



CBD



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Second Meeting
Montreal, 2 to 6 September 1996

**SUBMISSION BY THE GOVERNMENT OF SWEDEN
ON BIODIVERSITY AND SUSTAINABLE AGRICULTURE**

(Submission has been reproduced as received by the Secretariat)



Swedish Scientific Council
on Biological Diversity

Summary of Conclusions and Recommendations from a Workshop of International Experts on Biodiversity and Sustainable Agriculture

Ekenäs, Sweden 14-17 August 1996

The Convention on Biological Diversity should consider Agricultural Biodiversity as a key focal area. The Third Conference of the Parties should establish a Three -Year Global Program of Action, the Buenos Aires Mandate, on Agricultural Biodiversity.

Modern industrialised agriculture, including the Green Revolution, has achieved major cereal production gains but at the costs of shaping mostly uniform environments using a limited number of widely adapted crop varieties demanding high inputs. This technological approach, the agroindustrial paradigm, is creating a multitude of environmental problems. The adverse off-site effects of industrial agriculture include degradation of habitats by destruction of biotic and abiotic resources as well as threats to the natural resource base to agriculture, and socio-economic problems created by destruction of the local resource basis.

Biological diversity has not been adequately considered neither on the ecosystem level, nor on the species and the genetic levels. It is generally acknowledged that soil, plant, and animal biodiversity has been substantially reduced. Not only habitats, species and genes are being lost, but equally important knowledge in farming communities about their cultivars, environments, and management strategies including traditional and indigenous knowledge. Scientists are increasingly recognizing the values of biological diversity and local knowledge, for the integrity and functions of agroecosystems. The inseparable links between 1) the use of wild and domestic biodiversity at all levels - ecosystems, species and genes, 2) local knowledge, and 3) sustainable high-yielding agricultural production must be understood.

It should be stressed that the current technological approach to agroecosystem management and food production has had an extremely short duration, approx. 50 years. The already documented adverse environmental effects, and the emerging threats to the natural resource base of agriculture offer no assurance for sustainability. The history of agriculture is over 10.000 years. The time perspectives for sustainability of agricultural ecosystems must be of a similar dimension.

Current technological agrosocieties support the technical change paradigm dominated by the effort to modify micro-environments through the high use of extensive use of inputs in order to fit genetically similar but high-yielding cultivars. They are not sufficiently aware of how farmers view their natural environments in both time and space, how they fit adapted genetic resources and cultural practices to diverse ecosystems to obtain sustainability in food production. As a result many new technical interventions relate poorly to farmers' objectives and resources, and fit poorly into their agroecosystems.

The biotic component of the soil resources is still poorly known. Erosion of diversity in domesticated species, is accompanied by a related loss of biological diversity in

agricultural soils. Increasingly, agricultural systems are losing their diversity. Their nutrient cycling is seriously disrupted. Soil fertility is undermined and the result is productivity losses. One of the main reasons for decline in soil biological diversity is the management practices of industrial agriculture.

This general situation differs in nature and degree in the varying historical, agricultural, economic, and cultural settings of Europe, industrializing and agrarian Asia, Africa and the Americas. The fundamental problem, nevertheless, of inadequate articulation between the perspectives of farmers' communities and those of the modern scientific and policy communities was recognized throughout.

Actual and potential knowledge about local agroecosystems generated by farmer communities is a key to optimizing the management of those agroecosystems. This knowledge needs to be maintained as an active management process in local communities, as well as being documented for further use.

Much of the agricultural production, agricultural practices and not least the local breeding activities are performed and maintained by women in local societies. The role of women for maintaining those skills and knowledges is of paramount importance.

The major challenge facing us today is to establish an alternative, **Biodiversity Paradigm** based on the following two major elements:

- 1) change the current agro-technological approach of ecosystem uniformity into production practices based on local biotic and abiotic conditions;
- 2) maintain and mobilise local knowledge of farmers and of farmers communities in food production in order to identify, maintain, develop and use sustainably the components of biological diversity in agricultural ecosystems.

The constraints to meeting this challenge are not only technical but also of a policy nature.

This expert consultative workshop proposes two principles for future thinking on biodiversity and sustainable agriculture; the agroecosystem principle, the local community empowerment and farmers participation principle.

I. Agroecosystem Principle:

Agricultural and natural ecosystems have in practice to a large extent become separated. There exists a gradient between agroecosystems and systems less influenced by human activities, as well as between domesticated and wild species. Agroecosystems must be allowed to evolve, and future evolutionary capacity depends crucially on both local knowledge and biological diversity being sustained.

Current practices for the exchange and utilization of genetic resources are leading to a reduced genetic variability of domesticated species. The sustainable use of more diverse, adapted and productive genetic resources should be promoted in the spirit of the **Biodiversity Paradigm** for the development of sustainable agroecosystems, integrated resource management and future food security. Decisive actions to implement the Leipzig Global Plan of Action for the conservation and sustainable use of Plant Genetic Resources for food and agriculture, is of crucial importance. Also implementation of a Global Strategy for the Management of Farm Animal Genetic Resources is of importance.

Rapid erosion of both cultural- and biological diversity poses a long term threat to human food security, even if there is in the near to medium term no global problem of food supply. However, agroecosystems which presently are highly productive, with strongly reduced biological diversity, and other low to medium input systems to which high input unadapted genetic resources have been rapidly introduced, may not be sustainable. Conversely, for some people and some areas agriculture has not developed the potential to deliver income, employment and food security. For these people and areas, the lack of productivity in agriculture also is associated with degradation of biodiversity.

The globalisation of markets and the standardisation associated with commercial processing industries contribute to the erosion of local biodiversity. Urbanisation is contributing to the erosion of cultural diversity and creating human societies separated from direct experience of agroecosystems and the understanding of the relationships between food production and environmental resources, including biological resources.

Recommendations:

1. Develop integrated resource management (IRM) to achieve sustainable high-yielding agroecosystems. IRM comprises the strategies of adapted genetic resources and of lower external input and sustainable agriculture (LEISA), integrated farming systems, and organic farming, in ways that foster improved productivity and the ability to meet human needs as well as the conservation and sustainable use of the natural resources base for soils, water resources and biological diversity. The following elements should be highlighted and integrated:

- Participatory land use planning where landscape ecological dimensions should be focused.
- Sustainable management of the soil ecosystems including their biological diversity.
- Integrated Plant Nutrition Management and Integrated Pest Management (IPM) with an emphasis on nutrient recirculation at the agroecosystem level, including crop rotation and inter-cropping.
- Promote intergration of sustainable agriculture and aquaculture.
- Promote interaction between rural and urban areas in terms of recirculation of nutrients within the framework of the development of ecocycle societies.

2. Promote sustainable use of more diverse and productive agro-genetic resources:

- Communicate the central importance of basing sustainable agricultural development on locally adapted genetic resources.
- Promote farmers' needs and rights to exchange, select, breed, use, and sell local varieties
- Allow and encourage pluralism and flexibility in seed regulatory frameworks to permit farmers active involvement in exchange, selection, breeding, use and sale. Support and promote the exchange of germplasm among farming communities.
- Promote the characterization of genetic resources and of agro-ecosystems to understand development paths and improve the measure to improve sustainability.

- Promote participatory selection of varieties with the full involvement of breeders, farmers and extensionists in order to promote the rapid and targeted dissemination of genetic materials and to increase the motivation of extension field staff.
- Re-examine national seed release regulations and, when necessary, modify them so as to:
 - i) permit multiplication and dissemination of segregating plant populations to allow further developments in farmers fields;
 - ii) revise varietal release criteria to include information from farmer assessments
 - iii) remove criteria which require broad geographical adaptability at the expense fitting into local ecological conditions so as to ensure the release of material with superior performance in specific environments.
- Promote unrestrained availability of germplasms of crucial importance to food security to bona fide users including farmers for research and development purposes.
- Urgently develop and conclude international agreements for the exchange of genetic resources for food and agriculture, in accordance with the Convention on Biological Diversity, in order to encourage a broader exchange of genetic resources.
- Encourage the development of national programmes to commit resources towards the integration of in-situ, on-farm and ex-situ conservation activities.
- Support farmers' efforts to establish networks for the on-farm conservation of genetic resources. Such support should facilitate communication and linkages with ex-situ conservation systems, re-introduction of material as necessary, and development of locally adapted genetic resources, and creation of working linkages with participatory selection breeding activities
- Promote the establishment of genetic in-situ reserves for relatives of domesticated species threatened with extinction.
- Integration will involve the two-way exchange of materials as well as information on germplasm characters and seed technologies adapted to local requirements.
- Public institutions must promote and continue to conduct and fund breeding activities, in particular efforts to broaden the genetic base of breeding material, to provide a counter balance to the growing power of private sector firms and to ensure that social goods continue to be provided.
- Identify gaps in current collaboration for the conservation and utilization of genetic resources and promote collaboration where significant gaps occur. Priority should be given to species, breeds and varieties which have a wide geographical distribution, which reflect a high level of germplasm interdependence and which have global significance as food staples.
- Actively implement the Leipzig Global Plan of Action with an emphasis on action to promote farmers participation, the development of the rights of farmers, the creation of national integrated programs for in-situ, on farm and ex-situ conservation of plant genetic resources for food and agriculture and action to broaden the genetic base of breeding material.
- Promote the implementation of the country based Global Strategy of the Management of Farm Animal Genetic Resources.

- Invite the FAO to speed up the negotiations on the harmonization of the International Undertaking on Plant Genetic Resources with the Convention on Biological Diversity, and in that context to promote the realisation of Farmers' Rights and address the issue of collections of plant genetic resources acquired before the entry into force of the Convention on Biological Diversity.

3. Other activities in support of the Agroecosystem Principle:

- Promote public awareness of cultural and biological diversity as essential for sustaining food supplies and productive agriculture.

- Document, acknowledge, and provide open access to knowledge about existing agroecosystems, technologies, and practices, while ensuring fair and equitable sharing of the benefits derived from use of such knowledge.

- Analysis of risks and benefits of changes of agricultural practices should form components of Environmental Impact Assessment Analysis. Both spatial and temporal time scales should be addressed.

- Encourage research and technologies in food processing that would promote a broader utilisation of crops of low commercial interest.

- Support as a matter of urgency the development of tools and procedures for monitoring, and indicators of agroecosystem sustainability, in collaboration with farmers and other resource users.

- Promote a wide range of rural activities to generate employment and incomes, particularly when these may be valuable complements to agricultural production as such.

H. Local Community Empowerment Principle:

It is increasingly being acknowledged that the skills and practices farmers use in maintaining diversity in their fields and pastures, particularly outside conventional high input farming, is essential for agricultural sustainability and maintenance of biological diversity. These knowledge systems are not sufficiently documented and understood by the scientific community.

There is limited experience of pooling farmers' and scientists' knowledge and skills through collaboration in the development of new knowledge, technologies and practices. Recent initiatives demonstrate that the potential and the pay-off of participatory plant and animal breeding are considerable and merit further exploration and investment. Analogous examples in recent participatory agricultural science demands a shift towards the *Biodiversity Paradigm*.

This shift will empower farmers to solve specific community-identified problems, energize scientists and extension staff through more stimulating relationships with farmers' communities, and open significant opportunities for sustainable food production based on local community empowerment and the sustainable use of biological resources.

Recommendations:

1. Promote greater and earlier farmer involvement in defining research priorities, approaches and evaluation of research for sustainable agriculture. To achieve this, forums could be set up and maintained for farmers, researchers, and extension workers to meet, discuss, debate on a "level playing field" that creates an atmosphere for the two-way flow of information and promotes a dynamic and truly participatory process.
2. Promote interaction and exchange of experience between farmers, researchers and extension staff to facilitate more rapid and widespread adoption of productivity-enhancing resource-conserving practices
3. Support further exploration and development of the contribution of Farmer-Scientist collaboration in plant and animal selection and breeding, and in community- and farm-level curatorship of genetic resources and agricultural landscapes. Support farmer-to-farmer exchange of information and genetic material.
4. Promote institutional changes to allow pluralism in the provision of services to farmers and decentralisation of public extension and development services. Support mechanisms which increase the accountability of extension and development service providers to farmers.
5. Introduce policies to foster sustainable and productive use of common property resources taking into account the need for positive socio-economic incentives, and policies that govern common property management (community grasslands, forests, groundwater reserves etc.) can be particularly useful in instances where collective action is needed to achieve sustainable resource use.
6. Promote policies on land tenure encouraging sustainable land use, and policies that govern the relationship among land owners and tenants, where tenancy or access relationships discourage productive and sustainable land use.
7. Promote farmers', farm workers', as well as other non-governmental organizations such as environmental groups, in policy making at national levels.

Conclusions

FAO, CGIAR, UNESCO, UNDP, the World Bank and other relevant governmental organisations should be invited to assist the Convention on Biological Diversity in supporting efforts by the parties to develop major elements of the *Biodiversity Paradigm* for food security and sustainable agriculture. Special emphasis should be put on management related research and development of intergrated resource management practises and technologies in accordance with the Agroecosystem Principle. Gaps in knowledge should be identified and action suggested for filling these gaps. Active participation of farmers, including women farmers, indigenous and local communities embodying traditional life styles, farmers' and farm workers organisations, as well as other relevant non-governmental organisations should be a hallmark for all programs and projects in support of the development of the *Biodiversity Paradigm*, thus implementing the local communities empowerment and farmers' participation principle.

The Clearing House Mechanism of the Convention, assisted by an advisory body of active partners, should be mobilized to promote technical and scientific cooperation on development and transfer of new and adapted technologies based on the application of the Agroecosystem Principle and the Local communities and farmers participation principle.

A Buenos Aires Mandate on Agricultural Biodiversity and the Three-Year Global Program of Action should be submitted to the Interim financial mechanism of the CBD as policy guidance in the field of agricultural biological diversity.

The Leipzig Global Plan of Action should form an integrated part of a Buenos Aires Mandate. Support of its implementation from the Interim Financial Mechanism of the Convention should be guided by the priorities introduced in the Mandate.



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