

The present chapter focuses on how to enable the scientific and technological community, which includes, among others, engineers, architects, industrial designers, urban planners and other professionals and policy makers, to make a more open and effective contribution to the decision-making processes concerning environment and development. It is important that the role of science and technology in human affairs be more widely known and better understood, both by decision makers who help determine public policy and by the general public. The cooperative relationship existing between the scientific and technological community and the general public should be extended and deepened into a full partnership. Improved communication and cooperation between the scientific and technological community and decision makers will facilitate greater use of scientific and technical information and knowledge in policies and programme implementation. Decision makers should create more favourable conditions for improving training and independent research in sustainable development. Existing multidisciplinary approaches will have to be strengthened and more interdisciplinary studies developed between the scientific and technological community and policy makers and with the general public to provide leadership and practical know-how to the concept of sustainable development. The public should be assisted in communicating their sentiments to the scientific and technological community concerning how science and technology might be better managed to affect their lives in a beneficial way. By the same token, the independence of the scientific and technological community to investigate and publish without restriction and to exchange their findings freely must be assured. The adoption and implementation of ethical principles and codes of practice for the scientific and technological community that are internationally accepted could enhance professionalism and may improve and hasten recognition of the value of its contributions to environment and development, recognizing the continuing evolution and uncertainty of scientific knowledge.

A Improving communication and cooperation among the scientific and technological community and decision makers and the public

Basis for action The scientific and technological community and policy makers should increase their interaction in order to implement strategies for sustainable development on the basis of the best available knowledge. This implies that decision makers should provide the necessary framework for rigorous research and for full and open communication of the findings of the scientific and technological community, and develop with it ways in which research results and the concerns stemming from the findings can be communicated to decision-making bodies so as to better link scientific and technical knowledge with strategic policy and programme formulation. At the same time, this dialogue would assist the scientific and technological community in developing priorities for research and proposing actions for constructive solutions.

Objectives

- a** To extend and open up the decision-making process and broaden the range of developmental and environmental issues where cooperation at all levels between the scientific and technological community and decision makers can take place;
- b** To improve the exchange of knowledge and concerns between the scientific and technological

community and the general public in order to enable policies and programmes to be better formulated, understood and supported.

Activities Governments should undertake the following activities:

- a** Review how national scientific and technological activities could be more responsive to sustainable development needs as part of an overall effort to strengthen national research and development systems, including through strengthening and widening the membership of national scientific and technological advisory councils, organizations and committees to assure that:
 - i** The full range of national needs for scientific and technological programmes are communicated to Governments and the public;
 - ii** The various strands of public opinion are represented;
- b** Promote regional cooperative mechanisms to address regional needs for sustainable development. Such regional cooperative mechanisms could be facilitated through public/private partnerships and provide support to Governments, industry, non-governmental educational institutions and other domestic and international organizations, and by strengthening global professional networks;
- c** Improve and expand scientific and technical inputs through appropriate mechanisms to intergovernmental consultative, cooperative and negotiating processes towards international and regional agreements;
- d** Strengthen science and technology advice to the highest levels of the United Nations, and other international institutions, in order to ensure the inclusion of science and technology know-how in sustainable development policies and strategies;
- e** Improve and strengthen programmes for disseminating research results of universities and research institutions. This requires recognition of and greater support to the scientists, technologists and teachers who are engaged in communicating and interpreting scientific and technological information to policy makers, professionals in other fields and the general public. Such support should focus on the transfer of skills and the transfer and adaptation of planning techniques. This requires full and open sharing of data and information among scientists and decision makers. The publication of national scientific research reports and technical reports that are understandable and relevant to local sustainable development needs would also improve the interface between science and decision-making, as well as the implementation of scientific results;
- f** Improve links between the official and independent research sector and industry so that research may become an important element of industrial strategy;
- g** Promote and strengthen the role of women as full partners in the science and technology disciplines;
- h** Develop and implement information technologies to enhance the dissemination of information for sustainable development.

Financing and cost evaluation \$15 million from the international community on grant or concessional terms.

B Promoting codes of practice and guidelines related to science and technology

Basis for action Scientists and technologists have a special set of responsibilities which belong to them both as inheritors of a tradition and as professionals and members of disciplines devoted to the search for

A research scientist studies eucalyptus clones. National research and development systems need to be reviewed and strengthened to provide a more positive contribution to sustainable development.



knowledge and to the need to protect the biosphere in the context of sustainable development.

Increased ethical awareness in environmental and developmental decision-making should help to place appropriate priorities for the maintenance and enhancement of life-support systems for their own sake, and in so doing ensure that the functioning of viable natural processes is properly valued by present and future societies. Therefore, a strengthening of the codes of practice and guidelines for the scientific and technological community would increase environmental awareness and contribute to sustainable development. It would build up the level of esteem and regard for the scientific and technological community and facilitate the "accountability" of science and technology.

Objectives The objective should be to develop, improve and promote international acceptance of codes of practice and guidelines relating to science and technology in which the integrity of life-support systems is comprehensively accounted for and where the important role of science and technology in reconciling the needs of environment and development is accepted. To be effective in the decision-making process, such principles, codes of practice and guidelines must not only be agreed upon by the scientific and technological community, but also recognized by the society as a whole.

- a Strengthening national and international cooperation, including the non-governmental sector, to develop codes of practice and guidelines regarding environmentally sound and sustainable development, taking into account the Rio Declaration and existing codes of practice and guidelines;
- b Strengthening and establishing national advisory groups on environmental and developmental ethics, in order to develop a common value framework between the scientific and technological community and society as a whole, and promote continuous dialogue;
- c Extending education and training in developmental and environmental ethical issues to integrate such objectives into education curricula and research priorities;
- d Reviewing and amending relevant national and international environment and development legal instruments to ensure appropriate codes of practice and guidelines are incorporated into such regulatory machinery.

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Chapter 32

Strengthening the role of farmers

All references in this chapter to "farmers" and "farming" include all rural people who derive their livelihood from activities such as farming, fishing and forest harvesting.

Basis for action Agriculture occupies one third of the land surface of the Earth, and is the central activity for much of the world's population. Rural activities take place in close contact with nature, adding value to it by producing renewable resources, while at the same time becoming vulnerable to overexploitation and improper management.

The rural household, indigenous people and their communities, and the family farmer, a substantial number of whom are women, have been the stewards of much of the Earth's resources. Farmers must conserve their physical environment as they depend on it for their sustenance. Over the past 20 years there has been impressive increase in aggregate agricultural production. Yet, in some regions, this increase has been outstripped by population growth or international debt or falling commodity prices. Further, the natural resources that sustain farming activity need proper care, and there is a growing concern about the sustainability of agricultural production systems.

A farmer-centred approach is the key to the attainment of sustainability in both developed and developing countries and many of the programme areas in Agenda 21 address this objective. A significant number of the rural population in developing countries depend primarily upon small-scale, subsistence-oriented agriculture based on family labour. However, they have limited access to resources, technology,

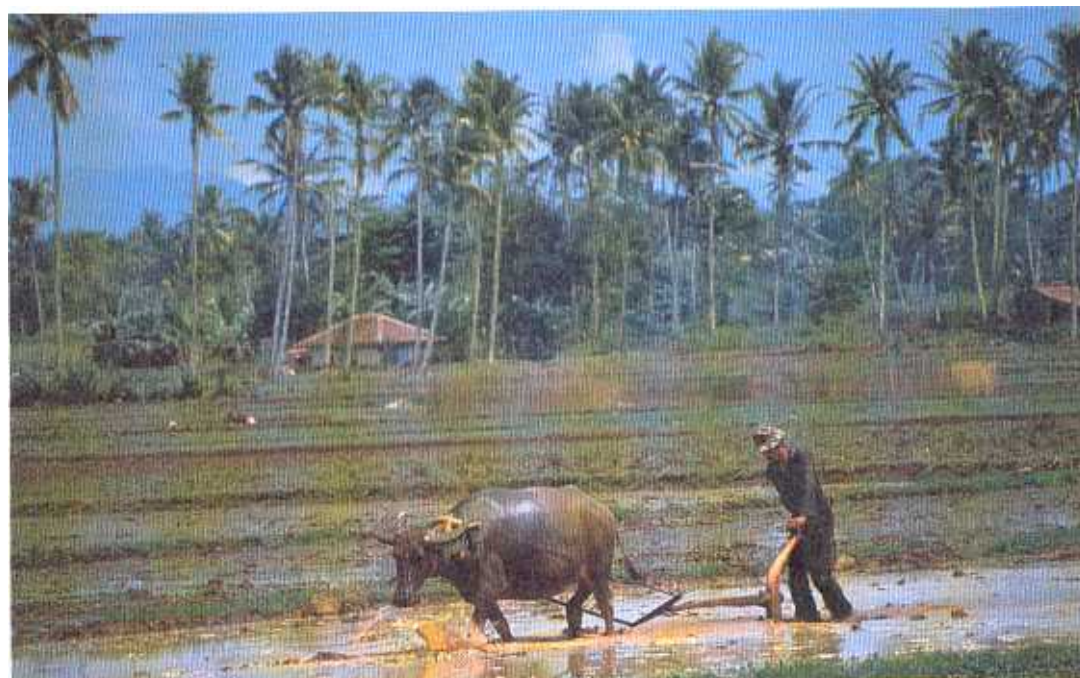
alternative livelihood and means of production. As a result, they are engaged in the overexploitation of natural resources, including marginal lands.

The sustainable development of people in marginal and fragile ecosystems is also addressed in Agenda 21. The key to the successful implementation of these programmes lies in the motivation and attitudes of individual farmers and government policies that would provide incentives to farmers to manage their natural resources efficiently and in a sustainable way. Farmers, particularly women, face a high degree of economic, legal and institutional uncertainties when investing in their land and other resources. The decentralization of decision-making towards local and community organizations is the key in changing people's behaviour and implementing sustainable farming strategies. This programme area deals with activities which can contribute to this end.

Objectives

- a To encourage a decentralized decision-making process through the creation and strengthening of local and village organizations that would delegate power and responsibility to primary users of natural resources;
- b To support and enhance the legal capacity of women and vulnerable groups with regard to access, use and tenure of land;
- c To promote and encourage sustainable farming practices and technologies;
- d To introduce or strengthen policies that would encourage self-sufficiency in low-input and low-energy technologies, including indigenous practices, and pricing mechanisms that internalize environmental costs;

Small scale and traditional farming in Bangladesh and Indonesia. Agriculture occupies one third of the land surface of the Earth and is the central activity for much of the world's population.



- e To develop a policy framework that provides incentives and motivation among farmers for sustainable and efficient farming practices;
- f To enhance the participation of farmers, men and women, in the design and implementation of policies directed towards these ends, through their representative organizations.

Management-related activities Governments should:

- a Ensure the implementation of the programmes on sustainable livelihoods, agriculture and rural development, managing fragile ecosystems, water use in agriculture, and integrated management of natural resources;
- b Promote pricing mechanisms, trade policies, fiscal incentives and other policy instruments that positively affect individual farmer's decisions about an efficient and sustainable use of natural resources, and take full account of the impact of these decisions on household food security, farm incomes, employment and the environment;
- c Involve farmers and their representative organizations in the formulation of policy;
- d Protect, recognize and formalize women's access to tenure and use of land, as well as rights to land, access

- to credit, technology, inputs and training;
- e Support the formation of farmers' organizations by providing adequate legal and social conditions.

Support for farmers' organizations could be arranged as follows:

- a National and international research centres should cooperate with farmers' organizations in developing location-specific environment-friendly farming techniques;
- b Governments, multilateral and bilateral development agencies and non-governmental organizations should collaborate with farmers' organizations in formulating agricultural development projects to specific agro-ecological zones.

Financing and cost evaluation The financing needed for this programme area is estimated in chapter 14 "Promoting sustainable agriculture and rural development", particularly in the programme area "Ensuring people's participation and promoting human resource development". The costs shown under chapters 3, 12 and 13 on combating poverty, combating desertification and drought, and sustainable mountain development are also relevant for this programme area.