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AGRICULTURAL BIODIVERSITY

Progress report on the implementation of the programme of work, including development of the International Pollinators Initiative

THE INTERNATIONAL INITIATIVE FOR THE CONSERVATION AND SUSTAINABLE USE OF POLLINATORS: A PROPOSAL FOR A PLAN OF ACTION

I. CONTEXT

1. Pollination is an essential ecosystem service that depends to a large extent on symbiosis between species, the pollinated and the pollinator. In many cases, it is the result of intricate relationships between plant and animal, and the reduction and loss of either will affect the survival of both parties. Not all plants depend on animals for pollination. Many plants are wind pollinated, like grasses which form the predominant ground-cover of many ecosystems. Similarly, in agriculture most stable foods are wind pollinated. However, at least one-third of the world's agricultural crops depends upon pollination provided by insects and other animals. Diversity among species, including agricultural crops, depends on animal pollination. Therefore pollinators are essential for diversity in diet and for the maintenance of natural resources. The assumption that pollination is a "free ecological service" is erroneous. It requires resources, such as refuges of pristine natural vegetation. Where these are reduced or lost they become limiting and adaptive management practices are required to sustain livelihoods.

2. In fact, throughout the world, agricultural production and agro-ecosystem diversity are threatened by declining populations of pollinators. The major contributors to this decline in pollinator populations are, *inter alia*, habitat fragmentation, agricultural and industrial chemicals, parasites and diseases, and the introduction of alien species.

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3. There are over 25,000 different species of bees, which differ tremendously in size, and diverge accordingly in the plants they visit and pollinate. Both the diversity of wild plants and the variability of food crops depend on this diversity. Though bees form the most important group of pollinators, other insects such as bats, butterflies and moths, flies and beetles also contribute. Some plants are visited by many different pollinators, while others have specific requirements. The same applies to the pollinators, some being generalists and others specialists. Therefore, pollination as a science requires detailed investigation, and the technological application of management practices is intricate. In most cases, there is a lack of knowledge about the exact relations between individual plant species and their pollinators, but studies in this field demonstrate that they are often quite specific.

4. In order to secure sustained pollinator services in agricultural ecosystems, far more understanding is needed of the multiple goods and services provided by pollinator diversity and the factors that influence their decline. It is necessary to identify adaptive management practices that minimise negative impacts by humans on pollinators, promote the conservation and diversity of native pollinators, and conserve and restore natural areas necessary to optimize pollinator services in agricultural systems.

5. Considering the urgent need to address the issue of worldwide decline of pollinator diversity, the Conference of the Parties to the Convention Biological Diversity established an International Initiative for the Conservation and Sustainable Use of Pollinators in 2000 (decision V/5, section II) and requested the development of a plan of action. The following proposal for a plan of action was prepared by the Food and Agriculture Organization of the United Nations (FAO), consistent with paragraph 16 of decision V/15.

II. OBJECTIVES AND APPROACH

6. The aim of the International Initiative for the Conservation and Sustainable Use of Pollinators is to promote coordinated action worldwide to:

(a) Monitor pollinator decline, its causes and its impact on pollination services;

(b) Address the lack of taxonomic information on pollinators;

(c) Assess the economic value of pollination and the economic impact of the decline of pollination services; and

(d) Promote the conservation and the restoration and sustainable use of pollinator diversity in agriculture and related ecosystems;

7. The Initiative is to be implemented as a cross-cutting initiative within the programme of work on agricultural biodiversity.

III. ELEMENTS OF THE PLAN

A. Element 1. Assessment

Operational objective

8. To provide a comprehensive analysis of status and trends of the world's pollinator diversity and of their underlying causes of its decline (including a focus on the goods and services provided by pollinator diversity), as well of local knowledge of its management. The result of the assessments will determine the further activities that are required.

Rationale

9. A number of scientific studies and various separate records strongly suggest that the numbers of crop pollinators are declining in many parts of the world. The yields of some crops are diminishing as a result of insufficient pollinators and many specialists, agronomists and fruit growers are concerned about the sharp declines in the numbers of bees in recent years. However, the scarcity of sound data remains a major limiting factor in presenting a strong case for the conservation of pollinator populations, and there is a need for convincing evidence to implement the required policy changes.

10. Similarly, a realistic evaluation of the economic value of animal-effected pollination is essential for the efficient planning of the world's agriculture. Existing estimates are contentious. The description and evaluation, in economic terms, of pollinator contributions to agriculture and environmental diversity will improve informed decision making at farm, regional, national and international levels.

11. In addition to the "taxonomic impediment" (see element 3), there is also a global "taxonomic deficit," that is, the unacceptably high numbers of bee genera for which identification keys are not available.

Activities

1.1 Monitor the status and trends of pollinators, through:

(a) The establishment of a global network of cooperators to monitor changes in the diversity, population levels and frequency of pollinators through time in selected areas of the world. The network would share findings and discuss local and global trends in pollinators;

(b) The implementation of a pilot global monitoring programme in selected areas worldwide;

(c) The development, assessment and compilation of methods for monitoring pollinators, their diversity and efficiency;

(d) The progressive development and implementation of a global programme for monitoring pollinator diversity, building upon activities (a), (b) and (c).

1.2 Assess the economic value of pollinators, including evaluation, in economic terms, of different crop-pollinator-pollination systems for optimal use of pollinators in sustainable agricultural systems, through economic analysis of data from various crop-pollinator-pollination systems, including those provided through case studies under element 2.

1.3 Assess the state of scientific and indigenous knowledge on pollinator conservation, in order to identify gaps in knowledge and opportunities for application of knowledge; including:

(a) Taxonomic knowledge; and

(b) The knowledge, innovations and practices of farmers and indigenous and local communities in sustaining pollinator diversity and agro-ecosystem services for and in support of food production and food security.

1.4 Promote the development of identification keys for bee genera.

Ways and means

12. Exchange and use of experiences, information and findings from the assessments shall be facilitated by Parties, Governments and networks with consultation between countries and institutions, including the use of existing networks. Capacity-building activities from programme element 3 will assist

countries in contributing to the assessment process. Case studies, carried out under programme element 2, will also assist the assessment process by highlighting and examining important issues in pollinator conservation and sustainable use and in some cases providing data.

13. The global monitoring programme of pollinators could be carried out in two stages. A first stage would include activities 1.1 (a), (b), and (c), and 1.4. A second stage would apply the findings of the first stage at a larger and representative number of field sites throughout the world in order to collect the data needed to detect changes in diversity and frequency of pollinators, especially of bee species. The project cannot be contemplated without the active participation of many nations, institutions and co-operators. Substantial additional financial resources would be required, especially for the second stage. Mechanisms will need to be put in place to ensure the continuity and sustainability of monitoring over the long term.

Timing of expected outputs

14. The first stage of the global programme for monitoring of pollinator diversity should be completed by 2005. The second stage would be conducted for an initial period of five years (2006 – 2010) and then, depending on the progress made, renewed for a further five years at a time thereafter. Important and significant trends are likely to emerge only after several years (5-10) of monitoring.

15. A preliminary report on the state of the world's pollinators would be prepared by 2004 based on existing data, and early results from elements 1 and 2. A first comprehensive report would be prepared by 2010, drawing upon, *inter alia*, the results of the monitoring programme, and the economic analyses.

B. Element 2. Adaptive management

Operational objective

16. To identify management practices, technologies and policies that promote the positive and mitigate the negative impacts of agriculture on pollinator diversity, in order to enhance productivity and the capacity to sustain livelihoods, by expanding knowledge, understanding and awareness of the multiple goods and services provided by pollinators.

Rationale

17. In order to secure sustained pollinator services in agricultural ecosystems, far more understanding is needed of the multiple goods and services provided by pollinator diversity and the factors that influence their decline. In particular, it is necessary to identify the various interactions between dimensions of agricultural biodiversity at different spatial scales that support effective pollinator functioning. In addition, it is necessary to identify adaptive management practices that minimise negative impacts by humans on pollinators, promote the conservation and diversity of native pollinators, and conserve and restore natural areas necessary to optimise pollinator services in agricultural systems.

Activities

2.1. 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 pollinator diversity, the role of components of biological diversity in agricultural ecosystems in supporting such diversity, and threats to such diversity including, for example, use of pesticides, habitat change and the introduction of exotic pollinators;

(b) To identify best management practices; and

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

18. This activity would address the multiple goods and services provided by pollinator diversity and the interaction between its various components, for example:

(a) The impacts of introduction of pollinators;

(b) The impacts of fragmentation and habitat loss on pollinators diversity;

(c) The impact of pesticides on pollinators diversity;

(d) Sustainable management of pollinators;

(e) Honeybee decline;

(f) Pollinators diversity decline;

(g) Conservation and restoration of pollinators diversity;

(h) Mainstreaming and stakeholder engagement;

(i) Economics of pollination.

2.2. Identify and promote the dissemination of information on cost-effective practices and technologies, and related policy and incentive measures that enhance the positive and mitigate the negative impacts of agriculture on pollinator diversity, productivity and capacity to sustain livelihoods, through:

(a) Comprehensive analyses in selected production systems of the costs and benefits of alternative management practices and technologies on pollinator conservation and effectiveness, and the valuation of the goods and services provided by pollinator diversity including the pollination requirements and best pollinators of each crop species and the impact of pollinator presence/absence on fruit and seed yield;

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

(c) Identification, at international and national levels, in close collaboration with relevant international organizations, of appropriate marketing and trade policies, legal and economic measures which may support beneficial practices. This may include certification practices and the development of codes of conduct.

2.3. Promote methods of sustainable agriculture that employ management practices, technologies and policies that promote the positive and mitigate the negative impacts of agriculture on pollinator diversity. This could include, for example, the protection of natural habitats, within agricultural landscapes, as sources of wild pollinators for crop improvement; the development of guidelines for policy makers and farmers; and the development of model-testing protocols for the introduction of non-native pollinators and to assess impacts of agrochemicals on pollinators.

Ways and means

19. Case-studies will be carried out and provided 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. Inputs would be sought from all relevant stakeholders. A framework for the case-studies is provided by the indicative outline for case studies on agricultural biological diversity http://www.biodiv.org/thematic/agro

Timing of expected outputs

20. A first set of case-studies is already under preparation. Further case studies would be 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.

C. Element 3. Capacity-building

Operational objective

21. To strengthen the capacities of farmers, indigenous and local communities, and their organizations and other stakeholders, to manage pollinator diversity so as to increase its benefits, and to promote awareness and responsible action.

Rationale

22. The management of pollinator diversity 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. 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 pollinator diversity.

23. One major area which needs addressing is the capacity of countries to address the Taxonomic Impediment, which derives from serious shortfalls in investment in training, research and collections management. It seriously limits our capability to assess and monitor pollinator decline globally, in order to conserve pollinator diversity and to manage it sustainably. The global Taxonomic Impediment is costly, especially when expressed in terms of those research initiatives in pollination and conservation ecology which are wholly dependent on access to sound bee taxonomy and are rendered wholly non-viable in its absence. There is also a global Taxonomic Deficit, that is, the unacceptably high numbers of bee genera for which identification keys are not available.

Activities

3.1. Promote awareness about the value of pollinator diversity and the multiple goods and services it provides for sustainable productivity, amongst producer organizations, agricultural cooperatives and enterprises, and consumers, with a view to promoting responsible practices.

3.2 Identify and promote possible improvements in the policy environment, including benefit-sharing arrangements and incentive measures, to support local-level management of pollinators and related dimensions of biodiversity in agricultural ecosystems. This could include consideration of how existing or new certification schemes might contribute to the conservation and sustainable use of pollinator diversity.

3.3. Promote enhanced capabilities to manage pollinator diversity at local level by promoting partnerships among and between farmers, researchers, extension workers and food processors, inter alia, through the establishment of local-level forums for farmers, and other stakeholders to evolve genuine partnerships, including training and education programmes.

3.4 Build taxonomic capacity to carry out inventories of the pollinator diversity and distribution in order to optimise their management, through, inter alia the training of taxonomists and parataxonomists of bees and other pollinators.

3.5 Develop tools and mechanisms for the international and regional exchange of information for the conservation, restoration and sustainable use of pollinators. This may include:

(a) Establishing an inventory of existing pollination and pollinators experts to serve as a pool for consultations in technology transfer, and establish an international advisory group on pollinator conservation.

(b) Disseminating information on pollination in agricultural environments through databases, websites, and networks. This may include the establishment of an international information network on pollinator conservation and promotion of networks of farmers and farmers' organizations at regional level for exchange of information and experiences.

(c) Developing and updating global and national lists of threatened pollinator species, and produce multilingual manuals on pollinator conservation and restoration for farmers.

Ways and means

24. This 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. There are opportunities for cooperation with the food processing industry in terms of supplying pesticide-free or low-residue products from agricultural systems that maintain pollinator diversity. Pilot projects for this element might be generated under the Initiative. Funding is likely to be on a project or programme basis. Catalytic support may need to 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.

25. The taxonomic elements would also be promoted through the Global Taxonomy Initiative.

Timing of expected outputs

26. Ten on-the-ground cases of enhanced partnerships resulting in greater conservation of pollinator diversity at the local level, by 2006. Introduction of mechanisms promoting pollinator diversity by 2010.

D. Element 4. Mainstreaming

Operational objective

27. To support the development of national plans or strategies for the conservation and sustainable use of pollinator diversity and to promote their mainstreaming and integration in sectoral and cross-sectoral plans and programmes.

Rationale

28. Many countries are now developing biodiversity strategies and action plans in the context of the Convention on Biological Diversity, and many also have a number of other policies, strategies and plans related to agriculture, the environment and national development. Decision V/5 of the Conference of Parties to the Convention on Biological Diversity seeks to promote the mainstreaming of agricultural biodiversity considerations into national strategies and action plans; 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. Pollinator conservation and sustainable use is an important aspect of agricultural biodiversity and should be integrated into this mainstreaming process. In addition, this 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. Integrate considerations of pollinator diversity, and related dimensions of agricultural biodiversity, including host plant diversity, at species, ecosystem and landscape levels, consistent with the ecosystem approach, into biodiversity strategies and action plans, and into planning processes in the agricultural sector.

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

4.3 Strengthen national institutions to support taxonomy of bees and other pollinators, through, *inter alia*:

(a) Assessing national taxonomic needs (this would contribute to activity 1.3);

(b) Maintaining continuity of taxonomic and reference collections of bees;

(c) Recognition of centres of excellence in bee taxonomy and establishment of centres of excellence as appropriate;

(d) Repatriation of data through capacity-building and benefit-sharing.

4.4 Include considerations of pollinator diversity, and related dimensions of agricultural biodiversity, including host plant diversity, at species, ecosystem and landscape levels, consistent with the ecosystem approach, in formal educational programmes at all levels. Integrate pollination issues as a component of sustainable management into agricultural, biological and environmental science courses and curricula and in primary and secondary schools by using local examples and relevant examples

from other regions. Promote applied research on pollination in agricultural ecosystems through training of post-graduates.

Ways and means

29. Activities would 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.

30. Additional resources may be needed for national capacity-building.

31. The taxonomic elements would also be promoted through the Global Taxonomy Initiative.

Timing of expected outputs

32. Progressively increased capacity at national level for taxonomy, information management, assessment and communication.

33. Consideration of pollinators and related dimensions of agricultural biodiversity incorporated into national biodiversity and/or agricultural sector plans in 50 countries by 2010.
