenue in reducing GHG emissions. The Asia Least-cost Greenhouse Gas Abatement Strategy (ALGAS) Project¹⁴⁰, a study by 12 Asian countries of their national emissions of GHGs in 1990, their projections of GHG emissions to 2020, and an analysis of the mitigation options in different economic sectors indicated that under the baseline of 1990, the energy sector will account for about 90% of total GHG emissions by 2020. The study also indicates that with regard to GHG mitigation options for the energy sector, energy efficiency measures on both the supply and demand side account for most of the least-cost GHG mitigation options.

Air Pollution

Air pollution is a major cause of environmental and health hazards in the Asia-Pacific region. The combustion of fossil fuels (coal, oil, and natural gas) is the principal source of air pollution in all urban areas. In most rural areas, the burning of biomass such as firewood, agricultural residues and animal waste is the main cause of indoor pollution. Most of the combustion of fossil fuels takes place in industries, but the domestic sector, transportation and generation of electricity are also involved. In the majority of Asian cities, transportation is the largest source of air pollution (UN-ESCAP/ADB 2000)¹⁴¹. With the trends of urbanisation, industrialisation and motorisation in the developing cities in the Asia-Pacific, increasing amounts of fossil fuels are being consumed and the emission and concentration of air pollutants have been increasing.

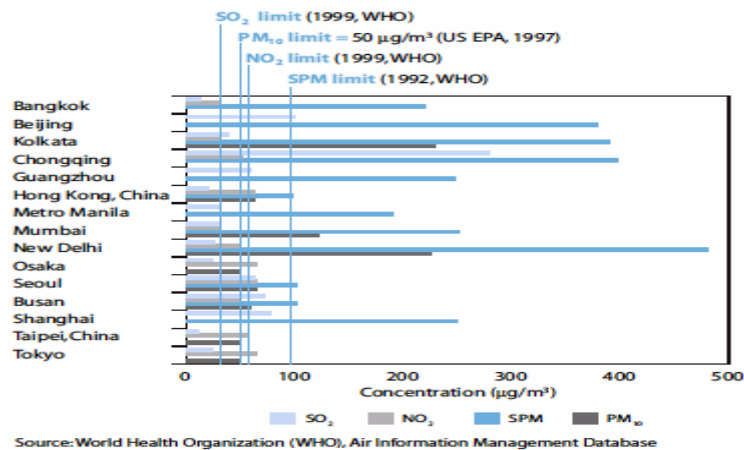
Common pollutants in the Asia-Pacific region include sulphur dioxide (SO₂), particulate matter (PM), volatile organic compounds (VOCs), ozone (O₃), lead (Pb), carbon monoxide (CO), and nitrogen oxides (NO_x). Figure 37 shows the average annual pollution concentration of SO₂, suspended particulate matter (SPM), particulate matter smaller than 10 microns (PM₁₀), and NO₂, in 15 mega cities in Asia from 1990 in relation to the standard set by the WHO and the United States Environmental Protection Agency for health effects. It shows that many cities exceed the standards, especially for SPM and PM₁₀. (*for related information, see the section on "Urban Air Pollution", p.33-34*)

¹³⁹ International Energy Agency, 2002. World Energy Outlook: Energy and Poverty. [Online]. Available: <http://www.worldenergyoutlook.org/pubs/weo2002/EnergyPoverty.pdf>

¹⁴⁰ The ALGAS project was designed to assist the countries meet their obligations under the United Nations Framework Convention on Climate Change. The project was executed by the Asian Development Bank (ADB) from 1995 to 1998 with funding of about \$9.5 million from the Global Environment Facility through the United Nations Development Programme (UNDP). ADB provided supplemental funding of \$592,000. The governments of Norway and the participating countries co-financed the project. The countries involved in the study were Bangladesh, China, India, Indonesia, Republic of Korea, Mongolia, Myanmar (Burma), Pakistan, Philippines, Thailand, Viet Nam and the People's Democratic Republic of Korea. For further information on the ALGAS project, see: [<http://www.adb.org/REACH/algas.asp>].

¹⁴¹ United Nations Economic and Social Commission for Asia and the Pacific and Asian Development Bank, 2000. State of the Environment in Asia and the Pacific. United Nations: New York.

Figure 37: Average Annual Pollution Concentrations, by City (1990-1999) ¹⁴²



Air pollution causes adverse effects on human health, crops and forests, and materials such as metals, painted surfaces, calcareous stones, polymer materials and paper. Air pollutants are also directly and indirectly related to climate change¹⁴³. Human health effects include respiratory and pulmonary effects (NO₂, O₃, PM, SO₂), impairment of visual perception (CO), decrements in intelligence quotient (Pb), and premature death (PM). Toxic air pollutants contained in VOC such as benzene have been found to be carcinogenic. The effects vary according to both the intensity and duration of exposure and the health status of the population exposed. High concentrations of air pollutants shown in Figure 37 mean that residents in those cities are living at very high risk to their health. The WHO indicated that about 500,000 of the 800,000 prenatal deaths due to exposure to urban outdoor air pollution are in Asia¹⁴⁴.

To address air pollution problems, various policy strategies and measures have been developed and implemented across the region. They include; (i) at the regional level, the Clean Air Initiative for Asian Mega Cities (CAI Asia) supported by ADB and the World Bank, and through the Manila Statement, adopted in January 2004 by 14 countries in the region, regarding realisation of environmentally sustainable transport in Asia, and (ii) at the national level, air quality standards for main pollutants, and emission standards for power plants, industries and motor vehicles. In addition to regulatory measures, options to reduce emissions from fuels have been introduced, such as measures which address fuel quality (including switching to cleaner fuels and improving the quality of fuels to reduce emissions), rationalisation of fuel prices to provide incentives for efficient fuel use, adoption of technologies that reduce emissions at the source, and energy efficiency measures which reduce emissions through reductions in the quantities of fuel used¹⁴⁵.

L.2 Steps towards Solutions

Most countries in the Asia-Pacific region remain heavily dependent on fossil fuels. In rural areas in the developing countries, traditional biomass is used widely for cooking and heating as a large proportion of the population in the region still faces difficulty in accessing electricity. This is attributed to a lack of appropriate policy and market mechanisms to support the development of renewable energy, as well as a low level of technology development (including proper infrastructure) for renewable energy and energy efficiency.

JPOI includes a clear commitment with regard to renewable energy: “*With a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to*

¹⁴² As cited by the Asian Development Bank (ADB), 2003a. Reducing Vehicle Emissions in Asia: Policy Guidelines for Reducing Vehicle Emissions in Asia. ADB. Manila, Philippines.

¹⁴³ ADB, 2003b. Appendix on Adverse Health and Environmental Effects from Vehicle Emissions: Policy Guidelines for Reducing Vehicle Emissions in Asia. ADB. Manila, Philippines.

¹⁴⁴ ADB, 2003a. Ibid.

¹⁴⁵ Haq, Gary, Wha-Jin Han, Christine Kim and Harry Vallack, 2002. Benchmarking Urban Air Quality Management and Practice in Major and Mega-Cities of Asia Stage I (Prepared and published in the framework of the Air Polluting in the Megacities of Asia Project). Korea Environment Institute. Seoul, Republic of Korea.

*total energy supply, recognising the role of national and voluntary regional targets as well as initiatives*¹⁴⁶. In the Bali Declaration on Asia-Pacific Perspectives on Energy and Sustainable Development, the member countries and associated members of UN-ESCAP stressed that “*renewable energy sources, particularly through the increased use of modern technologies, could play a key role in enhancing energy supplies, particularly in the rural areas of the Asian and Pacific region. To that effect, we will strive to initiate policies and strategies to focus on and facilitate the optimal commercial exploitation of renewable energy resources*”¹⁴⁷.

The Sustainable Energy Development Action Programme, Strategies and Implementation Modalities for the Asian and Pacific Region 2001-2005 notes that “*While significant progress has been made in some countries in the Asian and Pacific region, there are wide gaps in most countries between intention and action, and between action and achievement*”. Some of the major remaining challenges to address include the following:

- Policy and regulatory reforms have not provided the required price signals and sense of strong government commitment through clear policy objectives so as to induce a sustainable engagement of the private sector in the renewable energy sector;
- Financing remains dominated by public support mechanisms. The contributions of private financial institutions, consumer financing schemes and private entrepreneurship in the renewable energy sector continue to be marginal;
- The development of indigenous technological capacities or acquisition/transfer of technology has not been given the policy attention required to harness the potential of renewable energy resources.

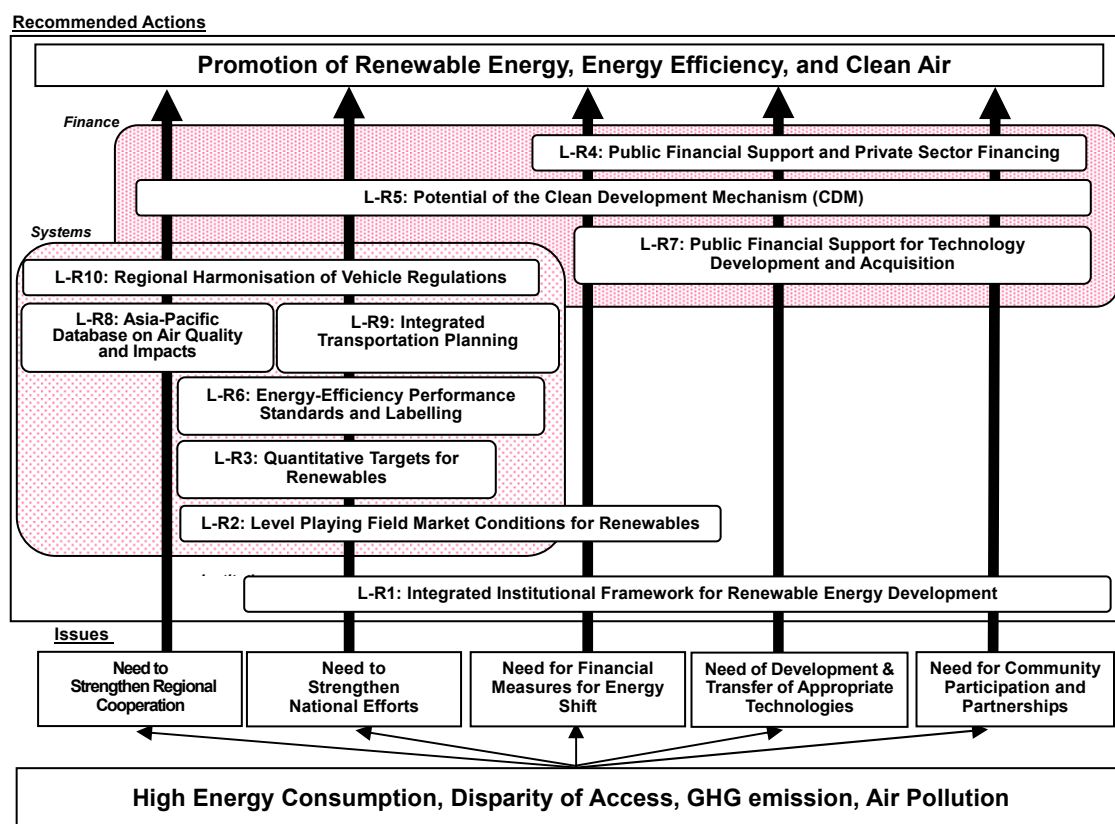
In response to these existing obstacles to sustainable energy development, a set of recommendations are proposed with a view to providing answers to the following questions:

- What further policy and regulatory reforms are necessary to create the market conditions necessary to propel renewable energy in the Asia-Pacific?
- What are the priorities? And how should such priorities be tackled (policy options)?
- Who are the main actors and what are their roles?
- How should the targeted public financial support be enhanced at local, national and regional levels with a view to creating conditions for massive private sector-led investment in the renewable sector?

¹⁴⁶ United Nations Department of Economic and Social Affairs, Division for Sustainable Development, Johannesburg Plan of Implementation, Chapter III. Changing unsustainable patterns of consumption and production, Section 20 (e). Accessible online at: http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm

¹⁴⁷ UN-ESCAP, 2001. “Bali Declaration on Asia-Pacific Perspectives on Energy and Sustainable Development – Sustainable Energy Development Action Programme, Strategies and Implementation Modalities for the Asian and Pacific Region 2001-2005”. New York: United Nations.

Figure 38: Recommended Actions on Energy and Clean Air



L.3 Recommendations

L.3.1 Renewable Energy

Institutions

L-R1. Integrated Institutional Framework for Renewable Energy Development

A renewable energy policy with clearly defined objectives, targets, strategies and modalities of implementation is an essential element of renewable energy development. Certain countries in the region have already adopted, through legislation, such policies, and many others are in the process of formulating renewable energy laws. It is recommended that specific institutions should be created with a mandate to address the policy, institutional, technology, financing, and social aspects of renewable energy development. The establishment of the Ministry of Non-Conventional Energy Sources in India, along with state nodal agencies and the Indian Renewable Development Agency Ltd. as a specialised development financial institution for the renewable energy sector is one laudable approach. There should be strong linkages between specialised institutions devoted to the promotion of renewable energy and the agencies in charge of poverty reduction, trade and economics, energy security and environmental protection.

System

L-R2. Level Playing Field Market Conditions for Renewables

A level playing field between renewable energies and other energy sources would enhance the commercialisation of renewable energy technologies. Measures in this direction could include:

- Adoption of an energy pricing system that reflects negative externalities related to health, safety,

- security and the environment of all energy sources, as well as positive effects such as employment generation, reduced import dependence and reduced burden on foreign exchange;
- Adoption of favourable economic instruments, including reduction or elimination of subsidies on fossil fuels, differentiated taxation on different energy sources by internalising external costs, and provision of green power purchasing options to consumers;
 - Installation of electricity meters that run in reverse so that households or businesses that generate surplus energy from renewable resources can be credited;
 - Reduction of the investment risks in renewable energy development through mechanisms such as renewable portfolio standards and feed-in-tariffs.

L-R3. Quantitative Targets for Renewables

With the objective of supporting a forward looking renewable energy policy and assuring a clear and stable public policy direction to the private sector, financial institutions, and consumers, all countries are encouraged to formulate clear renewable energy goals and targets, mandatory at best, indicative at least, along with plans of implementation and monitoring mechanisms. Such targets could set an objective to meet a certain proportion of the future energy supply by means of renewable energy resources, or set a target focused on renewable energy-based rural electrification alone. In formulating renewable energy targets, local conditions in terms of potential energy resources and environmental and socio-economic situations must be taken into account. For the purpose of developing renewable energy targets, the following course of action is recommended:

- Undertake a comprehensive assessment of the potential, location, and seasonal changes of available renewable energy resources, with support from regional and international organisations;
- Formulate renewable energy targets using an inter-agency approach and involve industry, financial institutions and civil society in the process.

Finance

L-R4. Public Financial Support and Private Sector Financing

Adequate financing is an essential aspect of renewable energy development. A key challenge is to expand financing options for renewable energy by the private sector, financial institutions and end-users, while providing temporary public support to overcome initial capital costs. The following measures could contribute to this objective:

- Commitment to budgetary allocation, through well-targeted and gradually removable public financial support including the use of performance-based subsidies and bidding-based means of subsidy provision¹⁴⁸;
- Establishment of institutionalised mechanisms of financing (e.g., Indian Renewable Energy Development Agency);
- Increase of the share of Official Development Assistance allocated to renewable energy development;
- Adoption of a “local enterprise” approach to manufacturing, instalment, operation, marketing, maintenance and provision of other services by promoting the development of local renewable energy services companies in urban and rural areas;
- Encouragement of, through fiscal and other incentives, financial institutions to set quantitative lending targets for renewable energy industry and consumer financing.

L-R5. Potential of the Clean Development Mechanism (CDM)

Many countries in the Asia-Pacific region are considered to have a high potential to host GHG abatement projects under the Clean Development Mechanism (CDM). There are, however, many constraints for the private sector alone to initiate CDM projects. These constraints include the lack of institutional capacity and national CDM policy and/or strategy, low awareness of CDM among policy makers, the private sector and civil society, and lack of skilled manpower related to CDM in host countries. Efforts to further promote the effective implementation of CDM need to focus on three elements: policy and institutions, human capacity building, and involvement of the private sector.

¹⁴⁸ In China, competitive bidding by potential suppliers of solar systems promoted optimal use of government subsidies, and resulted in reduction in the price of village power systems from about US\$20/Wp to about US\$15/Wp. “Up-grading renewable electrical energy programme for village levels in China by use of government financing and bidding based on market regulation”, in Institute for Global Environmental Strategies (IGES). 2003. Asia-Pacific Environmental Innovation Strategy Project (APEIS) Research on Innovative and Strategic Policy Options (SPO). Second Progress Report. March 2003.

- Formulation of a CDM policy/strategy, which would encompass an assessment of a country's potential for CDM, and the identification of relevant sectors for the CDM project, is essential for an effective use of the mechanism. At the institutional level, countries need support in the identification and/or establishment of a Designated National Authority (DNA) for CDM projects. In countries where a DNA has already been put in place, efforts would concentrate on developing functional capacity, especially as regards approval and operational procedures for CDM projects;
- Human capacity-building could be envisaged in terms of training in the formulation of a Project Idea Note (PIN), for baseline setting/calculation, and in the formulation of Project Design Document (PDD);
- The preparation of CDM Investor's Guidelines, which would provide all necessary and practical information such as country profile, institutional set-ups, approving process and requirements for approval of CDM projects in respective countries, to project proponents, consultants, financial institutions and other stakeholders, would help enhance private sector awareness and involvement in the CDM¹⁴⁹.

Box 53: A Unique Institution to Finance New and Renewable Energy in India

While the need for large-scale adoption of renewable energy is recognised, there are several obstacles currently preventing wider adoption.

In India, one solution was to establish the Indian Renewable Energy Development Agency Limited (IREDA) in March 1987. India is now one of the leading countries in the world in terms of the installed capacity from renewable energy sources. This has resulted largely from IREDA's operations over the last 15 years. The renewable energy sector now contributes about 3.5% of the total installed power generating capacity in India.

As a Public Sector Enterprise under the administrative control of the Ministry of Non-Conventional Energy Sources (MNES), IREDA has been adhering to its mission to ensure "Energy for All" by designing and implementing suitable financing arrangements for new and renewable energy (NRSE) development, aiming at the four objectives of (i) operating a revolving fund for promoting and developing new and renewable sources of energy; (ii) assisting in the rapid commercialisation of NRSE technologies, systems and devices; (iii) assisting in the upgrading of technologies in India; and (iv) extending financial support to energy efficiency and conservation projects and schemes.

IREDA is a unique financial institution devoted entirely to the development and promotion of NRSE in India. A major role of IREDA is to provide renewable energy users, manufacturers and producers with credit that initially features concessional terms but progressively approaches commercial market rates as the technology gains wider acceptance. By financing new ventures in renewable energy, IREDA helps create performance track records for NRSE technologies, facilitating their transition from novelty to mainstream status.

One of the keys to success for IREDA is collaboration among different stakeholders with sufficient support from the Government. Its journey started with a commitment from the government to meet the financial needs of the new growing sector. During the last 15 years, government, private sector entities and NGOs as well as international communities have been actively involved in the mobilisation of resources to meet the growing demand for renewable energy.

Source: APFED BPP

¹⁴⁹ Several institutions have initiated capacity-building programmes for effective implementation of the CDM in the Asia-Pacific region, including a programme on "Integrated Capacity Strengthening for Clean Development Mechanism (ICS-CDM)", being implemented in Cambodia, India, Indonesia, the Philippines and Thailand for the year 2004 by the Institute for Global Environmental Strategies on behalf of the Japanese Ministry of the Environment. For further information see IGES-CDM Programme [<http://www.iges.or.jp/en/cp/cdm/>].

L.3.2 Energy Efficiency

System

L-R6. Energy-Efficiency Performance Standards and Labelling

Improvements of energy intensity in the production process either directed by means of stringent emission standards or through voluntary agreements with the private sector, can improve energy efficiency. Labelling requirements are another set of new policies that drive technological development, and encourage the development of energy efficient products and processes. Labelling also enhances consumer awareness and can influence consumption patterns, as consumers become more aware of the environmental impact of their purchasing choices. The following initiatives could be considered in a voluntary or mandatory manner depending on the local context:

- Energy efficiency audits;
- Minimum required fuel rating and emission standards in the transport sector in order to minimise urban air pollution;
- Voluntary and, where appropriate, mandatory energy labelling for electrical equipment, including household appliances;
- Involvement of machinery manufacturers and consumer associations in the formulation of standards and labelling requirements;
- Development of installation cords for energy efficient equipment in buildings.

Finance

L-R7. Public Financial Support for Technology Development and Acquisition

A key challenge in promoting energy efficiency is to minimise the financial burden of shifting to cleaner technologies on industrial production lines. Some of the measures that could be applied, taking into consideration local conditions, are the provision of financial support in the form of fiscal incentives and the lowering of import duties and other financial support measures given to industry. Given that the countries in the region stand at different levels of capacity with regard to energy-efficiency technologies, regional and international cooperation in technology transfer and technology acquisition need to be promoted through expansion of existing initiatives.

L.3.3 Air Pollution

System

L-R8. Asia-Pacific Database on Air Quality and Impacts

Air quality information is important not only for reporting purposes but also for educating and encouraging stakeholders to participate and engage in air quality management initiatives. Without sufficient and appropriate information on air pollution and its impacts, it is difficult for governments to adopt sensible policies or to motivate people to take steps towards cleaner air. Therefore, reliable and comparable air quality data in the region should be obtained. At present, air quality monitoring data collection and air quality assessments are not sufficient. Due to the limited number, as well as poor operation and maintenance of air quality monitoring stations, monitoring activities in the region are minimal and data are not always reliable. In addition, monitoring techniques, which are different from country to country, make international comparisons difficult. Improved monitoring technologies and the development of an effective region-wide database on air quality and its estimated health effects are recommended.

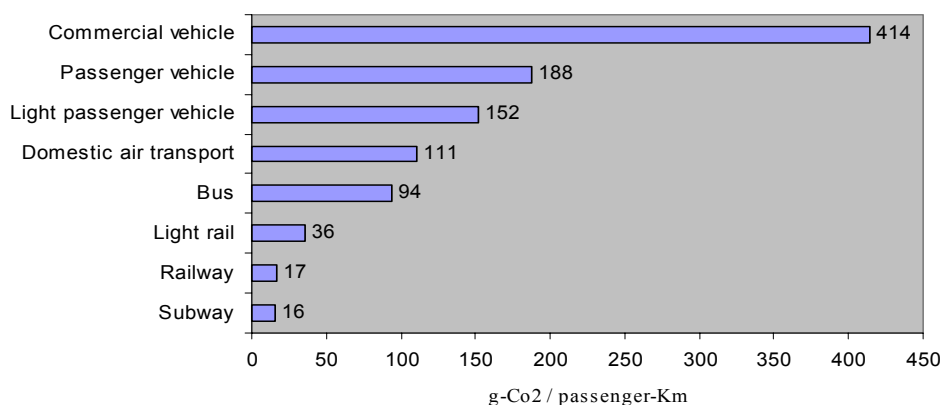
L-R9. Integrated Transportation Planning

The transport sector has been the fastest-growing source of GHGs and air pollutants¹⁵⁰. Relevant factors regarding air pollution from the transport sector can be categorised as: (i) increased travel demand, especially due to urban sprawl; (ii) increased use of motor vehicles to meet travel demand, since the supply of alternatives to automobile use, such as public transport, is insufficient and/or people prefer automobiles to public transport; and (iii) emissions of air pollution from each vehicle.

¹⁵⁰ UN-ESCAP, 2001. Review of Developments in Transport and Communications in the UN-ESCAP Region 1996-2001: Asia and the Pacific, United Nations, New York.

Therefore, to reduce air pollution from the transportation sector, it is not sufficient to focus only on vehicle emission controls. It is imperative to develop transportation plans to address consumer demands by integrating land use planning, telecommuting, public transportation, non-motorised transportation, awareness-raising initiatives towards less emission-intensive modes of transportation¹⁵¹ (Figure 39), and traffic demand management (TDM), as well as conventional emission standards and inspection/maintenance¹⁵².

**Figure 39: Emissions of CO₂ from Different Modes of Transportation in Japan (2000)
(Passenger transport)**



Source: Adapted from Foundation for Promoting Personal Mobility and Ecological Transportation, 2003, p. 13.

To develop integrated transportation planning, effective and responsive urban management requires appropriate organisational structures, technical capacity and a planning framework at the metropolitan level. Social aspects should be addressed by paying attention to “bottom-up” planning, including community consultation. Major transport and other urban infrastructure decisions will impinge on the form of urban development, and the resulting travel patterns should be carefully considered. Importantly, the planning framework should be realistic in terms of what governments can achieve¹⁵³.

L-R10. Regional Harmonisation of Vehicle Regulations

Emissions from vehicles are one of the largest causes of air pollution in the Asia-Pacific region. Imported second-hand engines, improper maintenance of vehicles, and poor fuel quality make the pollution even worse in developing countries, where fuel quality control is poor and resources to conduct inspection and maintenance are lacking. Harmonisation of vehicle regulations in the region could potentially lower the overall costs of air pollution control by introducing economies of scale in vehicle manufacture^{154,155}.

Harmonisation in two areas of vehicle regulations is suggested. The first involves harmonisation of new vehicle standards. The harmonisation of emission standards could reduce the costs of testing and would enable countries that lack sufficient testing facilities to consult with neighbouring countries facing similar difficulties, and to explore the feasibility of collectively commissioning testing facilities.

¹⁵¹ In the longer term, motor vehicles such as hybrid electric cars and hydrogen fuel cell vehicles (FCVs) will become available. Then emissions from such cars will be very low, and in the case of FCVs, emissions are simply water vapour.

¹⁵² IGES, 2003. Asia-Pacific Environmental Innovation Strategy

¹⁵³ ADB, 2003. Reducing Vehicle Emissions in Asia: Policy Guidelines for Reducing Vehicle Emissions in Asia. ADB. Manila, Philippines

¹⁵⁴ ADB, 2003c. Vehicle Emissions Standards and Inspection and Maintenance: Policy Guidelines for Reducing Vehicle Emissions in Asia. ADB. Manila, Philippines.

¹⁵⁵ ADB, 2003d. Cleaner Fuels: Policy Guidelines for Reducing Vehicle Emissions in Asia. ADB. Manila, Philippines.

The second suggested area of harmonisation is fuel requirements. Harmonisation would result in economies of scale in fuel distribution as well as vehicle manufacture, and, if fuel specifications were identical throughout the region, there would be less risk of air pollution. There is already a global agreement to work toward further harmonisation under the auspices of the United Nations Economic Commission for Europe Working Party 29 (WP29), and the Asia-Pacific region should collectively and actively promote harmonisation, as many countries in this region are already moving towards Euro 4 or Euro 5 standards for vehicles and fuels.

M. Land Use Management—Urbanisation, Rural Development and Forest Conservation

M.1 Overview

Asia-Pacific is already the most densely populated region in the world. As land is a scarce resource in the region, further population increases and economic growth will make land even more precious, both in rural and urban areas. Urban areas continue to rapidly expand, encroaching into important agricultural areas. For instance, policies to encourage each Chinese family to have at least one car would mean that much of China's agricultural land would be taken over by cars. Thus, city expansion should be upwards, not outwards. Strata titles operative in some countries allow condominium owners to own the air space but not the land. Urban expansion into agricultural areas will soon reach its limits, pushing more and more farmers towards marginal forest areas. Forest areas will continue to shrink, and infertile areas will increase as a result of desertification and land degradation. As forests and other natural ecosystems continue to diminish, the conservation of water resources and biodiversity will emerge as an ever more urgent task.

The Asia-Pacific region has a wide variety of vegetation types, and the land uses for such vegetation types have been expanded well beyond the capacity of the land to sustain them. For example, rice cultivation originated in the lowland monsoon areas and then spread to even mountain areas and cold areas, which are not suited for rice paddies. Indeed, Asia has pushed the use of its agricultural lands to the limit. In semi-arid areas, animal husbandry has been conducted widely since ancient times. More recently, however, huge population increases and extremely rapid land development to meet the demands of increasing population pressure have adversely impacted on arid and other marginal areas in the form of land degradation, deforestation and desertification.

The Global Assessment of Soil Degradation (GLASOD) estimates that about 13% (or 850 million ha) of the land in Asia and the Pacific is degraded. Most of this degradation is in Asia, but 104 million ha is estimated to be degraded in the Pacific subregion, where large-scale clearance of forest land has caused a decline in soil structure and fertility, and where invasive species are the predominant land cover on many of the islands¹⁵⁶. In the region, soil degradation is caused mainly by agricultural mismanagement and chemical discharges from nearby mines and industries, as well as by inappropriate waste disposal practices. Mining industry operations have posed serious threats to land management by encroaching into land used by indigenous farmers and hunter-gatherers. By clearing for mine areas and access roads, and disturbing surface streams and groundwater with acidic drainage and chemical spills, mining can have adverse environmental impacts.

Urbanisation

Urbanisation is expected to accelerate over the coming decades. Despite a number of positive impacts for human and economic development, urbanisation also causes various problems where expansion of urban areas is uncontrolled. Among these problems are housing shortages, lack of infrastructure, traffic congestion, insufficient waste management and environmental degradation. Many of these problems particularly affect the poor, while poverty can also be one of the drivers behind environmental degradation. The MDGs target significant improvement in the lives of at least 100 million slum dwellers worldwide by 2020.

As cities play a central role in bringing about stronger, more stable and adaptable regional and national economies, the form and structure of urbanisation hold the key to sustainable development. Effective urban management can provide greater cost and resource-effective opportunities for the provision of infrastructure and services in meeting the basic needs of the region's population. In addition, environmentally sensitive urbanisation can contribute to good land use management, enhancing the conservation of rural and forest

¹⁵⁶ UNEP, 2002. *Global Environmental Outlook 3*. United Nations, New York

areas and other land-based resources. Proactive approaches to urbanisation can establish alternative development models and set new standards for less material and energy-intensive consumption patterns, as concentrated production nodes provide scope for rationalising energy consumption, minimising waste and establishing resource recycling economies. A better system of sustainable transportation could also be developed through the provision of efficient and reliable mass transit systems such as railways, and through the promotion of information and communication technologies to reduce unnecessary traffic jams. Making sure that these opportunities are properly addressed in an increasingly urbanised world is one of the key challenges facing cities in the twenty-first century.

Integrated land-use planning should be promoted at all levels of urban management to comprehensively address the adverse impacts of urbanisation, and to enable systematic consideration of broader urban issues, such as land use, infrastructure, transportation, financing, governance and the environment. Ambitious policies may be able to suppress uncontrolled urban growth and the development of additional mega-cities. For example, certain urban functions (e.g., factories and research/education institutions) can be relocated to neighbouring suburban centres and satellite cities, thereby creating a dispersed urban system, which reduces the pressure on development of urban environmental infrastructure. Increased telecommuting would make a huge difference. Some cities are already providing community centres, often based at local libraries, from which people can log into their company computer systems, without travelling every day to their office. Energy and resource-efficient cities are maximising the use of available resources (e.g., solar power, rainwater harvesting and waste recycling) and demand-side management in the transportation sector.

In addition to regulatory tools, economic incentives and other market-based instruments are widely applied to effectively implement planning and infrastructure development for sustainable cities. Multi-stakeholder participation and partnership is essential in such processes. The obstacles, observed through past experience, include (i) flawed or ineffective policies at national and local levels; (ii) unresponsive and uncoordinated bureaucracies; (iii) corruption and cronyism within special interest groups; and (iv) weakness and fragmentation of the poor and marginalised communities.

Box 54: Urban Roof-Top Gardening in Adelaide, South Australia

Christie Walk, the first Australian totally “green” inner city development, was built on 2000 square meters of land in the Adelaide central business district. This co-housing development project demonstrates how communities can address the core issues for sustainable living in cities: water and energy conservation; material reuse and recycling; and healthy, people-friendly public spaces. The main features of the Christie Walk are:

- On-site sewage and grey water treatment - water reused for local subsurface irrigation of gardens;
- Onsite storage of storm water - used on gardens and to flush toilets;
- Solar hot water;
- Power from the sun through photovoltaic cells;
- Passive solar/climate responsive design;
- Heating, cooling and humidity control using breezes, sunlight and vegetation;
- Recycled, non-toxic materials with low embodied energy;
- Pedestrian-friendly spaces;
- Local food production;
- Shared community and roof top gardens;
- Reduced car dependency due to inner city context.

Designed to ecological criteria, the Christie Walk has incorporated four townhouses, six apartments, four highly popular straw bale cottages, a productive community garden and a genuine rooftop garden. The energy requirements are greatly reduced by the passive solar design and the use of very highly insulated, low embodied-energy materials. With the added provision of solar hot water and photovoltaic power, the Christie Walk is almost self-sufficient in terms of power requirements. Recycling of storm water and grey water greatly reduce reliance on mains water. Products containing toxins were avoided and artificial air conditioning was found not to be necessary, thus providing a healthier indoor environment.

Stages one and two of this ecologically designed development have been finished, all occupied, and stage three is about to start. This will be a 5-storey building with 13 apartments, 90% of which have been sold “off plan”.

Source: Barbara Hardy (2004) and Urban Ecology Austria (2004), what is Christies Walk? Available at: <http://www.urbanecology.org.au>

Land Degradation and Rural Communities

The Asia-Pacific region is facing serious land degradation and desertification problems (*see also “Land Degradation”, p.36-37*). Reduced productive capacity of land leads to adverse impacts on the local economy, potential increase of population outflows (i.e., “environmental refugees”), increased rural to urban migration, and intensified dust and sand storms. Besides natural disasters and long term climate change, land degradation and desertification in this region result mainly from unsustainable land use practices. These include unsustainable agriculture practices including heavy fertiliser use, heavy machinery use on fragile soils, and overgrazing. Underlying these causes are complex socio-economic factors, including population pressure, poverty, the high cost of and limited access to agricultural inputs and credit, low profitability of agricultural production and many conservation practices, high risks facing farmers, fragmented land holdings and insecure land tenure, short time horizons of farmers, and lack of information given to farmers about appropriate alternative technologies. Many of these factors are affected by government policies relating to infrastructure development, market development, input and credit supplies, land tenure, agricultural research and extension, conservation programmes, land use regulation, and local governance and collective action.

While the need to further improve agricultural productivity to support the ever-increasing population of the region is mounting, the challenge of rational land use, sustainable agriculture and rural development is enormous. Many call for the transformation of current agricultural practices into those that could better contribute to environmental protection and sustainable development in rural areas. This would involve revising the existing incentives and subsidy systems, introducing new economic instruments and market reforms in the system of property rights for land.

Forests

Deforestation and forest degradation are also critical issues in the region (*see "Degradation of Forests", p.37-38*). Deforestation threatens biodiversity, ecosystem stability and the long-term availability of forest products, as well as depleting the natural resource base, such as water resources, which underpins most national economies. Population pressure, heavy dependence on fuel-wood, timber and other products, as well as conversion of forests to agricultural, urban and industrial land are the underlying factors behind deforestation in the region, while overgrazing and shifting cultivation, fire, pests, diseases and natural disasters have often magnified the damage. The negative aspects of forest clearance and degradation have been recognised widely, and many governments have implemented forestry legislation and programmes that aim at conservation and afforestation. Recent policies also include new concepts such as integrated management of forest resources, incorporation of forest activities into national development strategies, and recognition of the socio-economic and environmental value of forests and their resources. However, in many cases, forest policies are still poorly defined or barely implemented. For instance, a lack of clear objectives, a lack of policy measures for defined objectives, fragmentation rather than integration into land use policy and so on are often found in national forest policy. The result is poor forest management systems that often lead to uncontrolled logging. The trend towards decentralisation, which would facilitate public participation in decision-making processes, is rather slow, and policies are rendered ineffective by the lack of financial support. On the positive side, new international initiatives are starting to address the linkages between rural communities and forest resources.

M.2. Steps towards Solutions

To respond to the problems identified above, a general policy should be introduced to promote an integrated approach to total land management. Integrated land use management supported by proper planning capacity would provide an opportunity to achieve sustainable development at national, provincial and local levels. Land-use planning should be addressed at all levels of national development planning, targeting the ultimate goals of poverty alleviation and improvement of quality of life. Different elements of national development programmes, including human and natural resource management; infrastructure and services development; economic efficiency in production and services; and environmental conservation, should be integrated into the planning of a nation's land resources. To this end, institutional mechanisms to support integrated land use management should be enhanced by setting up appropriate planning authorities at different levels and promulgating a comprehensive national land use policy through legislation.

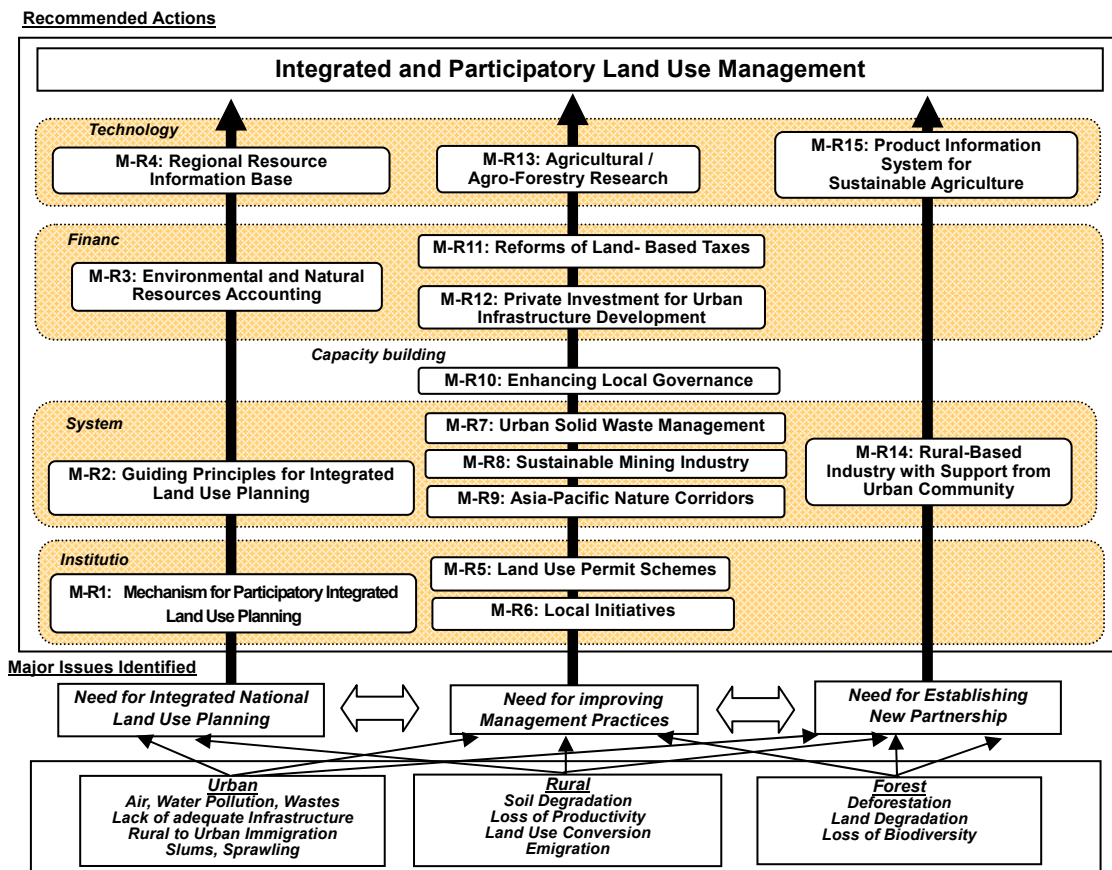
The cross-sectoral recommendations (*see chapter III, section 2*) also propose ways to address problems associated with land-based human activities. Ensuring multi-stakeholder participation and partnership in integrated land use management constitutes an indispensable factor for people-centred development, especially if it is coupled with capacity building and enhancement of different stakeholders. Key areas for capacity building and enhancement include: overall policy planning, particularly with long-term strategic policy targets; analysis and review of social, economic and environmental implications; assessment and coordination of sectoral benefits, losses and trade-offs; and transparent decision-making and enforcement. Reinforcing the technological basis of planning tools would contribute to transparent and participatory land use planning and management, as well as monitoring of land-based activities. Innovative tools are becoming increasingly available, in particular, in the field of satellite remote sensing, GIS, environmental and socio-economic risk analysis, and strategic environmental assessments (SEA).

Partnership and voluntary initiatives would be enhanced by addressing other aspects of land-based problems. In combating desertification, participatory monitoring activities are gaining in importance, and when it comes to trans-boundary problems such as dust and sand storms in Northeast Asia, further initiatives should be taken to strengthen international cooperation involving a broad spectrum of relevant stakeholders.

Policies and strategies linking urban, rural and forest areas are becoming increasingly important. Policies and

strategies that enhance urban-rural linkages and interaction would result in not only less migration into cities but also more equitable development of the nation. Resource flows and waste streams into and out of urban areas show a scale and complexity of linkages with rural producers and ecosystems, and demonstrate that “sustainable urban development” and “sustainable rural development” cannot be separated. Urban-rural linkages can be positive in both developmental and environmental terms. Demand for rural products from urban enterprises and households can increase the prosperity of farms and create rural settlements where environmental capital is not being depleted.

Figure 40: Recommended Actions on Land Use Management



M.3 Recommendations

To address the situations and problems noted above, three major target areas are identified: (i) Integrated Approach to National Land Use Planning; (ii) Improvement of Management Practices in Land-based Activities; and (iii) Establishment of New Partnerships for Rural-Urban Linkages.

M.3.1 Integrated Approach to National Land Use Planning

Institution

M-R1. Mechanisms for Participatory Integrated Land Use Planning

As a governance basis for integrated land use planning, appropriate institutional mechanisms should be established at the different planning authority levels. While a national planning committee should first be established as the highest authority of development planning, local committees should also be developed to ensure direct involvement of local stakeholders. Multi-stakeholder representation in such committees would provide a key framework for a strategy for sustainable land use, through

integration of the perspectives of a wide range of stakeholders, partnerships among them, and devolution of relevant political responsibility to local authorities.

System

M-R2. Guiding Principles for Integrated Land Use Planning

Although land use planning is intended to ensure the best use of land in view of the accepted objectives and aspirations, conflicts between various interest groups with different goals and perceptions are inevitable. Where multiple goals are at stake, trade-offs among these goals must be considered and arbitrated. While the national planning committee should work towards coordinating these interests and solving conflicts between the different land use goals, several basic principles should be developed by the committee to govern arbitration in land use in areas with multiple land regimes. Such principles include the following:

- Integrated land management requires that choices be based on valid and explicit objectives, economic and ecological valuations, and environmental impact assessments backed up by sound scientific research;
- To evaluate multiple benefits and trade-offs associated with the environmental and economic functions of specific land use, such tools as environmental and natural resources accounting and SEA would be useful;
- Socio-economic factors should be incorporated into land use decisions. Key factors include a stable population and sustainable livelihood in all parts of the country, while being supported by policies such as poverty alleviation; enhancement of employment opportunities; improvement of women's social status; improvement in child care programmes; expansion of sanitation and welfare programmes; and increased occupational and educational opportunities for all;
- Land use planning should aim to maximise the opportunities associated with different land use goals;
- A balance between infrastructure development and its environmental implications should be found;
- All decisions should be made through transparent and participatory processes.

Finance

M-R3. Environmental and Natural Resources Accounting

Consideration of the full value of the land, including not only short-term economic value, but also long-term and environmental values, is essential in the planning process. Forests have many environmental functions including the conservation of biodiversity and preservation of water resources, in addition to the commercial values of forest products, and a comprehensive system of natural resources accounting should be established to ensure that the economic value of these functions is duly reflected in decision making, such as evaluating the trade-offs of forest conservation vis-à-vis other land uses such as mining development.

Natural resources accounting may provide a tool to properly determine the value of environmentally-friendly land uses, while the valuation system recently approved by the Clean Development Mechanism (CDM) Executive Board provides a new tool to capture the carbon sequestration value for reforestation and afforestation activities. Such valuation and accounting systems are also useful in the consideration and introduction of modalities for compensating losses from arbitrated land use goals, as well as recognising community and private sector investments in environmental services, such as caring for the ecosystem or preserving biodiversity.

Technology

M-R4. Regional Resource Information Base

Effective and accessible information systems are vital to strategic land use planning. The recent development of information technologies, in the form of land-based data collection using satellite systems; digital recording, transmission, and dissemination of electronic information; and consistent treatment and coherent representation of geographical information, offer new potential for spatial planning and, in particular, participatory decision-making at all levels. A common data set of land-based information should be established for each country, as well as at the regional level, so that common, validated data could be shared effectively and used by different stakeholders in

analysing, planning and implementing land development projects and land use activities, and in assessing the impacts of such activities. The data would include present land use, economic characteristics, and the regulatory framework and natural resource features for each geographical unit of land in addition to their location, upon which environmental data sets, including biodiversity and other ecosystem information would be overlaid. Existing national land use registry systems should possibly be linked to such data sets.

Since the promotion of information disclosure plays a critical role in ensuring that decision-making in land use management is based on scientific knowledge and information, all stakeholders should be involved from the early stages of policy planning. In addition to establishing a common data set of land-based information, a variety of measures could be taken to accelerate information disclosure by all sectors such as governments, the private sector and international organisations. Success stories have demonstrated that disclosure of information, such as that related to chemical use and pollution emissions, can contribute significantly to effective urban environmental management. In the field of rural land management, information sharing regarding reliable technical options, indigenous knowledge and good practices has been identified as critical.

M.3.2 Improvement of Management Practices in Land-Based Activities

Institution

M-R5. Land Use Permit Schemes

Countries should review their conventional land use permit schemes and consider the introduction of alternative tenure systems for natural resources and ecological services, such as water, forests and biodiversity, separate from the rights for economic development of the land, such as industry development and mineral resource exploitation. For example, in some countries (e.g., the Philippines), the rights to exploit freshwater bodies are awarded as auxiliary water rights to mining companies that are granted mining exploratory permits. This practice is a virtual transfer of ecological property rights to private companies, which has significant negative effects on the sustainable management of ecological resources such as water.

M-R6. Local Initiatives

Local governments can play a vital role in many aspects of the management of local land-based resources. This applies particularly to the management of urban issues, as local governments have increasing authority over urban land use, building, construction, infrastructure development, energy supply and management in some cases, and even over the financing for these activities. In addition, local governments can encourage voluntary actions by individual citizens, community based organisations, businesses and social groups through day-to-day communications, campaigns and information dissemination when combined with various policy tools. Such initiatives should be significantly strengthened, and perhaps coupled with measures to improve overall urban governance, in particular through enhancing the managerial capacity of local governments and increasing transparency and stakeholder participation in local policy-making.

System

M-R7. Urban Solid Waste Management

To address mounting problems of solid waste, the regional trend is to involve more and more stakeholders in national waste management policies and strategies. Public and private partnerships are being progressively introduced in the development and operation of waste management services. Even as this trend is further strengthened, more explicit emphasis should be placed on community initiatives and participation at the heart of sustainable urban development. Case studies in Karachi (see Box 55) illustrate the potential of integrating the community more closely with solid waste management practices as a way to stretch scarce resources, to improve the health and well-being of urban inhabitants, and to encourage grassroots enterprise development.

Reduction, reuse and recycling (3Rs) of waste, in particular at the source, are imperative elements of urban solid waste management. In view of this, Japan proposed the 3R Initiative to the G8 Summit

in 2004, and it was agreed that Japan will organise an international meeting on 3Rs in April, 2005. There are many attempts practiced in the region to promote 3Rs. In Australia, for example, a container-deposit system works more effectively for this purpose than charging people for dumping waste, as disposal charges are generally too low to give disincentives for people to dump. It is preferable if recycling can be carried out at a local level, as close as possible to production, so as to reduce transport costs and transport energy. The concept of a “resource circulating society” has yet to be fully explored and implemented, but offers considerable potential to reduce raw materials, energy and waste, coupled with possible economic benefits.

The “extended producer responsibility” (EPR) should be understood as the basic principle for promoting 3Rs. EPR has started to be applied to a number of wastes that have high recycling value. In Asia, Japan and Republic of Korea already introduced the EPR system both in simple products like packaging and complex products like electronic equipment. In Japan, vehicle wastes will soon be subjected to the same system. Most developing countries in Asia as well as pacific island nations increasingly face serious issues concerning vehicle wastes. The Tarawa case outlined in Box 56 shows both technical and economic potentials of a regional vehicle waste recycling and management system among small island countries. An exchange of experiences and successful practices regarding solid waste management in various cities is a useful learning exercise, and thus should be strengthened through regional networks such as the Kitakyushu Initiative for a Clean Environment.

The disposal and treatment of industrial, toxic and hazardous waste also causes serious problems, particularly in the Pacific Island countries, as well as in South and Southeast Asia. Solutions to hazardous waste problems, not only in controlling trans-boundary movement but also in building managerial and technological capacity in individual countries, particularly in small island countries, would require further enhancement of regional and subregional cooperation (*for related information, refer to “Box 26: Region-wide Recycling of e-Waste”, p.95*).

Box 55: Karachi Administration Women Welfare Society (KAWWS)

KAWWS is a group of housewives from a higher middle-income neighbourhood of Karachi, known as Baloch Colony. The area is characterised by a number of undeveloped open plots, which have *de facto* become sites for household waste disposal. In 1988, KAWWS formed a group with the objective of collecting money to purchase waste collection bins to help address the problem of improper disposal on open plots. KAWWS charge a monthly fee of Rs. 100 from each participating housewife. At this stage bins were purchased for the neighbourhood, the collection and disposal of the waste remained a problem, but there was no formal agreement between the municipal corporation and KAWWS to collect waste from the transfer points.

KAWWS subsequently negotiated with the municipal refuse vehicle driver in the area to arrange for waste collection for a set fee. The arrangement worked well, and in 1994 KAWWS received funding from UNICEF to establish a revolving fund to provide additional waste bins in the area. Following consultation with local shopkeepers and other residents, bins were placed at appropriate sites in the neighbourhood. An evaluation study in 1994 showed that the programme had substantially improved cleanliness in the area. The main constraints included low levels of participation (restricted to about 50 housewives), residents' perception of the initiative as a service delivery programme (many residents prefer a cleaner environment and a regular service for waste collection, but few are interested in contributing their own time in arranging the system); increasing housing density has made the siting of bins a long-term problem; and the municipal sweeper system is being disturbed as workers move to other profitable areas. Despite these constraints, KAWWS is still active in the area and has expanded its work into other environmental improvement projects such as tree planting, park development, and so on.

Source: Mansoor Ali and Darren Saywell, 1995. "Community initiatives in solid waste," 21st WEDC Conference "Sustainability of Water and Sanitation Systems", Kampala, Uganda, <http://www.lboro.ac.uk/departments/cv/wedc/papers/21/groupf/ali.pdf>

Box 56: Recycling Old Car Bodies from Pacific Islands

Problems associated with waste vehicles underpin the need for concerted action among small developing countries. The rapid increase in the importation of vehicles, many of which are second-hand ones, has resulted in a dramatic rise in the volume of waste vehicles. Toxic wastes from vehicles pose a serious challenge to waste management systems of small island countries, in particular. A recent study conducted in the Pacific Island country of Kiribati, with support from the Australian High Commission on Tarawa, attempts to address these problems. It has examined additional workloads and other resources necessary for stripping a typical vehicle, calculated associated costs, and discussed possibilities of vehicular waste recycling. The study has confirmed feasibility of regional recycling, i.e., crushing and processing of waste vehicles by means of a materials-recovery facility, the cost of which would be shared among participating neighbouring island countries. Such a facility could properly handle liquid wastes such as waste oils, and toxic wastes, such as lead-acid batteries.

Source: Alice Leney, 2004. An Initial Feasibility Study: Te Kaoki Mange Project

M-R8. Sustainable Mining Industry

Mining is another key industrial activity that has generated serious conflicts with other land use purposes; particularly indigenous and nature-based land uses involving important environmental functions and services. It has thus attracted long-mounted criticisms from the NGO community in many countries in the region. Indeed, the mining industry should contribute to achieving sustainable

development goals, but this would only be possible once the following conditions are in place:

- Pro-poor public and corporate governance, including proactive planning and management to maximise poverty alleviation through sustainable development;
- Much more effective social and environmental policies;
- Respect for human rights.

Such efforts should involve not only the governments and financial institutions but also local communities in particular, to encourage and monitor the mining industry in fulfilling the abovementioned conditions, and to review, improve, and update the relevant safeguard policies.

M-R9. Asia-Pacific Nature Corridors

Many national parks and protected areas have been established in the region. However, in many cases, they are too small, not well managed, and often fragmented and disconnected from each other. As a result, protected area systems in the region are not necessarily effective in conserving biodiversity. To address such problems, it is proposed to designate Asia-Pacific Nature Corridors (APNCs) to link the scattered protected areas both within separate countries and across borders. In the areas designated, several conservation-oriented activities should be promoted. For example, sustainable forestry and agriculture would be practiced; private sanctuaries could also be established; and eco-tourism would be very strongly promoted. Support in the form of subsidies and compensation to local communities would be provided to enable them to benefit economically from APNCs. In the operation of APNCs, it would be crucial to involve as many stakeholders as possible, especially private landowners.

Given the increasing pressures on land and protected areas, APNCs would facilitate a practical first step of concrete action towards the promotion of nature conservation in many parts of the region. Several APNCs could be set up across national borders. In such cases, support would be sought from the international community, such as through the GEF. Such cross-border APNCs, if managed properly on a sustainable basis, could become a regional natural heritage in the future.

Capacity Building

M-R10. Enhancing Local Governance

To promote participatory integrated land use planning recommended in this section, local governance should be strengthened with appropriate capacity building programmes. Firstly, capacity building initiatives should be targeted at local government staff, primarily to help them achieve environmental soundness and sustainability in urban administration. A series of training courses on themes such as ‘sustainable urban administration’ could be provided, targeting city managers and government officials as a first priority, and then citizen group leaders and NGOs. Training would be provided at regional, subregional and national levels, based on consultations with organisations that are already active and experienced in this area. In support of such efforts, a certification system could be introduced to evaluate the progress of capacity development in local governments as well as the environmental-friendliness of their policies and initiatives. A set of quantitative indicators for measuring environmental management capacity could be developed and employed as a self-assessment tool for local communities to benchmark the progress of the environmental management capacity of local society as a whole, encompassing the local government, the private sector and civil society (*see also “I-R3. Capacity Building for Local Authorities”, on p.123*).

Community-based organisations are in the crucial position of bridging the gap between information channels and individual end-users, including farmers. Thus in the field of rural development, including land use management, capacity building activities could also focus on community level organisations, in particular to build their capability to access and interpret scientific information and knowledge disseminated through different channels, and to translate such information into grass-roots practices. Education and awareness-raising among end-users, consumers and the general public are essential. The important role that women play in land use should be duly recognised and emphasised in community-level capacity building (*refer also to “I-R4. Supporting Community-Based Activities for Sustainable Development”, on p.123-124*).

In the domain of forest conservation, key areas for capacity building include: analysis and review of

the social, economic and environmental implications of specific forestry operations and management practices, in particular the environmental and ecological functions of different types of forests; and the availability of different technical options of sustainable forest management. A certification system could be introduced for both forests and forest products, with possible linkages to the Asia-Pacific Green Labelling scheme proposed in the previous chapter (*refer to “H-R6. Asia-Pacific Green Labelling”, on p.118-119*).

**Box 57: Learning and Capacity Building Toolkits
by the World Bank and WWF Alliance for Forest Conservation and Sustainable Use**

In an effort to promote best practices for sustainable forest management, the World Bank and WWF Alliance for Forest Conservation and Sustainable Use have developed toolkits to promote Learning and Capacity Building. These toolkits seek to (a) educate forest managers, government officials, and community groups about the certification process, and (b) strengthen the capacity of indigenous and local communities, NGOs, local governments and the private sector to engage effectively in the certification process. Such initiatives in the Asia-Pacific region should be further expanded and strengthened with close coordination among existing programmes.

Source: <http://lnweb18.worldbank.org/essd/envext.nsf/80ByDocName/LearningandCapacityBuildingSustainableForestManagement>

Finance

M-R11. Reforms of Land-Based Tax

A range of tax and economic incentives/disincentives could be employed to promote effective enforcement and compliance of integrated land use plans, and to rationalise management practices of land-based activities. Among other measures, environmental taxes could be used to internalise the costs associated with environmental conservation, and the associated revenues could be channelled into new subsidies to encourage environmentally friendly practices elsewhere. This would stimulate capital flow from urban to rural areas, and thus help rationalise the management of land-based resources in both urban and rural areas. A key issue in this whole area of financing is to conduct thorough assessments of alternative ways to meet the ultimate objectives – no single financing mechanism could be expected to be suited to all situations. Ultimately an optimum combination of command and control, market-based instruments, and voluntary initiatives would be most successful.

As current agricultural subsidies often encourage the wasteful use of economic as well as natural resources such as pesticides, fertiliser, and water, such subsidies should be broadly revised and eliminated in stages. Alternatively, countervailing subsidies could be introduced to support organic agriculture practices and products. In addition, environmentally friendly measures should be introduced for fallow, windbreak forests, soil conservation and wildlife protection. These combined measures could promote resource-efficient and sustainable agriculture, which would also contribute to environmental conservation.

With regard to forest conservation, subsidies conducive to unsustainable forest harvesting and other land use changes should be phased out and economic measures to promote better forest management should be strengthened. Financial support for rehabilitation activities such as reforestation would also contribute to the conservation of water resources as well as the control of desertification.

M-R12. Private Investment for Urban Infrastructure Development

As urbanisation continues, investment in urban infrastructure imposes enormous demands on fiscal resources. While central governments retain the primary responsibility for financing infrastructure in developing countries, other options are increasing. There is a region-wide trend of providing local governments with greater discretion in the levying of taxes, fees and service charges. Also, increased reliance is being placed on the private sector through public-private partnership (PPP) options.

Regional programmes, such as the Asia-Pacific Network of Environmental Investment proposed in the previous chapter (*see p.86-87*), should encourage such trends. To ensure the efficient development and tapping of the private capital market by a broad range of infrastructure developers, appropriate policies to encourage private investment should be implemented at the national level.

Integration of the urban poor and reform of city slums by voluntary initiatives are essential to building future sustainable cities in developing countries. Therefore, whether development projects are financed by public, private or combined sources, due attention must be paid to ensuring that those projects serve to reduce poverty and improve the quality of life for all city residents. To supplement large-scale investment, micro-financing may be arranged to support voluntary initiatives of community improvement and strengthen the informal sectors (*for related recommendations, refer to "H-R3. Renovation of Informal Sector", p.115-116*).

Technology

M-R13. Agricultural/Agro-Forestry Research

Research towards identifying the environmental functions and ecological footprints of agriculture should be strengthened. Benchmarking the magnitude of various functions of agriculture (i.e., specific agricultural operations) should be expanded. As efforts continue to be made to further enhance agricultural productivity to support the growing population in the region, particular attention should be paid to the environmental impacts of different options, and those options with the least severe environmental impacts should be promoted.

For example, while the introduction of genetically modified organisms (GMOs) should be carefully assessed for possible far-reaching impacts on local, regional and global ecosystems, environmentally sound indigenous technologies may be highlighted as options. Agro-forestry techniques practiced by many indigenous people deserve further study and promotion, as they are considered sustainable and environmentally sound. With regard to GMOs, most R&D is based on cropping systems in the US and Europe (e.g., herbicide resistance genes), rather than "orphan" crops of interest to poor people in developing countries (e.g., chickpeas, cassava, yams etc.). Publicly funded research, such as that of the Consultative Group on International Agricultural Research, should focus on improving crops that will help the poor. There should be a rapid expansion in the research on and practice of sustainable agriculture techniques (including organic farming), including a programme on how to improve and transfer these techniques.

M.3.3 Establishment of New Partnerships for Rural-Urban Linkages

System

M-R14. Rural-Based Industry with Support from Urban Community

From a sustainability perspective, land use planning, in particular at the local level, should be designed to support an efficient material cycle throughout urban and rural areas, and to conserve maximum energy, water and other natural resources. Research into the comprehensive flow of energy, water, food, construction materials, chemicals and other commodities, should examine their production, consumption and disposal (including reuse and recycling). Research should also be targeted at the maximum use of available resources via the best available technology, such as solar power generation, rainwater harvesting, waste recycling and composting technology.

To maintain sustainable livelihoods in rural communities, rural-based industries should be promoted in such a way that they do not pose significant threats to existing agriculture and forestry activities. Such industries may include value-added processing of agricultural and forestry by-products, as well as those combined with production and application of wind and biomass energy rich in rural areas. Their development is considered an effective new opportunity for rural communities, and a way to create more employment opportunities. Promotion of eco-tourism also has the potential to significantly contribute in this respect, in addition to its function of strengthening the partnership between rural and urban residents. Research should be guided towards concrete options of rural-based industries and then tested through demonstration projects, as employment opportunities created by these industries represent vital incentives for youth to stay in communities, aiding

sustainable rural development.

Technology

M-R15. Product Information System for Sustainable Agriculture

To promote environmentally friendly agriculture through strengthened linkages between producers and consumers, an emerging system called “agriculture with a human face” should be promoted, in which new information technologies could contribute significantly. When certain agricultural products are delivered along the supply chain, all the information regarding the life cycle of the product is provided in the barcode or microchip attached. Such life cycle information includes the identity of the farmer, location of the farm, genetic characteristics of the product, type of pesticides and fertiliser applied and the history of their application. It is also useful if the amount of water used in producing an agricultural product, i.e., so-called virtual water (*see p.130*), is added to such information, assuming that further study can provide more reliable data on virtual water. This system naturally results in high market prices for products that have added value such as those produced by organic farming. Thus, it may be instrumental in promoting environment-friendly agriculture.

N. Chemical Issues

N.1 Overview

Chemicals subject to contemporary international priorities and concerns in relation to effects on human health and the environment are the persistent organic chemicals (such as dieldrin, aldrin, chlordane, endrin, heptachlor, Mirex, toxaphene, hexachlorobenzene, polychlorinated biphenyls, DDT and polychlorinated dibenzo-p-dioxins and dibenzofurans, which are referred to in the annexes to the Stockholm Convention on Persistent Organic Pollutants), other endocrine disrupting chemicals, and heavy metals such as lead and mercury.

Signs of Chemical Contamination

Signs of serious contamination are abundant. Levels of arsenic and heavy metals (such as cadmium, mercury and lead) exceed basic water quality standards in many of the region’s water bodies. Water bodies of the Southeast Asian subregion, particularly in deltaic regions, are the most heavily contaminated with heavy metals and toxic chemicals. Arsenic pollution of groundwater in Bangladesh and some adjacent parts of India is a notable case of contamination by heavy metals, largely of natural origin. Contamination by persistent organic pollutants (POPs) is also prevalent in the region. In Japan, a study of 15 cities showed that 30% of all groundwater supplies are contaminated with chlorinated solvents from industry; in some cases the solvents from spills travelled as far as 10 km from their source.

Indoor air pollution is another growing concern in the region. Exposure to indoor air pollution has increased due to a variety of reasons: construction of more airtight buildings; reduced ventilation; and the use of synthetic materials for building and furnishing. In addition, the growing number of household care products—such as synthetic glues, paints, paint strippers, and other solvents; wood preservatives; aerosol sprays; cleansers and disinfectants; moth repellents and air fresheners; and stored fuels and automotive products—have elevated the level of indoor air pollution with chemicals and create the so-called “sick house syndrome”. The rural parts of the region are not an exception. A large number of people continue to rely on traditional fuels such as firewood, charcoal, and cow dung for cooking and heating. Smoke generated by the burning of such traditional fuels poses serious health risks to rural inhabitants.

Sources of chemical contamination originate from activities ranging from emissions of pesticide use in agriculture, emissions to the air and untreated or poorly-treated wastewater from industrial activities; a multitude of waste management and disposal practices; and vehicle emissions. Extensive use of organic solvents in the Asia-Pacific region, particularly in the electronics industry, but also in the textile and engineering sectors, has resulted in soil and groundwater contamination. The growing use of chemical fertiliser and pesticides has also resulted in pollution of water and soil. Effects of DDT exposure, following its use in malarial control, remain a critical issue in the region.

General Trend of Chemical Production

According to the OECD, developing countries accounted for only 23% of world chemical demand in 1995. This will increase to 33% by 2020. During the period from 1980 to 1997, basic chemicals production shifted from mainly developed countries to China and other countries in Northeast Asia. Reasons for this shift to developing countries include the growth in domestic demand, low labour costs and the expansion of industrial sectors heavily dependent on chemicals. An example of such an industry is pulp and paper, which is rapidly growing in Asia. In the next few years, Asia will surpass North America in the production of pulp and paper.

As more chemical industries are established in developing parts of the region, more hazardous chemicals are likely to be discharged unless effective control measures are introduced. At present, the majority of developing countries in the region have insufficient capacity to monitor, control and dispose of hazardous chemicals. Dealing with increased chemical contamination and its associated effects is a huge challenge for these countries.

International Responses

The vast majority of global concerns regarding the adverse effects of chemicals on the environment and human health are reflected in the objectives and provisions of relevant international conventions, initiatives within those conventions, and other activities in the international arena. Major conventions addressing chemicals have included the Stockholm Convention on Persistent Organic Pollutants, 2001; the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal, 1989; and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998.

Several other international conventions mention the movement of chemicals and their effects. These include the Convention on the Long Range Transport of Atmospheric Pollution 1979 (LRTAP) and its eight protocols, the Montreal Protocol (1987) on Substances that Deplete the Ozone Layer, UNFCCC 1992, and the Convention on Biological Diversity 1992. In addition, the United Nations' "Recommendations on the Transport of Dangerous Goods: Model Regulations" are also relevant as they deal with procedures for ensuring the safe packaging and transport of chemicals.

In addition to these conventions, there are a number of agreements that, while not legally binding, reflect international concerns. One of the most important of these is the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA), 1995. Although the focus of this agreement is placed on protection of the marine environment, its application requires that water discharges into the sea from rivers and streams be strictly controlled. Thus, this agreement implicitly affects the uses and quality of the freshwater environment.

A further recent international initiative that stems from widespread political concern is the completion of "A Global Mercury Assessment" issued by UNEP Chemicals in December 2002. Concerns about mercury stem from its toxicity and the lipophilic nature of methyl mercury and its pole-ward transports through a global distillation mechanism.

Positive Signs of Chemical Control

The largest volume of lead in the environment originates from gasoline. Dakha, Bangladesh has the highest atmospheric lead levels in the world. In Beijing, China, one in five children has more lead in their blood than is considered safe. Many major cities in Southeast Asia had serious lead pollution until the 1990s, but most Southeast Asian countries have successfully addressed this problem. Singapore, Malaysia and Thailand introduced a policy of taxing leaded gasoline at a higher level than unleaded gas. This policy succeeded in discouraging drivers from using leaded gasoline, thus dramatically reducing lead emissions.

Fiscal measures are also effective in dealing with toxic chemicals. The Netherlands introduced levies on the discharge of heavy metals based upon quantity. This provided strong incentives for companies to switch to cleaner processes. Sweden has a pesticide tax that adds a 7.5% surcharge for every kilogram of active ingredient purchased. Farmers in Sweden cut their use of pesticides by 65% between 1986 and 1993. In 2003, the EU introduced a directive to impose a responsibility on companies to prove that any chemical they produce or import in amounts greater than one tonne per year is safe.

As for pesticide use, Indonesia introduced integrated pest management, through which the use of pesticides,

particularly in rice production, has been substantially reduced. The contracting states of the Stockholm Convention will be strongly influenced by the provisions of the Convention, once it comes into force, with regards to the future use of POPs. This global initiative will result in a strong impetus to reduce the use of such pesticides and the search for, and use of, more benign and less persistent, alternatives.

A notable success story in the international community comes from the regulation of CFCs. CFCs are stratospheric ozone depleting substances, controlled by the Montreal Protocol. Production of CFCs dropped by 87% between 1988 and 1997. The biggest factor that contributed to this success was the availability of alternative chemicals.

In order to deal with the sick house syndrome mentioned above, Republic of Korea has recently introduced the Indoor Air Quality Management Act. The Act has set indoor air quality standards for formaldehyde, particulate matters, etc, and applied them to seventeen types of facilities including libraries, medical facilities, markets and subway stations. Construction materials containing high levels of pollutants such as formaldehyde are prohibited from being used in public facilities. This has resulted in development of less polluting construction materials.

Publicity also plays an important role. In 1986, the U.S. introduced the Emergency Planning and Community Right-to-know Act. This created a national database of toxic emissions and releases by manufacturing plants. The Toxics Release Inventory created under the Act allowed citizens and the media to publicise the identity of major sources of toxic chemicals. This programme had the effect of reducing the original core group of 300 chemicals by 45% between 1988 and 1999.

Emerging Green Chemistry

Risk is defined as: $\text{Risk} = \text{Hazard} \times \text{Exposure}$. Traditionally, the risks posed by chemicals have been dealt with by limiting exposure. Most of the measures outlined in the previous section follow this approach, namely, the appropriate management of chemicals during use, handling, treatment, storage and disposal. Green chemistry, on the other hand, tries to minimise the risk by reducing the hazard. Green chemistry is the design, development and use of chemical products and processes that reduce or eliminate the use and generation of substances that are most hazardous to human health and the environment (Box 58).

Box 58: Twelve Principles of Green Chemistry

The American Chemical Society has developed twelve principles of green chemistry. Considerable R&D is being carried out based upon these principles. Many encouraging results are being obtained.

- a) Prevention: It is better to prevent waste than to treat or clean up waste after it has been created.
- b) Atom Economy: Synthetic methods should be designed to maximise the incorporation of all materials used in the process into the final product.
- c) Less Hazardous Chemical Synthesis: Whenever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.
- d) Designing Safer Chemicals: Chemical products should be designed to achieve their desired function while minimising their toxicity.
- e) Safer Solvents and Auxiliaries: The use of auxiliary substances (e.g., solvents, separation agents) should be made unnecessary whenever possible and innocuous when used.
- f) Design for Energy Efficiency: Energy requirements of chemical processes should be recognised for their environmental and economic impacts, and should be minimised. If possible, synthetic methods should be conducted at ambient temperature and pressure.
- g) Use of Renewable Feedstocks: A raw material or feedstock should be renewable rather than depleting, whenever technically and economically practicable.
- h) Reduce Derivatives: Unnecessary derivatisation (use of blocking groups, protection/deprotection, and temporary modification of physical/chemical processes) should be minimised or avoided if possible, because such steps require additional reagents and can generate waste.
- i) Catalysis: Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.
- j) Design for Degradation: Chemical products should be designed so that at the end of their function they break down into innocuous degradation products.
- k) Real-Time Analysis for Pollution Prevention: Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formulation of hazardous substances.
- l) Inherently Safer Chemistry for Accident Prevention: Substances and the form of a substance used in the chemical process should be chosen to minimise the potential of chemical accidents, including releases, explosions and fires.

Source: American Chemical Society Homepage

<http://www.chemistry.org/portal/a/c/s/1/general.html?DOC=greenchemistryinstitute%5Cgc_principles.html> Original source is Anastas, P. T.; Warner, J. C. Green Chemistry: Theory and Practice, Oxford University Press: New York, 1998, p.30. By permission of Oxford University Press.

In conventional chemistry, many chlorinated solvents are used that are highly toxic. Research has been conducted extensively to develop safer alternatives. Carbon dioxide is emerging as a powerful alternative to conventional solvents, combining versatility and ease of separation with environmental compatibility.

Conventional plastics are based on petrochemical feedstock and therefore rely on fossil carbon resources. Biodegradable plastics increasingly use annually renewable resources such as corn. One company has developed plates, bowls and other food containers from a mix of potato starch, limestone and post-consumer recycled fibre.

N.2 Steps towards Solutions

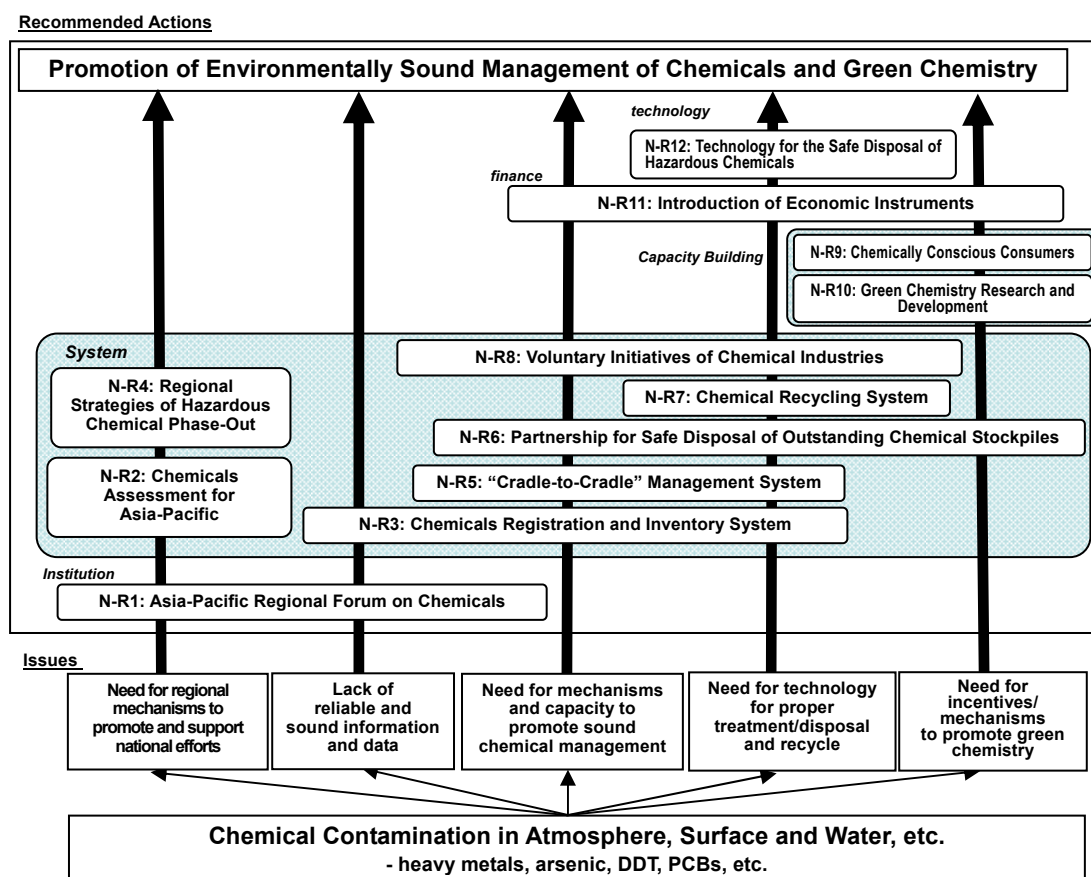
Increasing chemical production in the Asia-Pacific region and serious contamination of the environment and health have created an urgent need to improve comprehensive chemical management and policy. Besides a limited number of successful cases, current chemical-related actions, especially those relating to hazardous chemicals in the region, are still limited and fragmented. For instance, there is a strong tendency to conduct micro-management for individual chemicals, rather than address the cumulative effects of such chemicals, which perpetuate current chemical problems. The most critical deficiency is lacking or poor institutional capacity to conduct comprehensive management of chemical issues. For instance, there is insufficient capacity to monitor or track the movement of chemicals, to test and analyse wastes and contaminated sites, to cure the victims of exposure, and to safely dispose of hazardous chemicals.

To improve chemical management in the Asia-Pacific region, there is an urgent need to activate the precautionary principle. The precautionary principle demands elimination of hazardous substances from the environment and away from consumers¹⁵⁷. The following are strategic areas to target:

- **Establishment of long-term national policies on hazardous chemicals:** Long-term policies should include national bans on, or reductions in the use of, the most hazardous and persistent pesticides within specific time periods and/or bans on the trans-boundary movement of hazardous wastes. Such clear direction would help private companies and other stakeholders to initiate timely preparation for sound chemical management;
- **Strengthening regional mechanisms for sustainable chemical management:** Regional mechanisms would enhance the harmonisation of chemical policy by promoting and supporting national policies. Also, it could help to solve regional conflicts caused by the trans-boundary movement of hazardous substances and wastes;
- **Promotion of Green Chemistry:** Green chemistry should be promoted by applying the substitution principle. Development of more benign chemicals could accelerate the elimination of hazardous substances from the environment. To promote green chemistry, the creation of favourable market conditions, support for R&D and proper patents or property right schemes should be developed.

¹⁵⁷ European Environmental Bureau, 2002. *European chemical policy reform-from paralysis to actions*. [Online]. Available: http://www.eeb.org/activities/chemicals/Publication-EEB-013_02.pdf

Figure 41: Recommended Actions on Chemicals



N.3 Recommendations

Institution

N-R1. Asia-Pacific Regional Forum on Chemicals

An increasing number of chemicals, in various forms, are being transported over national boundaries. Problems and conflicts arising from expanded chemical movement have created a strong need to build regional collaborative approaches. Establishment of an "Asia-Pacific Forum on Chemicals" should be considered to deal with the wide variety of problems and threats associated with the current systems of manufacture, use and disposal of chemicals. The "Asia-Pacific Forum on Chemicals" could facilitate: (i) information exchange on outstanding problems caused by chemicals, (ii) development of benign chemicals to replace chemicals that are hazardous (and toxic) to human health and the environment, and (iii) potential harmonisation of national practices relating to chemicals management.

A regional chemical forum would initiate an active participatory mechanism, involving chemical experts, various organisations, and institutions from all over the region to exchange knowledge, experience, and ideas for improving chemical management. It would also support the development and organisation of joint chemicals projects. Sound knowledge accumulated through such activities within the forum would contribute to the overall improvement of chemical management in the region.

System

N-R2. Chemicals Assessment for Asia-Pacific

In response to widespread concerns on the effects of individual chemicals or mixtures of chemicals,

information on the relationships between chemical exposure and the environment and health effects is urgently needed, especially for developing countries. A regional chemical assessment system should be established, which could facilitate the distribution of such information and monitor the early detection of threats and problems. Full participation in these initiatives by relevant countries would improve coverage and detail in the results obtained from such a system. All countries in the region should be encouraged to participate.

Within the regional assessment system, scientific investigations into the source, pathway, and fate of chemical substances should be enhanced in order to improve the understanding of the environmental consequences and risks associated with chemical releases into the environment. This investigation process offers opportunities to improve cooperation between scientists and scientific institutions in the region, and to create a consensus on common measures to limit the impact of chemicals on the environment and human health.

N-R3. Chemicals Registration and Inventory System

To facilitate good chemical management, it is necessary to have an overview of the chemical flow throughout the entire life cycle of chemicals, including their manufacture, import, export, and use, as well as the storage of waste chemicals, and disposal phases. A “chemical registration and inventory system” should be established, to provide accurate information on the volume of chemicals in use, as well as the locations, uses and disposal of chemicals.

The design and content of this tracking and inventory system could be initially undertaken through consultation between countries in the region. By sharing the effort, the financial and resource burdens on individual countries would be reduced, and at the same time, a unified system would be created throughout the entire region. The unified form and structure of this inventory system in the region would facilitate easy use, assessment, and analysis of chemicals. In addition, it would benefit the preparation of chemical inventories required by international agreements (e.g., under the Stockholm Convention) and the documentation to support compliance with other Conventions (e.g., the Basel Convention and Rotterdam Conventions on Prior Informed Consent).

N-R4. Regional Strategies of Hazardous Chemical Phase-Out

Regional targets to phase-out hazardous chemicals should be established and strategies and specific action plans should be developed. Given different national conditions, it may not be easy to reach a consensus on regional quantitative targets within a defined time frame. However, such regional targets may encourage progressive national actions especially in developing countries with a high dependence on hazardous chemicals. For example, GEF sponsored a consultative project on DDT use for malaria vector control in Southeast Asia.

Once specific phase-out targets for major hazardous substances have been established, a strategic action plan should be prepared. Through the regional chemical forum (as recommended above), deficiencies in contemporary chemical management practices would be identified. While allowing countries to deal with their own particular chemical related problems, the regional chemical forum could create model guidelines that would include appropriate guidance on the manufacture, import, export, use and disposal of chemicals for safe chemical management in the region. In addition, regional standards could be developed on a multilateral basis. Accordingly, there is considerable potential benefit from strengthening multilateral activity.

N-R5. “Cradle-to-Cradle” Management System of Chemicals

While several countries have made considerable progress in establishing improved mechanisms for safe chemical management and waste disposal, there remain widespread deficiencies in chemical and waste management practices in the region. Accordingly, there is a need to adopt the “cradle-to-cradle” approach to chemical management that ensures that safe management applies to all aspects of chemical manufacture, transport, use and disposal. Reuse and recycling should be promoted to the extent possible so that the release of hazardous chemicals should be minimised. Various policies and measures should be designed to suit the different stages of the chemical life cycle.

All practices in the chemical life cycle should adequately protect human health and the environment.

Chemicals from all sources that are exposed to workers and amenities should be strictly limited to the WHO's acceptable levels (including rates and quantities). For hazardous substances, the regulating system should be uncompromisingly implemented.

The management system should carefully review whether to meet all of the requirements of existing international agreements on chemical issues, principally the Stockholm Convention. It should be sufficiently flexible in order to adhere rapidly to new agreements that are about to come into force. This could be achieved by preparing national guidelines regarding acceptable and unacceptable practices of chemicals management. The International Forum on Chemical Safety (IFCS) could provide considerable assistance in the preparation of such guidelines.

N-R6. Partnership for Safe Disposal of Outstanding Chemical Stockpiles

There are many chemical hotspots in the region. These outstanding problems are a legacy of previous practices. A regional initiative would commence with national-level assessments of chemical contamination. The assessments would identify urgent problems such as the need to dispose of hazardous wastes and outdated pesticides, prioritise them, define technologies to be applied among the various options, and design concrete actions to rectify problems. While this assessment work should be conducted to a certain extent by various agencies such as UNEP and UN-ESCAP, it is important to involve local communities, NGOs and other stakeholders in determining the specific actions for addressing stockpiles of hazardous chemicals.

N-R7. Chemicals Recycling System

Considering the region's waste problems, including increasing chemical waste, the development of a chemical recycling system is critical. The region should attempt to create a framework for the reuse and recycling of chemicals on a consultative basis, aiming at reducing the severity of problems associated with chemical wastes. The introduction of reuse and recycling systems creates opportunities to prevent environmental contamination by chemical waste, to improve material efficiency, to generate cost savings from reducing chemical disposal costs, to create revenue from the extended use of chemicals, and to increase public (including private sector) awareness of chemical issues.

Adequate caution should be exercised to prevent the possibility that chemical recycling could be used as a means of dumping hazardous chemicals on developing countries. Any chemical recycling system should adhere to international agreements such as the Rotterdam Convention on Prior Informed Consent, ensuring that the governments of recipient countries are adequately notified of such activities in advance.

N-R8. Voluntary Initiatives of Chemical Industries

Voluntary measures by the chemicals industry for achieving improved environmental performance have emerged. These include "Responsible Care", a unilateral initiative of the chemical industry¹⁵⁸; and other types of national voluntary agreements between industry and governments to establish a multi-year schedule of reduced emissions from chemicals; and environmental management systems.

These voluntary initiatives could improve the negative public image of the chemical industry by radically changing corporate attitudes and prior practices, for instance by introducing operational safety and emergency preparedness, product responsibility, occupational safety and health, and improving many other aspects of industry activities. Even though the credibility of voluntary initiatives must be improved to broaden social consensus and to involve more direct association of workers and stakeholders, it is clear that such voluntary initiatives could be an effective vehicle in the creation of more environmental friendly chemical industries.

Governments should recognise these advantages and support such voluntary initiatives, especially for SMEs and others that do not have the same capacity to participate as MNCs. Development of national guidelines and consultancy services for its implementation could facilitate good practices in the chemical industry. National guidelines should contain guidance on the core elements of proper

¹⁵⁸ Responsible Care was initiated in the mid-1980s in Canada, and has since grown to be the primary instrument for the chemical industry's attempts to improve its performance in almost all aspects of its operations. Currently it has been adopted in 40 nations.

management of hazardous chemicals, minimum standards, and simple reporting guidance. In addition, an award system for companies with best practices in managing, reducing and replacing hazardous chemicals could provide additional incentives to producers. Best practices should be publicised and shared with stakeholders, including the general public. This type of award is often instrumental in setting precedents for other companies to follow.

Capacity Building

N-R9. Chemically Conscious Consumers

Consumer action for green chemicals is one key for change. Consumer/user groups advocating the purchase of environmentally-friendly chemical products are very effective in changing individual consumer behaviour. In Japan, networks to promote the purchase of environmentally-benign goods have been established, led by environmental consumer groups. Publications by such groups regarding safe products could assist consumers in identifying, selecting and using more environmentally-responsible goods and services.

Stakeholders, including the general public, must have access to information on chemical hazards and exposures posed by individual companies and products. Such information should be provided in a way that chemical risks are presented in a balanced manner and in context.

N-R10. Green Chemistry Research and Development

Green chemistry is an important path to sustainable chemical use, and intensive R&D on green chemistry, especially into alternatives to hazardous chemicals, should be strongly promoted. At the moment, insufficient attention is paid to green chemistry initiatives in the region. Several supporting mechanisms should be created to boost green chemistry development:

- **R&D support on green chemistry:** pilot projects on green chemistry, public and private cooperative projects on green chemistry;
- **Development of green chemistry network:** national and regional networks on green chemistry could facilitate information exchange, expertise, and communication;
- **Creation of favourable market for green chemistry:** government subsidies or tax exemptions on green chemistry could promote green chemistry consumption and boost financial investment in green chemistry;
- **Increasing consumer awareness for green chemicals:** consumer awareness of green chemicals should be promoted. Various informative instruments such as labelling of green chemicals could be used to increase green chemicals consumption.

Finance

N-R11. Introduction of Economic Instruments

Favourable market development for the sustainable consumption of chemicals is a critical element of the policy agenda. To promote environmentally desirable chemical use, economic instruments should be used effectively and efficiently. Such instruments should include measures for the internalisation of the costs of environmental damage in national regulatory mechanisms. However, the current market situation for chemical users and its economic activities may mean that it is not feasible to fully internalise the externalities immediately. Still, it is important to show a clear direction at an early date to inform all users of how market prices of chemicals would change based on their external costs. This would help the private sector to prepare and be innovative in their future activities.

Various economic instruments (subsidies, taxes, fees, charges, etc.) could be applied to correct market prices of both harmful chemicals and green chemicals (the “getting price right” principle). To use such economic instruments effectively, it is crucial to determine the chemicals to target methods of application (types of instruments) and the level of monetary value. For instance, an insignificant level of tax on a hazardous substance would not affect its consumption pattern. The following are useful economic instruments to stimulate sustainable chemical use:

- Elimination of subsidies on substances that are harmful to humans and the environment should be strongly recommended. For instance, many Western European countries are slowly eliminating subsidies on fertiliser to discourage chemical fertiliser use;

- Differentiated taxation of chemicals is also an effective instrument in promoting environmentally benign chemicals, while discouraging hazardous chemicals. Clear signals would be sent to producers to encourage them to increase their production of alternatives to hazardous chemicals. High taxation on hazardous chemicals would encourage producers and consumers to purchase cheaper alternatives, which are more environmentally friendly;
- A charging system could provide financial incentives to promote minimal use of hazardous chemicals.

Technology

N-R12. Technology for the Safe Disposal of Hazardous Chemicals

Technologies to safely dispose of hazardous waste are not available in many developing countries. Low-temperature incineration of hazardous chemicals inadvertently generates even more toxic compounds. There is, therefore, a need in the region for an evaluation of the technology options available for the safe disposal of hazardous chemicals and wastes stockpiled in the region. For example, incineration facilities for PCBs developed in Japan hold a good safety record.

An evaluation of options could be combined with technology development activities in individual countries aimed at resolving outstanding waste management problems. A small-scale and high-temperature incinerator loaded onto a vehicle, for instance, is identified as effective and efficient technology for the safe disposal of medical wastes, and has already been introduced in some countries. Approved best technology should be expanded to other areas; a regional cooperation system to facilitate such technology transfer among member countries could accelerate the safe management of chemicals.