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AGRICULTURAL BIODIVERSITY: ASSESSMENT OF ONGOING ACTIVITIES AND PRIORITIES FOR A PROGRAMME OF WORK

Note by the Executive Secretary

EXECUTIVE SUMMARY

The present note has been prepared by the Executive Secretary, in collaboration with the Food and Agriculture Organization of the United Nations (FAO), to facilitate the work of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) in developing advice and recommendations for the Conference of the Parties at its fifth meeting concerning the further development of the programme of work on agricultural biodiversity. It draws upon the main findings of the assessment of relevant ongoing activities and instruments (UNEP/CBD/SBSTTA/5/INF/10) carried out jointly by the Convention Secretariat and FAO in response to the request of the Conference of the Parties in paragraph 2 of its decision III/11.

Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture. It encompasses the variety and variability of animals, plants and micro-organisms, at genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure, and processes for, and in support of, food production and food security.

Four elements for a programme of work are proposed for consideration by the SBSTTA. They apply the ecosystem approach, emphasizing the ecological functions of biodiversity in agriculture. The four programme elements are intended to be mutually reinforcing and to be implemented in parallel. Prioritization of activities within each programme element will be necessary, as set out in the sections on ways and means and timing of expected outputs. They have the following operational objectives:

(a) Element 1: To provide a comprehensive analysis of status and trends of the world' s agricultural biodiversity, as a basis for the identification of areas requiring priority attention and the development of appropriate policies, plans and programmes by Parties, through a coordinated programme of ongoing and planned assessments of different components of agricultural biodiversity, and the development of the necessary methods and tools;

* UNEP/CBD/SBSTTA/5/1.

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(b) Element 2: To identify management practices, technologies and policies that promote the positive and mitigate the negative impacts of agriculture on biodiversity, and enhance productivity and the capacity to sustain livelihoods, by expanding knowledge, understanding and awareness of the multiple goods and services provided by the different levels and functions of agricultural biodiversity;

(c) Element 3: To strengthen the capacities of farmers, their communities, and other stakeholders, to manage agricultural biodiversity so as to increase their benefits, and promote awareness and responsible action by producer organizations and agro-enterprises;

(d) Element 4: To support the development of national plans and strategies for the conservation and sustainable use of agricultural biodiversity and to promote their integration in sectoral and cross-sectoral plans and programmes.

The proposed elements of the programme of work have been developed bearing in mind the need: to support the development and integration of national strategies, programmes and action plans; to build upon existing, internationally agreed plans of action, programmes, strategies and other agreements; to ensure harmony with the other thematic areas of the Convention; and to promote synergy and coordination, and to avoid duplication, between existing relevant programmes of international organizations and to respect their mandates.

SUGGESTED RECOMMENDATIONS

The Subsidiary Body on Scientific, Technical and Technological Advice may wish to recommend that the Conference of the Parties:

1. Endorses the programme elements, to be contained in an annex to its decision;*

2. Urges Parties, countries, international and regional organizations, civil-society organizations and other relevant bodies to promote, and, as appropriate, carry out, the programme of work;

3. Calls upon the Global Environment Facility to provide financial support, in accordance with Article 21 of the Convention, for activities and capacity building for the implementation of the programme of work;

4. Requests the Executive Secretary to invite the Food and Agriculture Organization of the United Nations to continue to work together with other relevant bodies, in supporting the implementation of the programme of work.

* Based on section III of the present note.

CONTENTS*

* The assessment of ongoing activities and instruments on agricultural biological diversity is contained in document UNEP/CBD/SBSTTA/5/INF/10.

I. INTRODUCTION

1. At its third meeting, held in Buenos Aires in 1996, the Conference of Parties to the Convention on Biological Diversity established, through its decision III/11, a multi-year programme of activities on agricultural biodiversity, and requested the Executive Secretary to invite the Food and Agriculture Organization of the United Nations (FAO), in close collaboration with other relevant organizations, to identify and assess relevant ongoing activities and instruments. The results of this assessment were to be reported back to the Conference of the Parties through the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). At its fourth meeting, held in Bratislava in 1998, the Conference of Parties, in its decision IV/6, requested that SBSTTA develop and provide to the Conference at its fifth meeting, advice and recommendations for the further development of the programme of work on agricultural biodiversity.

2. The above-mentioned assessment of ongoing activities and existing instruments for the conservation and sustainable use of agricultural biodiversity has been carried out on the basis of:

(a) National reports submitted to the Convention Secretariat by countries, as well as national reports on the implementation of agreed strategies and plans of action;

(b) A survey of international organizations, by which they were invited to provide information on their activities, including case-studies, as well as regular reports from such organizations to the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA);

(c) Workshops such as the International Workshop on the Conservation and Sustainable Use of Pollinators in Agriculture, with an Emphasis on Bees, held in Sao Paulo, Brazil, in October 1998, and the Workshop on Sustaining Agricultural Biodiversity and Agro-ecosystem Functions, held in Rome in December 1998; and

(d) Research and updating through the Internet and literature review. 1/

3. A copy of the full report on the assessment is being circulated as an information document for the fifth meeting of SBSTTA (UNEP/CBD/SBSTTA/5/INF/10).

4. The present note has been prepared by the Executive Secretary in collaboration with FAO to facilitate the work of SBSTTA in developing, for submission to the Conference of the Parties, advice and recommendations for the further development of the programme of work, as requested by the Conference of the Parties in its decision IV/6. It briefly summarizes the main findings of the assessment and, drawing on those conclusions, identifies proposed elements for the further development of the programme of work.

5. Drafts of the present document and the report on the assessment itself were reviewed in September 1999 by a liaison group of experts, drawn from international organizations working in relevant fields 2/ and by a regionally balanced group of experts from the roster, and were finalized in the light of the comments received.

1/ Including an FAO background paper on agricultural biodiversity prepared for the Netherlands/FAO Conference on the Multifunctional Character of Agriculture and Land (September 1999, Maastricht).

2/ FAO, Secretariat of the Convention on Biological Diversity, secretariat of the Global Environment Facility (GEF), United Nations Environment Programme (UNEP), International Plant Genetic Resources Institute (IPGRI) (on behalf of the System-wide Genetic Resources Programme (SGRP) of the research centres of the Consultative Group on International Agricultural Research (CGIAR)), International Institute for Environment and Development (IIED), World Resources Institute (WRI), Tropical Soils Biology and Fertility Programme (TSBF), International Livestock Research Institute (ILRI), International Centre of Insect Physiology and Ecology (ICIPE), Rural Advancement Foundation International (RAFI).

II. THE MAIN CONCLUSIONS OF THE ASSESSMENT

A. The scope of agricultural biodiversity

6. Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture. As noted at the Workshop on Sustaining Agricultural Biodiversity and Agro-ecosytem Functions, it encompasses the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes for, and in support of, food production and food security.

7. The Conference of Parties has recognized "the special nature of agricultural biodiversity, its distinctive features, and problems needing distinctive solutions". 3/ The distinctive features include the following:

(a) Agricultural biodiversity is essential to satisfy basic human needs for food and livelihood security;

(b) Agricultural biodiversity is actively managed by farmers; many components of agricultural biodiversity would not survive without this human interference; indigenous knowledge and culture are integral parts of the management of agricultural biodiversity;

(c) There is a great interdependence between countries for the genetic resources for food and agriculture, largely because many economically important farming systems are based on introduced crop and animal species;

(d) For crops and domestic animals, diversity within species is at least as important as diversity between species and has been greatly expanded through agriculture;

(e) Because of the degree of human management of agricultural biodiversity, its conservation in production systems is inherently linked to sustainable use; preservation through protected areas is of less relevance; 4/

(f) Nonetheless, in industrial-type agricultural systems, much biological diversity is now held ex situ in gene banks or breeders' materials rather than on farm.

8. For the purposes of the assessment, the following dimensions of agricultural biodiversity were identified: 5/

(a) Genetic resources for food and agriculture (species, breeds and varieties, their wild relatives, harvested wild foods), including:

3/ See decision II/15 of the Conference of the Parties to the Convention on Biological Diversity.

4/ However, protected areas have a role in conserving the biological diversity of interest to food and agriculture, including wild relatives of crops, outside production areas.

5/ These correspond, approximately, to the three dimensions identified at the Workshop on Sustaining Agricultural Biodiversity and Agro-ecosystem Functions:

(a) Sustainable production of food and other agricultural products emphasizing both strengthening sustainability in production systems at all levels of intensity and improving the conservation, sustainable use and enhancement of the diversity of all genetic resources for food and agriculture, especially plant and animal genetic resources, in all types of production systems;

(b) Biological or life support to production emphasising conservation, sustainable use and enhancement of the biological resources that support sustainable production systems, particularly soil biota, pollinators and predators;

(c) Ecological and social services provided by agro-ecosystems such as landscape and wildlife protection, soil protection and health (fertility, structure and function), water cycle and water quality, air quality, carbon sequestration, etc.

(i) Plant genetic resources including pasture and rangeland species and forest genetic resources;

(ii) Animal genetic resources, including fishery genetic resources; 6/

(iii) Microbial genetic resources (including rhizobial bacteria, fungi such as yeast, mushrooms, etc.); 7/

These constitute the main units of production in agriculture. Cultivated species, including domesticated species, belong essentially to category of "planned agricultural biodiversity". Managed wild plants and animals may also be included here. 8/ Diversity is important at both species and genetic levels. The latter allows for evolution or deliberate improvement through breeding. 9/ New biotechnologies offer ways to expand the use of genetic resources;

(b) Components of agricultural biodiversity that provide ecological services. These mainly fall under the heading "associated agricultural biodiversity" and include:

(i) "Functional biodiversity" in agricultural production systems themselves, provided by a diverse range of organisms, that contribute inter alia to: 10/

(a) nutrient cycling, including decomposition of organic matter and maintenance of soil fertility (notably soil bacteria and other micro-organisms, earthworms and termites, and the associated microflora; as well as crop and farm animal symbionts);

(b) pest and disease regulation (notably insects and other arthropods as natural enemies of plant herbivores; genetic diversity of crops may also contribute to limit plant disease);

(c) pollination (notably bees and other insects, also some birds, bats and other species);

(ii) Biodiversity that provides ecological services at larger scale. These include services important to agriculture at the landscape or farming system level for: water catchment and infiltration; recycling of water between the soil and the atmosphere; maintaining water quality; watershed protection, regulation of runoff; soil and water conservation and management; local climate regulation; carbon sequestration; and the maintenance of local wildlife and habitats;

(c) Abiotic factors, which have a determining effect on these aspects of agricultural biodiversity and, in line with decision III/11, were also addressed in the assessment;

6/ Many aspects of fishery genetic resources may be considered also under the work programmes on inland waters and marine and coastal biodiversity. For the purposes of the present note, the focus is on aquaculture and mariculture, including fish production that is an integral part of farming systems.

7/ Probably the most significant contribution of micro-organisms is through the provision of services in nutrient cycling.

8/ Many species and populations that have been considered wild are actually managed by people, albeit less intensively than cultivated or domesticated species, and are often very important for food and livelihood security.

9/ The interaction between the environment, genetic resources and management practices that occurs in situ within agro-ecosystems ensures that a dynamic portfolio of agricultural biodiversity is maintained. At the local level, it results in genetic material (landraces or animal breeds) that is adapted to the local abiotic and biotic environmental variation, and to the socio-economic context of the production system, as well as being adaptable to changing conditions in the future. This is complemented by formal crop and animal breeding programmes, including the use of new biotechnologies, that draw largely upon genetic resources maintained ex situ.

10/ Agro-ecosystems vary in the extent that this biological support to production is replaced by external inputs: in more industrial-type agricultural systems, they have been displaced to varying extents by inorganic fertilizers and chemical pesticides and herbicides.

(d) Socio-economic and cultural dimensions, which were also considered, as cross-cutting issues, since agricultural biodiversity is largely shaped by human activities and management practices. These include:

(i) Traditional and local knowledge of agricultural biodiversity, cultural factors and participatory processes; and

(ii) Socio-economic environment, including trade and marketing practices, and property rights.

9. The assessment emphasizes the value of the goods and services provided by agricultural biodiversity for food and livelihood security.

B. Genetic resources for food and agriculture

10. Although "agricultural biodiversity" is a term that has come into wide use only relatively recently, the assessment shows that work on certain components of agricultural biodiversity is well established, primarily in the various sectors concerned with the conservation and sustainable use of genetic resources for food and agriculture, where many of the necessary institutional arrangements for promoting the conservation and sustainable use of crop, forest, farm animal and fish genetic resources, are in place or planned. These include:

(a) International agreements (such as the Code of Conduct on Responsible Fisheries and the International Undertaking on Plant Genetic Resources 11/);

(b) Global country-driven assessments and information systems (such as the periodical reports on the State of the World' s Plant Genetic Resources, the planned corresponding report on animal genetic resources and the Domestic Animal Diversity Information System (DAD-IS));

(c) Globally agreed plans of action (such as the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food And Agriculture), which provide frameworks for national plans and activities;

(d) A global intergovernmental forum with 160 member countries and the participation of all stakeholder groups (the FAO Commission on Plant Genetic Resources for Food and Agriculture (CGRFA)). 12/

11. Nevertheless, ongoing assessment and priority-setting processes indicate that substantial work is still required even in these areas. The strategies and plans of action agreed upon and adopted by countries, or under development for each of the sub-sectors (crop, forest, farm animal and fish), specify priority needs for research, capacity-building, public awareness, as well as policy development and legislation. Implementation of these strategies and plans of action is a major challenge that requires adequate financial resources and appropriate institutional strengthening at all levels: local, national and international. Particular gaps concern below-ground diversity, and wild and under-utilized species of interest to food and agriculture.

12. Cross-cutting issues that emerge from the plans and processes concerned with genetic resources for food and agriculture include the need to facilitate the involvement of multiple stakeholders and the need to provide for proper planning and coordination. Broad-based national programmes are essential in this regard.

11/ The International Undertaking is currently under revision, in harmony with the Convention.

12/ The mandate of CGRFA, broadened by the FAO Conference in 1995, includes "subject to approval by the governing bodies of FAO, as appropriate, to respond to requests from the Conference of the Parties to the Convention on Biological Diversity in specific areas of genetic resources of relevance to food and agriculture, including the provision of information and other services to the Conference of the Parties and its subsidiary bodies (...)". CGRFA has subsidiary intergovernmental technical working groups for plant and animal genetic resources.

13. For many of the sub-sectors, there are gaps in the development of indicators of agricultural biological diversity and its loss. 13/ There is also a need to define production environments in such a way as to aid comparison between the sub-sectors and allow consideration of the use of genetic resources in production systems on a more holistic or integrated basis, taking into account linkages between components of agricultural biodiversity.

C. Components of agricultural biodiversity that provide ecological services

14. In many areas of agriculture, there has been ongoing work that would now be considered as contributing to the conservation and sustainable use of agricultural biodiversity but has only recently been explicitly recognized as such. Integrated pest management, for example involves the field-level management, by farmers, of beneficial and detrimental insects and other components of agricultural biodiversity. Polyculture of freshwater fishes improves nutrient use and reduces input requirements. Some soil management practices, such as minimum tillage, are aimed at improving soil structure and function, largely as a result of increased soil biodiversity.

15. These three areas alone provide many case-studies that demonstrate the value of the functional services provided by agricultural biodiversity to agricultural production. However, there are no comprehensive assessments of these ecological functions and ecosystem services, and specialized mechanisms for developing appropriate policies and programmes are not well developed. On the other hand, there has been substantial progress in implementation at a practical level, and some of the methodologies developed for education and capacity-building might be applied to the management of other components of agricultural biodiversity.

16. Similarly, there has been a substantial amount of work at the level of farming systems, for example, on integrated agroforestry, mixed crop-fish farming and farming-system development, but rarely has this been integrated with other levels of agricultural biodiversity.

17. Agricultural practices often impact on habitats outside of production areas, through, for example, the abstraction of water, and run-off and leaching of excess fertilizers and pesticides. Moreover, the expansion of cultivated areas encroaches on such areas. 14/ The biological diversity of these habitats is often of direct interest to food and agriculture. Uncultivated areas, for example, may provide refuges for useful insects, or harbour wild relatives of crop varieties. There has been little assessment of the value of the goods and services provided by the biological diversity of these areas, however, and few programmes directly address this matter.

18. There is also much information about abiotic resources that provide the basis for agriculture (soil, water, land cover and use, climatic and agro-ecological zones), and there are many programmes that address natural-resources management and sustainable agriculture, such as watershed and valley-bottom management.

19. The assessment indicates that there is an increasing realization of the importance of agricultural biodiversity in ecosystems. As defined in the Convention, an ecosystem is a dynamic complex of plant, animal and micro-organism communities and their non-living environments, interacting as a functional unit. Agro-ecosystems need to be considered at several levels or scales, for instance: a field, crop, herd or pond; a farming or land-use system; a watershed; or an agro-ecological zone. In any particular case, the scale should be determined by the issue or problem to be addressed. As agricultural biodiversity also varies in time, there is also a need to consider seasonal, annual and perennial variations. However, there is no such thing as an a priori "optimum" level and mixture of agricultural biodiversity in an agro-ecosystem; the desirable configuration is determined by prevailing local natural and – equally importantly – socio-economic circumstances.

13/ At its fifth meeting, SBSTTA will also consider the development of indicators of biological diversity and will have before it a note by the Executive Secretary on the subject (UNEP/CBD/SBSTTA/5/12).

14/ See decision III/11, annex 1.

D. Coordination of planning and development of national strategies for agricultural biodiversity

20. A concerted and coordinated effort addressing the various components of agricultural biodiversity depends upon a coherent framework to guide national strategies and actions for the conservation and sustainable use of agricultural biodiversity, as well as dynamic processes that ensures country-level flexibility and updating of regional and international priorities and actions.

21. The agricultural sector is very complex and there are many different stakeholders that need to be involved in the planning and development process. These stakeholders include farmers and other producers, scientists and technicians, policy makers in the diverse sectors within government and parastatal institutions, international and non-governmental organizations and the private sector, and consumers. Transparent consultative processes are required to allow exchange of ideas and concerns, negotiation and, as required, conflict resolution between different stakeholders. Effective feedback mechanisms between farmers and researchers and the technical and policy levels are crucial in the identification of issues and priorities, the design of appropriate strategies and actions, and the monitoring and evaluation of the performance and impacts of programmes and actions.

22. The assessment reinforces the need to mainstream agricultural-biodiversity considerations in national strategies, programmes and action plans for food, agriculture, forestry and fisheries, and the need to integrate such considerations into national biodiversity strategies and action plans and national environmental action plans.

III. THE FURTHER DEVELOPMENT OF THE PROGRAMME OF WORK ON AGRICULTURAL BIODIVERSITY

A. Overall objectives, approach and guiding principles

23. The overall aim of the programme of work is to promote the objectives of the Convention in the area of agricultural biodiversity, in line with relevant decisions of the Conference of Parties, notably decisions II/15, III/11 and IV/6.

24. More specifically, the objectives, as spelt out in paragraph 1 of decision III/11, are:

(a) To promote the positive effects and mitigate the negative impacts of agricultural systems and practices on biological diversity in agro-ecosystems and their interface with other ecosystems;

(b) To promote the conservation and sustainable use of genetic resources of actual and potential value for food and agriculture;

(c) To promote the fair and equitable sharing of benefits arising out of the use of genetic resources.

25. The proposed elements of the programme of work have been developed bearing in mind the need:

(a) To support the development of national strategies, programmes and action plans concerning agricultural biodiversity, in line with decision III/11, and to promote their integration in sectoral and cross-sectoral plans, programmes and policies;

(b) To build upon existing international plans of action, programmes and strategies that have been agreed by countries, in particular, the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture, the Global Strategy for the Management of Farm Animal Genetic Resources, the Code of Conduct for Responsible Fisheries, and the International Plant Protection Convention (IPPC);

(c) To ensure harmony with the other relevant programmes of work under the Convention, including those relating to forest biological diversity, mountain ecosystems, inland water biological diversity, marine and coastal biological diversity, and drylands, as well as with cross-cutting issues such

as access and benefit-sharing, sustainable use, indicators, alien species, the Global Taxonomy Initiative, and issues related to Article 8(j);

(d) To promote synergy and coordination, and to avoid duplication, between relevant programmes of various international organizations and between programmes at the national and regional levels established under the auspices of international organizations, while respecting the mandates and existing programmes of work of each organization and the intergovernmental authority of the respective governing bodies, commissions and other forums.

26. In implementing the programme of work, the ecosystem approach adopted under the Convention will be applied, emphasizing the ecological functions of biodiversity in agriculture. 15/ The application of this approach implies, inter alia, intersectoral cooperation, decentralization of management to the lowest level appropriate, equitable distribution of benefits, and the use of adaptive management policies that can deal with uncertainties and are modified in the light of experience and changing conditions. The implementation process will also build upon the knowledge, innovations and practices of local communities and thus complement Article 8(j) of the Convention. A multi-disciplinary approach that takes into account scientific, social and economic issues is required.

27. The proposed programme of work has been developed in the light of the basis for action annexed to decision III/11. 16/ Its implementation, particularly the implementation of programme element 1, will shed further light on the status and trends of agricultural biodiversity. 17/

B. Proposed elements of a programme of work

28. Based on the above, the following elements for a programme of work are proposed as options to be considered by SBSTTA. It is important to note that the four programme elements are intended to be mutually reinforcing: outputs of certain elements would feed into others. Accordingly, the ordering of the elements does not imply sequential implementation. However prioritization of activities within each programme element will be necessary as set out in the sections on ways and means and timing of expected outputs.

Programme element 1. Country-driven assessments of the status and trends of agricultural biodiversity

Operational objective

To provide a comprehensive analysis of status and trends of the world' s agricultural biodiversity, as a basis for the identification of areas requiring priority attention and the development of appropriate policies, plans and programmes by Parties, through a coordinated programme of ongoing and planned assessments of different components of agricultural biodiversity, and the development of the necessary methods and tools.

15/ The ecosystem approach is considered in the note by the Executive Secretary (UNEP/CBD/SBSTTA/5/11) on the subject, which will also be before the Subsidiary Body on Scientific, Technical and Technological Advice at its fifth meeting.

16/ This was elaborated from the recommendations of SBSTTA, which, in turn, drew upon a note by the Executive Secretary (UNEP/CBD/SBSTTA/2/10) submitted to the Subsidiary Body at its second meeting. Further discussion of agricultural biodiversity, its multiple functions, and the underlying causes of its loss are provided in the background paper entitled "Agricultural Biodiversity", prepared for the FAO/Netherlands Conference on the Multifunctional Character of Agriculture and Land and referred to in footnote 1 above.

17/ It should be noted that the assessment on which this document draws focused on ongoing activities and instruments and was not intended to provide a definitive analysis of the status and trends in agricultural biodiversity.

Rationale

Processes for country-driven assessments are in place, or under development, for the crop and farm animal genetic resources components. For fishery and forestry genetic resources, they are conducted as part of wider assessments of these sectors. The assessments draw upon, and contribute to, comprehensive data and information systems. There is also much information about abiotic resources which provide the basis for agriculture (soil, water, land cover and use, climatic and agro-ecological zones). However, there are no such comprehensive assessments for microbial genetic resources or for "functional biodiversity" in agriculture (the ecological services provided to agriculture from biodiversity in terms of nutrient cycling, pest and disease regulation and pollination).

Moreover, the assessments of the various components are conducted separately; there is no integrated assessment of agricultural biodiversity as a whole. There is also lack of reliable or widely accepted indicators of agricultural biodiversity and its various components. The further development and application of such indicators, as well as assessment methodologies, is necessary to allow an analysis of the status and trends of agricultural biodiversity and its various components and to facilitate the identification of biodiversity-friendly agricultural practices (see programme element 2).

Activities

1.1. Support the ongoing or planned assessments of different components of agricultural biodiversity, such as the periodic reports on the State of the World' s Plant Genetic Resources for Food and Agriculture, and the first report of the State of the World' s Animal Genetic Resources for Food and Agriculture, as well as reports by on the state of land, water, forestry and fisheries and assessments by FAO and other organizations, including the corresponding national and regional level assessments, with particular attention to gaps in earlier assessments.

1.2. Promote and develop specific assessments of additional components of agricultural biodiversity, in particular functional biodiversity that provides ecological services to agriculture, including microbial diversity, drawing upon the outputs of programme element 2.

1.3. Develop methods and techniques for assessing and monitoring the status and trends of agricultural biodiversity, including:

(a) For a limited set of criteria, indicators of agricultural biodiversity to facilitate monitoring and assessment of the status and trends in different production systems and environments, and the impacts of various practices, building on existing work; 18/

(b) An agreed terminology and classification for agro-ecosystems and production systems to facilitate the comparison and synthesis of various assessments and monitoring of different components of agricultural biodiversity, at all levels and scales, between countries and partner organizations; 19/

(c) Data and information exchange on agricultural biodiversity, in particular through the clearing-house mechanism under the Convention, building on existing networks, databases, and information systems.

18/ To be pursued in a way consistent with the programme of work on indicators.

19/ This would draw upon, and not seek to replace, existing classification systems for ecosystems and farming systems (e.g. eco-region, agro-ecological zones, landscapes, land evaluation systems, production systems/environments, farming systems and farm typologies, etc.), taking into account physical resources (air, climate, land, water, vegetation types), human resource attributes (population intensity, land-use pressures, settlement patterns), and degree of market integration.

Ways and means

Exchange and use of experiences, information and findings from the assessments shall be facilitated through networks and consultation between countries and institutions, including use of existing networks, etc.

Country-driven assessments of genetic resources (activity 1.1) shall be implemented, through programmes of FAO and other organizations (with regular budget and extra-budgetary resources). Supplementary resources may be needed to support additional assessments (activity 1.2), which will draw upon elements of existing programmes of international organizations, and the outputs of programme element 2.

This programme element, particularly activity 1.3, will be supported through catalytic activities, building upon and bringing together existing programmes, in order to develop agricultural biodiversity indicators, agreed terminology, etc., through, inter alia, technical workshops, meetings and consultations, e-mail conferences, preparation of discussion papers, travel. Funding of these catalytic activities will be through the Secretariat, with in-kind contributions from participating organizations.

Timing of expected outputs

List of indicators of agricultural biodiversity and its loss, and agreed terminology of production environments by 2002.

Periodic reports on the state of the world' s genetic resources (animal, plant, forest and fish), as programmed, leading progressively towards a comprehensive assessment and understanding of agricultural biodiversity, with a focus on functional biodiversity in agriculture, by 2010.

Programme element 2. Identification and promotion of adaptive management practices, technologies and related policy and incentive measures

Operational objective

To identify management practices, technologies and policies that promote the positive and mitigate the negative impacts of agriculture on biodiversity, and enhance productivity and the capacity to sustain livelihoods, by expanding knowledge, understanding and awareness of the multiple goods and services provided by the different levels and functions of agricultural biodiversity.

Rationale

There are large and fairly well-defined research agendas for crop, farm animal, forest and fishery genetic resources. These include developing of complementary conservation and use strategies, and a focus on developing the conservation and use of under-utilized species. There are also an increasing number of case studies on, for example, on farm and in situ conservation of genetic resources, and community integrated pest management. However, far more understanding is needed of the multiple functions of biodiversity in production systems. Much more research is needed, for example, to examine the relationship between diversity, resilience and production in agro-ecosystems

A blend of traditional and newer practices and technologies is used in agriculture, which utilize, or impact on, agricultural biodiversity in different ways, with particular consequences for biological diversity and for the sustainability and productivity of agricultural systems. A better understanding and application of these complex interactions could help to optimize the management of agricultural biodiversity in production systems.

Such work is essential in order to meet the objectives of decision III/11 of the Conference of the Parties to promote the positive and mitigate the negative impacts of agriculture on biological diversity, and enhance productivity and capacity to sustain livelihoods.

Activities

2.1. To carry out a series of case-studies, in a range of environments and production systems, and in each region:

(a) To identify key goods and services provided by agricultural biodiversity, and threats to such diversity;

(b) To identify best management practices; and

(c) To monitor and assess the actual and potential impacts of existing and new agricultural technologies.

This activity would address the functions of agricultural biodiversity and the interaction between the various components, as set out in paragraph 0 of the present note, 20/ with a focus on particular issues such as:

(a) The role and potential of wild, under-utilized and neglected species and products;

(b) The role of genetic diversity in providing resilience, reducing vulnerability, and enhancing adaptability of production systems to changing environments and needs;

(c) The synergies and interactions between different genetic resources (such as between crop, farm animal, fish and associated wildlife genetic resources);

(d) The role of pollinators, with particular reference to their economic benefits, and the effects of introduced species on indigenous pollinators and other aspects of biological diversity;

(e) The role of soil and other below-ground biodiversity in supporting agricultural production systems, especially in nutrient cycling;

(f) Pest and disease control mechanisms, including the role of natural enemies and other organisms at field and landscape levels, host plant resistance, and implications for agro-ecosystem management;

(g) On the wider ecosystem services provided by agricultural biodiversity (e.g. climatic regulation, hydrological cycle, and soil and water conservation;

(h) The role of different temporal and spatial patterns in mosaics of land use.

2.2. To identify and promote cost-effective practices and technologies, and related policy and incentive measures, that enhance the positive and mitigate the negative impacts of agriculture on biological diversity, productivity and capacity to sustain livelihoods through, inter alia:

(a) Comprehensive analyses in selected production systems of the costs and benefits of alternative management practices as identified from activity 2.1, and the valuation of the goods and services provided by agricultural biodiversity;

(b) Comprehensive analyses of the impacts of agricultural production on the environment and identification of ways to mitigate negative and promote positive impacts;

(c) Identification, at international and national levels, of appropriate marketing and trade policies, legal and economic measures, which support beneficial practices, for example:

(i) Promotion of neglected and under-utilized crops;

(ii) Measures to add value to products of production systems that sustain biodiversity, and to diversify market opportunities;

(iii) Access and benefit-sharing measures and intellectual property issues;

(iv) Economic incentives, including removal of perverse incentives; and

20/ See page 5 above.

Training and capacity-building in support of the above.

Ways and means

Case-studies will be carried out by national institutions, civil-society organizations, and research institutes, with support from international organizations for catalysing preparation of studies, mobilizing funds, disseminating results, and facilitating feedback and lessons learned to case-study providers and policy makers. New resources may be needed to promote such studies, to analyse the results and to provide necessary capacity-building and human resource development, especially at the inter-community or district level. Where a need is identified, for example, through lessons learned from earlier case-studies, coherent regional or global programmes of case-studies, or action research, will be promoted.

Timing of expected outputs

Thirty selected case-studies published, analysed and disseminated by 2005. The case-studies should be representative of regional issues and prioritize best practices and lessons learned that can be broadly applied.

Programme element 3. Promoting the participation and strengthening capacities of farmers and other stakeholders in the sustainable management of agricultural biodiversity

Operational objective

To strengthen the capacities of farmers, their communities, and other stakeholders, to manage agricultural biodiversity so as to increase their benefits, and promote awareness and responsible action by producer organizations and agro-enterprises.

Rationale

The management of agricultural biodiversity involves many stakeholders and often implies transfers of costs and benefits between stakeholder groups. It is therefore essential that mechanisms be developed not only to consult stakeholder groups, but also to facilitate their genuine participation in decision making and in the sharing of benefits.

The sustainable management of agricultural biodiversity by farmers and their communities, in particular, is a prerequisite to achieving sustainable increases in food and livelihood security and to protecting natural resources. Decision III/11, paragraph 17 (c), of the Conference of the Parties encourages Parties to promote the "mobilization of farming communities, including indigenous and local communities for the development, maintenance and use of their knowledge and practices in the conservation and sustainable use of biological diversity in the agricultural sector". By paragraph 15 of the same decision, countries are encouraged "to set up and maintain local level forums for farmers, researchers, extension workers and other stakeholders to evolve genuine partnerships". "Farmer field schools" have been successful in promoting integrated pest management by strengthening the capacity of farmers to manage plant pest and predator populations in the crop ecosystem. Participatory breeding and selection strategies for agricultural crops had been successful in identifying seeds and planting materials adapted to local conditions and circumstances. There is a largely unrealized potential to apply similar approaches to improve the management of other aspects of "functional biodiversity", which would also allow communities to exercise effective demand for biodiversity-related technologies and services.

Farmer groups, and other producer organizations, can be instrumental in furthering the interests of farmers in optimizing sustainable, diversified, production systems and consequently in promoting responsible actions concerning the conservation and sustainable use of agricultural biodiversity. Consumer organizations are also increasingly influential in this regard.

Activities

3.1. Promote enhanced capacities to manage agricultural biodiversity by farmers and local communities through, inter alia, the provision of local-level forums that enable farmers and communities to exercise effective demand for biodiversity-related services and technologies, including training and non-formal adult education programmes, drawing upon local knowledge, innovations and practices.

3.2. Provide opportunities for farmers and local communities, and other stakeholder groups, to participate in the development and implementation of national strategies, plans and programmes for agricultural biodiversity, through decentralized policies and plans, and local government structures.

3.3. Identify and promote possible improvements in the policy environment, including benefit-sharing arrangements and incentive measures, to support local-level management of agricultural biodiversity.

3.4 Promote awareness about the value and functions of agricultural biodiversity for sustainable productivity amongst producer organizations, agricultural cooperatives and enterprises, and consumers, with a view to promoting responsible practices.

Ways and means

This programme element is to be implemented primarily through initiatives within countries, including through extension services, local government, educational and civil-society organizations, including farmer/producer and consumer organizations and mechanisms emphasizing farmer-farmer exchange. This programme element would engage the widest possible range of civil-society organizations, including those not normally linked to biodiversity initiatives.

Funding is likely to be on a project or programme basis from bilateral and multilateral donors. Catalytic support may be provided through national, regional and global programmes, organizations, facilities and funding mechanisms, in particular to support capacity-building, exchange and feedback of policy and market information, and of lessons learned from this and programme element 2, between local organizations and policy makers, nationally, regionally and globally.

Timing of expected outputs

Progressive establishment of local-level forums, with a coverage target of at least 1000 communities by 2010.

Examples at country level of operational mechanisms for participation by a wide range of stakeholder groups including civil-society organizations, by 2002.

Involvement of farmers and local communities in the majority of national programmes by 2010.

Programme element 4. Support to coordinated and integrated national policies, strategies, programmes and action plans

Operational objective

To support the development of national plans and strategies for the conservation and sustainable use of agricultural biodiversity and to promote their integration in sectoral and cross-sectoral plans and programmes.

Rationale

Many countries are now developing biodiversity strategies and action plans in the context of the Convention, and many also have a number of other policies, strategies and plans related to agriculture,

the environment and national development. 21/ Moreover, countries have agreed on global action plans for major components of biological diversity, such as plant genetic resources for food and agriculture, and, in Agenda 21 and the World Food Summit Plan of Action, on plans for sustainable development and food security in general.

There is clearly a need to mainstream the action plans for components of agricultural biodiversity in sectoral development plans concerned with food, agriculture, forestry and fisheries, and to promote synergy and avoid duplication between the plans for the various components. Together with other thematic programmes of work, this could contribute to the integration of biodiversity considerations in national plans.

Development and implementation of action plans requires reliable and accessible information, but many countries do not have well developed information, communication or early warning systems or the capacity to respond to identified threats.

Activities

4.1. Support the institutional framework and policy and planning mechanisms for the mainstreaming of agricultural biodiversity in agricultural strategy and action plans, and its integration into wider strategies and plans for biological diversity, through:

(a) Support for institutions in the conduct of national assessments on the status and trends of agricultural biodiversity within the context of ongoing biodiversity and sectoral assessments;

(b) Development of policy and planning guidelines, and training materials, and support for capacity-building initiatives at policy, technical and local levels in agricultural and environmental for the development, implementation, monitoring and evaluation of policies, programmes and actions for the conservation and sustainable use of agricultural biodiversity; and

(c) Improved consultation, coordination, and information sharing within countries among respective focal points and lead institutions, relevant technical committees and co-ordinating bodies, to promote synergy in the implementation of agreed plans of action and between ongoing assessments and intergovernmental processes.

4.2. Support the development or adaptation of relevant systems of information, early warning and communication to enable effective assessment of the state of agricultural biodiversity and threats to it, in support of national strategies and action plans, and of appropriate response mechanisms.

Ways and means

Activities are to be implemented primarily at national level through enhanced communication, coordination mechanisms and planning processes that involve all stakeholder groups, facilitated by international organizations, and by funding mechanisms.

This programme element should draw upon the experience of ongoing programmes (such as UNEP' s support to national biodiversity strategies and action plans) and a critical analysis of existing practice.

National, regional and international projects and programmes that address policy and institutional development within specific sectors, should make provision, as appropriate, for integration across sectors. Similarly, the development of guidelines should be carried out within the context of the objectives of this programme element.

21/ These include agricultural sector plans, national environment action plans, national sustainable development strategies, national forestry action plans, World Bank plans for structural adjustment, etc.

Additional resources may be needed to further develop or adapt early warning systems, including the capacity to identify thresholds and action needed, and for pilot examples of effective and sustainable response mechanisms to address threats at local, national and supra-national levels

Timing of expected outputs

Progressively increased capacity at national level for information management, assessment and communication. Over 100 countries to participate in various assessments under activities 1.1 and 1.2 by 2005.

Coordination between sectoral assessments and plans of action at national level in the majority of countries by 2005.

Range of guidelines published at the international level (on topics to be determined according to needs at national and regional levels).
