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Report of the Secretary-General

Addendum

Promoting sustainable agriculture and rural development*

(Chapter 14 of Agenda 21)

CONTENTS

* The present report was prepared by the Food and Agriculture Organization of the United Nations (FAO) as task manager for chapter 14 of Agenda 21, in accordance with arrangements agreed to by the Inter-Agency Committee on Sustainable Development (IACSD). It is the result of consultation and information exchange between United Nations agencies, international and national science organizations, interested government agencies and a range of other institutions and individuals.

I. KEY OBJECTIVES

1. The present report reviews progress made in the implementation of the objectives set out in chapter 14 of Agenda 21 (Promoting sustainable agriculture and rural development),[1] taking into account the decisions taken by the Commission on Sustainable Development on that subject at its third session, in 1995. The major objective of sustainable agriculture and rural development (SARD), as spelled out in chapter 14 of Agenda 21, is to increase food production in a sustainable way and enhance food security. That ambitious task requires education initiatives, economic incentives and the development of appropriate and new technologies, as well as employment and income generation to alleviate poverty, and natural resource management and environmental protection.

2. The 12 programme areas of chapter 14 are closely related to other chapters of Agenda 21, especially chapters 10, 15, 18 and 19. Those programme areas, which address issues of policy and agrarian reform, participation, particularly of rural people, income diversification, land conservation and improved management of inputs, define the key objectives of the chapter.

II. SUCCESSES

3. The recent World Food Summit organized by FAO (Rome, 13-17 November 1996) marked a milestone in international acceptance and commitment to achieve the goals of enhanced food production and food security. Summit participants deplored the continued widespread prevalence of hunger, and pledged at the very least to halve the current numbers of malnourished, estimated at more than 800 million, by 2015 and preferably earlier. They also recognized the need for the sustainable management of natural resources and protection of the environment, and committed themselves to implement the outcome of the United Nations Conference on Environment and Development (UNCED), particularly with regard to chapter 14 of Agenda 21. Initial proposals broadly outlining how a World Food Summit monitoring system might function are currently being developed for discussion among concerned institutions, for subsequent consideration by the FAO Committee on World Food Security at its twenty-third session, in April 1997. Parallel to that process, the Administrative Committee on Coordination (ACC) has been invited by the United Nations General Assembly to consider an appropriate inter-agency mechanism to assist in the implementation of the World Food Summit Plan of Action, and to report on its decision to the Economic and Social Council at its substantive session of 1997.

4. The Summit sent a strong and committed political message. Yet there are similar initiatives that were already present at the time of UNCED in June 1992, and have since evolved further. In general terms, in the developed countries, progress towards meeting SARD objectives appears linked to land "set-aside" programmes as a consequence of weak food markets and hence low prices of the early 1990s. The opportunity still has not been taken of linking set-aside programmes to environmental objectives.

5. In the economies in transition, there is the continuing issue of transferring agricultural production systems to market mechanisms. Some

progress has been made in correcting the worst polluting production systems. The desire to gain access to western food markets is guiding production practices to meet food quality standards. The risk remains of those countries adopting unsustainable agricultural policies that promote production without adequate environmental protection.

6. In the developing countries, there is a continuing dilemma over production/income and environmental goals. Some progress has been made in phasing out input subsidies, usually under fiscal pressures. Access to western food markets is also an important factor for some countries and products. The strategy of the sustainable intensification of already converted land of greatest production potential is beginning to be more widely accepted and introduced. Adoption of such a strategy should reduce the pressure on more marginal and environmentally fragile lands.

7. There is a growing awareness in most countries of the necessity and desirability of integrating environmental concerns into agricultural policies by, inter alia, (a) adjusting agricultural support prices and encouraging farmers to adopt environmentally sensitive production and harvesting methods; (b) the preparation of national environmental action plans (NEAPs) in some developing countries, which results in a better understanding of needs for addressing environmental problems, including SARD programme areas; (c) undertaking sectoral agricultural policy reviews in food-deficit low-income developing countries to improve sustainable food security; and (d) in countries with economies in transition, the transfer of land property rights into new forms of agricultural enterprises, and the introduction of policies to take marginal lands out of production.

8. Regarding the effects of the Uruguay Round of multilateral trade negotiations on agricultural trade and production, various studies reflect the view that the direct impact of the Uruguay Round is likely to be negligible on global agricultural production, with some reduction in the output of temperate zone products in developed countries and a small offsetting rise in developing countries overall. The Uruguay Round is expected to lead to significant gains in trade revenue for countries in Latin America and the Caribbean, and to loss for most African countries as well as for countries in transition in Europe. The impact of the Uruguay Round on the objectives of SARD, which go beyond environmental considerations, has not yet been assessed, although an FAO study, being conducted in collaboration with the United Nations Conference on Trade and Development and the World Trade Organization is under way.

9. In the area of peoples' participation, including development of human resources, there is a better understanding of how to utilize the reciprocal relations both within and among formal and informal civil society institutions to strengthen their involvement in decision-making and policy-making processes. The role and participation of women in sustainable agriculture and rural development is recognized as essential, as is the need to integrate women's activities into ongoing and planned programmes and projects. It is now understood that coalitions and networks must be formed to assist the process of consensus-building. In practice, progress has been marked by institutional restructuring of agricultural cooperatives; legislation reforms to facilitate the formation of civil society organizations, such as rural workers' and

farmers' self-help organizations; and the empowerment of informal coalitions in civil society. There is now better collaboration between the United Nations system and international trade union organizations and federations of agricultural producers, such as the International Federation of Agricultural Producers. Capacity-building is focusing, inter alia, on strengthening rural organizations' abilities to gain access to inputs, credit and training of trainers in cooperative membership formulation. The aim is to build up social/organizational capital at the local levels (see boxes 1 and 2, for examples). Another example is the creation of the National Rural People's Concertation Committee in Senegal to act as an interlocutor of rural people's movements with the Government and external partners. The Committee now consists of nine national federations representing farmers, herders and fisherfolk. The establishment in 1996 of the Platform of Peasant Organizations in the Sahel extends such organizations' ability to conduct a policy dialogue at the regional level, for example with the Interstate Committee to Combat Drought in the Sahel.

10. It is becoming clear that land conservation and rehabilitation activities can only be carried out at a reasonable cost and over large areas through the activities of the land-users themselves. Governments and donors are moving away from trying to carry out large-scale soil conservation projects themselves. There has been progress in implementing various initiatives under the FAO International Scheme for Conservation and Rehabilitation of African Lands, and its new counterpart in Asia since January 1996, the Conservation of Lands of Asia and the Pacific. Under the Scheme, Malawi has produced a national land-use and management policy and five-year action plan. That inter-ministerial effort addresses such issues as land rehabilitation, waste disposal, smallholder farmers, land tenure and property rights, and business and industry (investment and research). Other initiatives include the introduction of the Sloping Agricultural Land Technology in several Asian countries, the development of traditional soil and water conservation technologies in the Sahel, and increasing activities within national action plans (NAPs) under the United Nations Convention to Combat Desertification in those Countries Experiencing Drought and/or Desertification, particularly in Africa. A parallel initiative is the formulation of FAO/United Nations Environment Programme National Soil Policy documents. The policy document prepared for Jamaica has led to funding proposals, and serves as a useful model for promoting the idea to other countries, especially small island States faced with soil degradation. Maintaining the productivity of agricultural soil and rehabilitating arable lands are particularly significant issues in the context of the deliberations under way in the Commission's Intergovernmental Panel on Forests, in which the creation of additional agricultural land has been noted as a principal factor in deforestation and the associated loss of the socio-economic value of forests in tropical regions.

Box 1. Farmer-centred Resource Management Programme and Farming System Development approaches

In Asia, an FAO/UNDP/UNIDO Farmer-Centred Agricultural Resources Management programme for sustainable agriculture has been launched to support the implementation of Agenda 21 in China, India, Indonesia, Nepal, Philippines, Sri Lanka, Thailand and Viet Nam. The programme is targeted to resource-poor communities and farm households, with an overall objective of improved conservation, management and utilization of natural resources in rain-fed lowlands and uplands. It has seven subprogrammes, on participatory development; farming systems; watershed management; agroforestry; integrated pest management; safe pesticides; and biotechnology and biodiversity.

In Eastern and Southern Africa, farming system development now features prominently in Kenya, the United Republic of Tanzania, Zambia and Botswana, achieved through awareness programmes for decision makers, human resources development programmes and networking. In the Sudano-Sahelian region of West Africa (Niger, Benin, Burkina Faso, Senegal), a new generation of sustainable resources management projects is increasingly using a comprehensive farming system development approach. In Benin, the Recherche âgronomique en milieu Reel project aims to improve the technological transfer process, and the Poursuite des etudes en milieu reel project advocates improving farmers participation in rural development.

In Latin America, more comprehensive systems are being launched to promote farming system development, particularly in marginal areas in Peru, Ecuador and Brazil, with the aim of promoting participatory rural development. Attention is also focused towards increased demand for technologies that are more appropriate for small farmer conditions, such as labour-intensive technologies, agro-ecological and organic farming systems and low-input farming. A private agricultural services sector is beginning to emerge. A network of rural farmer credit unions is being established, e.g., in the Dominican Republic, Honduras and Peru. State-run national agricultural research and extension institutions have been reduced in size and functions, but are beginning to be replaced by private research and extension institutions, e.g., in Chile.

Box 2. Promising changes in people's participation at field level

Although progress in raising awareness on people's participation has been slow in most developing countries, notable progress has been achieved in such countries as Indonesia, Sri Lanka, Pakistan, Tanzania and Zambia, where Governments are currently experimenting with the introduction of new participatory and small community-based approaches for supplying farm inputs and services. Bolivia has recently embarked on an ambitious programme to promote more effective participation of rural people at the municipal level, and other Latin American countries such as Chile, Ecuador, Mexico and Venezuela, have embarked on similar schemes. New cooperative legislation is now in the process of being discussed and debated in a broad range of countries, including Zambia, Guinea, India and Viet Nam. With declining government budgets for rural developments, many non-governmental organizations are now playing more significant roles towards enhancing people's participation. Rural people's organizations are now entering into the dialogue processes with Governments in shaping sustainable agricultural policies.

11. The objectives of the programme area on the conservation and sustainable utilization of plant genetic resources for food and agriculture (PGRFA) are being pursued essentially through the FAO Global System. The mandate of the former FAO Intergovernmental Commission on Plant Genetic Resources, which monitors the Global System, has been broadened to cover other aspects of agricultural biodiversity and renamed the Commission on Genetic Resources for Food and Agriculture. The Fourth International Technical Conference on Plant Genetic Resources, held at Leipzig in June 1996, welcomed the first issue of the periodic Report on the State of the World's Plant Genetic Resources, and adopted the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources, which focuses on implementing programmes that aim towards conservation, sustainable utilization and sharing of benefits. Through the Commission on Genetic Resources, countries are negotiating the revision of the International Undertaking on Plant Genetic Resources in harmony with the Convention on Biological Diversity, including the realization of farmers' rights and the issue of access on mutually agreed terms to PGRFA, including ex situ collections not addressed by the Convention.

12. In addition, the FAO World Information and Early Warning System is promoting a worldwide information network that provides the basis for a periodic revision of the Report on the State of the World's Plant Genetic Resources. Furthermore, 12 agricultural research centres associated with the Consultative Group on International Agricultural Research (CGIAR) have put their core collections, with about 500,000 accessions, under the auspices of FAO, within the International Network of Ex Situ Collections.

13. Key Agenda 21 objectives concerning the conservation and sustainable utilization of animal genetic resources for sustainable agriculture have been met through the FAO Initiative for Domestic Animal Diversity. The Global Strategy for the Management of Farm Animal Genetic Resources has been launched, with a mission to document existing animal genetic resources, develop and improve their utility to achieve food security, maintain those that represent unique genetic material and that are threatened, and facilitate access to animal genetic resources that are important to food and agriculture. A key output of the Global Strategy thus far has been a joint FAO/UNEP publication, The World Watch List for Domestic Animal Diversity. According to the Global Databank, more than 300 breeds of animals used for food and agriculture are endangered.

14. The global community has also made considerable progress in recognizing the contributions to sustainable agriculture of the conservation and sustainable use of agricultural biological diversity, as reflected, for example, in the decision of the Conference of the Parties to the Convention on Biological Diversity at its third meeting to establish a multi-year programme of activities on the sustainable use of agricultural biological diversity, aiming, inter alia, to promote the positive and mitigate the negative effects of agricultural practices on biological diversity. As part of that effort, the Conference of the Parties has invited FAO, in close collaboration with other relevant United Nations bodies and regional and international organizations, to identify and assess relevant ongoing activities and existing instruments at the international level.

15. Considerable progress has been achieved in the area of integrated pest management (IPM). The most widely quoted successful IPM programme is rice in Indonesia, but other programmes have been mounted in Viet Nam, China, India and the Philippines. IPM is being introduced in Africa (see box 4 on Ghana), and has had quite a long history in Latin America and the Caribbean. An IPM facility, combining the efforts of FAO, UNEP, the United Nations Development Programme, the World Bank and the Centre for Agriculture and Bioscience International, has been established in direct response to Agenda 21. It will provide the link between donors, co-sponsoring agencies, farmers' groups, and national and local governments and non-governmental organizations. The International Centre of Insect Physiology and Ecology consistently uses IPM methods in complementing the activities of CGIAR centres in plant health, which its expertise and facilities in insect biology, physiology, ecology and behaviour well qualify it to do. Success has been noted not only in plant pest control through IPM but also control of disease vectors, such as tsetse and mosquitoes. Experience in mounting IPM programmes has shown that for such programmes to succeed farmers must be the primary decision makers in crop production systems, and improving their analytical ability, typically through farmers' field schools - is the key to IPM. In that regard, it is to be noted that their decisions are influenced by the policy environment, such as input subsidies or other government programmes, which may dissuade them from adopting IPM methods.

16. The development of organic farming and associated accreditation schemes continues in response to consumer concerns on food quality. Progress has also been made in negotiating a legally binding instrument on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, under the joint auspices of UNEP and FAO.

17. Other forms of biological control that are finding widened application include the sterile insect technique, which has been refined by FAO/the International Atomic Energy Agency through the use of nuclear gamma irradiation, for example in eradication programmes for the New World screw worm in North Africa and the Mediterranean fruit fly in South America.

18. With regard to integrated plant nutrition management and associated systems, some progress has been achieved in identifying and carrying out country-level appraisals of all currently and potentially available sources of plant organic and mineral nutrients. Concepts have been sharpened through expert consultations and the sharing of experience (e.g., between FAO and the CGIAR International Food Policy Research Institute) and by field trials in South and South-East Asia. Non-governmental organizations, such as the Swaminathan Research Foundation in India, have been particularly active in that area. Progress is often constrained by the fact that such activity requires access to external sources of nutrients as well as large inputs of labour, particularly in cases in which massive quantities of biomass are to be recycled.

19. With regard to the evaluation of the effects of ultraviolet radiation caused by the depletion of the stratospheric ozone layer, the evidence suggests that ultraviolet irradiation resulting from stratospheric ozone depletion has little adverse effect on photosynthesis or growth under field conditions, although there may be longer-term damage to nucleic acids. In contrast, increased tropospheric ozone levels arising from atmospheric pollution will have immediate adverse effects on most plant species.

III. PROMISING CHANGES

20. The following important common policy approaches are emerging in the promotion of SARD: (a) the use of economic incentives to guide sustainable agricultural practices; (b) education and information exchange for human development; (c) the development and transfer of new and appropriate technologies; (d) farm and off-farm employment for alleviating poverty; (e) sound natural resource management leading to environmental protection; and (f) focusing on men and women farmers themselves.

21. It is noteworthy that rural energy technologies, such as wind energy, have seen a significant decline in cost in recent years. Power generation from wind farms or single systems has grown dramatically, not only in Europe and the United States of America, but in India, China, Mexico and Indonesia. Solar photovoltaic (PV) systems are gradually reaching competitive prices, and the market has expanded considerably. Large PV programmes in Mexico, India, China, Argentina and other countries have been implemented since UNCED. Continued privatization and deregulation of electric power utilities worldwide is providing new opportunities to generate electricity through renewable energy technologies. Impressive technical progress has led to successful small-scale off-grid PV applications, as well as wind energy projects and co-generation from biomass residues. However, in the transition of rural energy policies and technologies to cost-effective energy sources, progress crucially depends on economics. Getting energy cheaply from renewable sources to small-scale farming families in developing countries is still far from being realized.

22. Other promising developments in implementing SARD have occurred, for the industrialized economies, in the areas of policy integration, setting agrochemicals reduction targets, the introduction of environmental taxes and other policy instruments, and a growing awareness of organic farming. In developing economies, new initiatives have reflected farmer-centred approaches and people's participation and IPM programmes (see boxes 3 and 4).

Box 3. Promising changes in policy integration and introduction of organic farming practices in OECD countries

Although OECD countries in the past relied heavily on regulatory measures, the use of economic instruments has continued to expand in recent years. Environmental taxes in the agriculture sector focus primarily on pesticides, fertilizers and manure wastes. The most commonly practised market-based measure is the use of environmental fees for discouraging farmers to use pesticides, including a 20 per cent sales tax on pesticides in Denmark, a 13 per cent tax on purchase price of pesticides in Norway and a $2.50 tax per kg of pesticides in Sweden. In addition, voluntary programmes introduced encourage farmers to practice IPM methods.

Some OECD countries have already set agrochemicals reduction targets. For example, Canada and the Netherlands have opted to cut pesticide use by 50 per cent (base year 1985-1988) by 2000, and Denmark by 25 per cent (base year 1991) by 1997. Previously, Sweden had opted to cut use by 50 per cent (base year 1981-1985) by 1990. The Netherlands imposed an excess manure tax: while farms producing up to 125 kg/ha/yr of manure are exempted from the tax, a tax rate of 0.25 guilders per kg is set for farms producing between 125 and 200 kg of manure per year, and 0.50 guilders per kg beyond 200 kg/ha/yr. Norway introduced a fertilizer tax set at 1.21 kroner per kg of nitrogen and 2.30 kroner per kg of phosphorus. Finland has introduced a similar tax.

Austria, Italy, Spain and Switzerland have established minimum forage areas for cattle. In Spain, over a five-year period it is aimed to expand the organic farming area from the current level of 12,000 ha to 28,000 ha by the year 2000.

Recent information on organic farming in the European Union (EU) shows increasing adaptation, with Germany having almost half the total area in the EU. One comparison of area under organic practices between 1987 and 1993 indicates that in most countries, area increased by 100-300 per cent, but from a small base. The number of farmers using organic techniques also nearly doubled in the EU between 1987 and 1992, from an initial figure of 7,500 to about 14,000. The market share of organic products is still very low, however, at about 0.5 per cent of the total food market for the EU as a whole. Nevertheless, it has been estimated that market share of organic products will increase to 2.5 per cent by the year 2000.

In the United States, production of organic foods increased by about 20 per cent per year between 1989 and 1995, in line with the growing demand for those products. While the number of organic certified organic farmers increased from 2,841 in 1991 to 4,060 (a 43 per cent increase), the number of certified processors and distributors handling organic foods more than doubled in the same period, from 254 to 526. Organic market outlets are being increasingly diversified to meet the growing demand for organic foods.

Box 4. Successful implementation of IPM in Ghana

Successful implementation of policies and programmes aiming at SARD in developing countries require that they benefit farmers as well. The example of Ghana shows how IPM programmes successfully are achieving that goal.

Intensification of rice-farming systems in Ghana for meeting the increasing demand for food posed a high risk of new pest problems. To cope with that situation, the national Government took steps to revise national agriculture policy by declaring IPM a national policy for crop protection, abolishing subsidies on pesticides, and developing legislation to strengthen the environmental protection control over pesticide importation and use. With those policy changes and government initiatives, a four-month IPM training of trainers course was conducted for a total of 28 extension officers, and three season-long farmer's field schools were provided to 75 farmers, of whom 15 were women. The process started with analysing agro-ecosystems, comparing crops grown under the conventional inputs package with crops produced with IPM methods. The crop protection trials conducted under those two categories resulted in a 32 per cent higher return in the IPM case, with typical cost savings equivalent to around US$ 100 per farm. Farmers were also able to understand how the traditional practice of using chicken manure in alkaline soils that they were already practising was a scientific way of dealing with the problem.

23. A number of international non-governmental organizations have been very active in promoting SARD. The International Federation of Agricultural Producers adopted a number of SARD policies at its recent World Assembly, and is proposing action to strengthen farmers' organizations and links among farmers, researchers and extension services. The International Federation of Organic Agricultural Movements is developing and promoting an international organic standard system to maintain the productive capacity of the soil. The Pesticides Action Network is undertaking advocacy and field work to reduce dependence on chemical pesticides by promoting sustainable agriculture. The World Sustainable Agricultural Association has organized conferences on sustainable agriculture in Asia and South America. At the same time, informal networking arrangements have multiplied in the non-governmental organizations world as an effective and flexible way of exchanging experience across national and regional frontiers.

IV. UNFULFILLED EXPECTATIONS

24. The implementation of agriculture and rural development objectives during the five-year post-UNCED period is still far from satisfactory. The elaboration of comprehensive rural policies that bring together production, environmental and rural welfare objectives has for the most part not been achieved. The Organisation for Economic Cooperation and Development (OECD) group of countries have made some progress towards integrating agricultural and environmental policies, delinking agricultural support from production incentives and

promoting sustainable agricultural practices. However, environmental improvement is still highly dependent on market forces: low prices on world markets and high stock levels often determine land set-aside measures, leading to less intensive and more environmentally friendly production systems. The importance of non-farm, industrial-promoting policies for employment, especially for areas of lower agricultural potential, is not well reflected in rural development and environment strategies. The possibilities for small-scale organic systems are constrained by the lack of biomass, mixed (crop/livestock) systems, labour supply and economic incentives. There is often a lack of coherence between agricultural and environmental policies. In addition, different government authorities with different mandates and interests are involved in implementing SARD at the country level.

25. As emphasized by the Rome Declaration on World Food Security and the World Food Summit and Plan of Action, many developing countries face continuing challenges of poverty and hunger, highly inequitable access to land and production inputs, and a need for environmental protection. Little progress will be made towards achieving SARD without a radical reduction in the numbers of undernourished people, in a wide variety of countries and ecological settings and in a relatively short period. Hence, the coexistence of poverty, hunger and environmental degradation still makes achieving SARD an elusive target. Lack of proper financing mechanisms for rehabilitating degraded lands has also aggravated the problem.

26. The share of agriculture in total official development assistance (ODA) has declined. In terms of constant 1990 dollars, external assistance to agriculture fell from about $19 billion in 1986 to only $10 billion in 1994. Although development banks and other donors are reorienting their investing strategies towards SARD, the scale of international funding is still well below the levels required to fulfil the expectations raised by chapter 14.

27. As mentioned above, there has been notable progress made in the institutional aspects of genetic resources for food and agriculture; there has been less progress, however, in developing networks of <u>in situ</u> PGRFA in protected areas and early-warning mechanisms. The process of revising the International Undertaking on PGR has been hampered by the lack of financial commitment to the Undertaking. Major challenges remain in instituting mechanisms for the conservation and utilization of animal genetic resources at the national and local levels.

28. The low levels of energy inputs for productive activities in rural areas is at the root of low agricultural productivity, continued human drudgery and increasing marginalization of the poorest of rural populations, particularly in Africa. Similarly, institutional and policy weaknesses and the increasing reliance on market forces are having a negative effect on energy investments in rural areas: rarely are the latter commercially viable. That situation, which has been further compounded by the phasing out of subsidies and other developmental and promotional tools, explains the relative stagnation of investment in rural electrification programmes.

V. EMERGING PRIORITIES

29. An important issue is the need to focus on men and women farmers. Their involvement in technology development, policy formulation and investment decisions, as well as their participation in seeking solutions to technical and socio-economic problems, is vital. Out of that appreciation flow at least four priorities:

(a) The need to develop a stronger focus on farmers' and rural workers' organizations as a means to transform rural societies with an SARD focus;

(b) The need to provide appropriate opportunities and incentives for the full and effective participation of women in SARD programmes and projects, by, inter alia, developing legal measures and administrative regulations to improve their secure access to land and credit, using public awareness campaigns to remove social and attitudinal constraints, and ensuring equal access of women and men to education, training and extension services;

(c) The need for farmer-centred, participatory approaches, such as farmers' field schools that have proved successful in promoting IPM, may be used to promote other SARD-oriented technologies, such as integrated plant nutrition;

(d) The need to stress indigenous knowledge and technology, which are often the best option for the local environment, and should be carefully recorded and assessed.

30. Greater attention needs to be given to sustainable intensification. The use of environmentally friendly technologies to intensify production on already high-potential land already converted to agriculture is preferable to converting more marginal fragile land and valuable forests to low productivity or shifting agriculture. Such development may be facilitated by increasing population densities that allow the higher labour inputs that intensification demands and the access to markets and inputs that are often required.

31. Emergency situations and disasters, both natural and - especially - man-made, are a major enemy of SARD. They undermine food security, widen and deepen poverty, and may lead to immeasurable environmental damage. Disaster preparedness - early warning, early action and rapid rehabilitation following relief - is part of the SARD agenda.

32. Urban and peri-urban intensive agriculture provides opportunities for sustainable, small-scale, poverty-reducing and nutrition-improving systems as a complement to but not as a substitute for better linking urban food demand with rural supply.

33. In the important area of genetic resources for food and agriculture, a number of priorities are shifting, with a resulting need to adjust key objectives for PGR: from increasing the number of gene banks to ensuring better maintenance of existing ones and regulation of access; from ex situ collection and conservation to on-farm and in situ conservation; from highly uniform cultivated varieties to locally adapted crop varieties and crop diversification; from free to regulated access; from ad hoc activities to developing economic

analytical methods to internalize the costs of conservation into costs of production; and from sophisticated biotechnologies to differentiated, appropriate biotechnologies and local technologies. Also, following the Fourth Technical Conference on PGR, there is a need, under the guidance of the FAO Commission on Genetic Resources for Food and Agriculture, to follow up on, evaluate and prioritize the implementation of the Global Plan of Action. There is also a critical need to widely recognize that farm animal genetic resources are under serious threat and are essential for the sustainable development of most production environments. Implementing the Global Strategy is essential.

34. The situation of low fertilizer application rates and low productivity, coupled with evidence of nutrient mining, is found in much of the sub-humid rain-fed areas of sub-Saharan Africa. A strategy of merely promoting fertilizer use will inevitably lead to the exclusion of many resource-poor farmers, given the severe supply-side problems that they face. Past programmes proposed more self-reliant plant-nutrition strategies but failed to consider links to the cycling and use of the organic materials to which farmers have access. To move out of a low-productivity, low-input cycle, it will be necessary to combine the external sources of nutrient inputs with management practices to increase soil organic matter.

35. Since rural energy problems persist and energy is not playing its full role as a motor for rural development, the following issues have emerged as complementary priorities or as new areas of focus: (a) more emphasis on the micro or household level; (b) renewed interest in eco-village projects, solar villages etc.; (c) promotion of innovative financial schemes to promote small businesses; and (d) emphasis on the impact of rural energy on agricultural productivity.

36. In some situations, the efficient utilization of existing resources, channelling of information and protection of indigenous skills and technologies may be more important than extrabudgetary resources. While financing is an important issue, in some situations more coherent SARD-oriented policies and the use of existing knowledge may have equal or greater relevance to improving food security and protecting the natural environment - the two key components of SARD.

37. The continuing revolution in information technology offers exciting opportunities for promoting SARD. Increasing accessibility to computers and electronically transmitted information permits ever more rapid and wider sharing of knowledge and experience; the Domestic Animal Diversity Information System is just one example. The future challenge is to harness those opportunities effectively and convert much of the task into a virtual system of information generation, capture and exchange.

Notes

[1] See Report of the United Nations Conference on Environment and Development, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.
