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COMPILATION OF NATIONAL CONTRIBUTIONS ON AGRICULTURAL BIOLOGICAL DIVERSITY

Introduction

1. In its Decision III/11, conservation and sustainable use of agricultural biological diversity, the Conference of the Parties requested the Executive Secretary to report the results of the initiatives undertaken by Parties, in line with paragraphs 1-6 of the decision, together with advice from the Subsidiary Body of Scientific, Technical and Technological Advice (SBSTTA) as a basis for the Conference of the Parties (COP) to set priorities for further work within the programme of work on agricultural biodiversity (paragraph 7). Accordingly, the Executive Secretary on 4 February 1997 invited Parties to report on their identification and assessment of relevant ongoing activities and existing instruments and on their identification of issues and priorities that need to be addressed at the national level, taking into consideration the thematic areas in Annex 2 of decision III/11.

2. Parties were also invited to conduct case studies on pollinators and soil micro-organisms in agriculture, the two initial issues identified by SBSTTA at its second meeting (decision III/11: paragraph 11 and Annex 3). The Conference of the Parties further instructed SBSTTA to coordinate and assess the lessons learned from work by Parties and by relevant international and regional organizations and bodies on pollinators and soil micro-organisms and to report back to the COP (decision III/11, paragraph 12).

3. This report provides an overview of the submissions received to date from Governments and Parties on agricultural biological diversity in response to Decision III/11. Attention is drawn to this information document under Item 6 of the Provisional Agenda of the Third Meeting of SBSTTA.

4. Submissions on agricultural biological diversity have been received to date from the following Governments:

- Canada 3 May 1997
- Latvia 6 May 1997
- United States of America: 2 June 1997
- Greece 10 June 1997
- Thailand 12 June 1997
- Venezuela 28 July 1997
- Republic of Belarus 1 August 1997
- Norway 28 August 1997 (attached as Annex 2)

5. In addition, in its national report on biological diversity (November 1996) the Government of the Netherlands outlines elements of its policy on agricultural biodiversity which is also referred to in this document. Furthermore, the Government of Morocco provided, on 23 May 1997, an extensive case study resulting from a project financed by UNDP/GEF on the Conservation and Sustainable Utilisation of Plant Genetic Resources Diversity in the Maghreb region, which responds to decision III/11, as well as, decisions III/9, III/12, III,14 and III/18[1]. On the basis of three sectoral studies on the conservation and sustainable use of cultivated plants, forest genetic diversity and native flora, rangelands and pasture plants, as well as, thematic studies on legal and socio-economic issues concerning plant genetic resources and their conservation, the project proposed strategies and priorities, in particular vulnerable target species, and recommended a programme of actions and institutional arrangements specific to the three sub-sectors.

6. The country submissions on agricultural biological diversity are very varied in scope and coverage: some focus on certain components of agricultural biological diversity and illustrate ongoing projects and programmes, while others outline strategies and action plans including relevant instruments that are being developed in response to decisions III/11 and related decisions. The submissions by Latvia and by the United States provide a compilation, neither of which is intended to be exhaustive, of activities and issues covering all of the thematic areas listed in Appendix II of Decision III/11. The submission by Canada comprises an action plan for biodiversity prepared by the responsible department for agriculture and agri-food which addresses decision III/11 in a comprehensive manner.

7. In response to the request for case studies on the topics outlined in Annex 3 of decision III/11, the United States' Government has provided an extensive bibliography on pollinator biology, with over 270 articles, resulting from a literature survey. A synopsis of the findings of this survey, together with some introductory inputs by the Republic of Belarus, Latvia and Canada, is outlined in paragraphs 75-83 below. Other than this, research findings or case studies implemented in response to decision III/11 have not yet been provided on either pollinators or soil micro-organisms important to agriculture. Both , Belarus and Latvia indicate that they do not have funding to conduct work on these topics and Latvia has prepared project proposals for which it is soliciting support.

[1] Decisions III/9 Application of Articles 6 and 8 of the Convention; III/12 Development of a programme of work on forest biological diversity; III/14 Implementation of Article 8(j); and III/18 Incentive measures.

8. As soon as the Executive Secretary receives substantive inputs and case studies from Parties and Governments and from international and regional organisations and bodies, regarding the situation of pollinators and soil micro-organisms important to agriculture, the Convention's clearing-house mechanism will be used to make the findings available on these topics. Where Parties and Governments require support to assist them in the conduct of assessment and/or appropriate case studies, attention is drawn to the financial mechanisms that are in place for the Convention, in accordance with the guidance given in decision III/5.

9. Further suggestions from Parties are welcomed regarding possible mechanisms for coordinating and assessing the lessons learnt in the different regions with a view to reporting back substantively to the Conference of the Parties. In view of the status of this work which is ongoing, it is proposed that a systematic review of the findings be considered by the fourth meeting of the SBSTTA.

10. The overview of the scope and content of information provided by Parties and Governments on agricultural biological diversity has been organised into five parts with a view to facilitate its review and to assist other countries in preparing their submissions:

    I. Concepts and Challenges: outlines a number of key global issues raised;

    II Policies and Measures: presents a number of policy, legal and institutional instruments for addressing the conservation and sustainable use of agricultural biological diversity;

    III Partnerships and Responsibilities: highlights some general considerations raised by countries on this issue;

    IV Approaches and Activities for the Conservation and Sustainable Use of Agricultural Biodiversity, is divided into five sub-sections which address::

        (a.) conservation approaches:

        (b.) conservation and sustainable of ecosystems and landscapes;

        (c.) *in situ* conservation of animal, plant and microbial genetic resources;

        (d.) *ex situ* conservation of animal, plant and microbial genetic resources; and

        (e.) transformation of unsustainable agricultural practices into sustainable practices

    V Bibliography on Pollinator Diversity.

    The text is supported by two tables synthesising the country inputs: Table 1 presents "Issues and priorities identified which (a) threaten and (b) support agricultural biodiversity and ecosystems", and Table 2 presents "Examples of ongoing and planned national programmes and actions" with reference to relevant paragraphs of decision III/11 and to the thematic areas listed in its annexes.

I. Concepts and Challenges

11. The country submissions referred to the Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture to recall:

    <u>Why agricultural biodiversity is unique</u>:

    - unlike most natural resources, agricultural genetic resources require continuous, active human management; and,
    - the interdependence of countries is particularly high with respect to agricultural genetic resources.

    <u>Why biodiversity is important to agriculture</u>

- Wild species and obsolete crop cultivars and races of livestock provide a source of genetic resources- possessing desired genetic traits- that may be used in crop or livestock breeding programmes
- Soil micro-organisms such as arthropods, bacteria and fungi break down organic matter and minerals, making nutrients available in soil
- Wetlands help to protect groundwater reserves, and provide a measure of protection against drought, help control flooding and provide wildlife habitat
- Many species of insects are pollinators of crop plants, many species of insects, spiders and mites can be used in biological control as predators of agricultural pest, or as indicators of agro-ecosystem health
- Plants, including agricultural crops, act as a carbon sink, reducing levels of some greenhouse gases and regulating climate change.

12. The Government of Canada recognises that the agri-food sector is being re-shaped by significant changes in the global economy, trade agreements, technology, consumer preferences and fiscal pressures. At the same time, processes including global climate change and transnational environmental concerns, continue to present new challenges. Key challenges to the sector are:
    - working with the agri-food sector to maintain sustainable and diverse ecosystems;
    - improving the knowledge base and understanding of biodiversity;
    - ensuring that genetic resources exist for present and future uses in agriculture; and,
    - integrating biodiversity conservation and sustainable use into operations and decisions.

13. The Netherlands policy on agricultural biodiversity also takes into account the challenge of how to achieve a sustainable use of the cultural and natural inheritance at a time when gene erosion is proceeding at an alarming rate.

14. Latvia emphasizes that protection of existing biological diversity and the elaboration and implementation of sustainable development concepts today, will be far less costly than restoring degraded biotopes and populations of wild plants and animals in the future.

II. Policies and Measures

15. In its national report on biological diversity (November 1996), the Government of the Netherlands considers the conservation and sustainable use of agricultural biodiversity to be an integral part of the policy for sustainable agriculture and rural development (SARD). It also contributes to integrated land use planning as outlined in UNCED- Agenda 21. Its strategic action plan for biodiversity is a joint product of all concerned ministries[1] with the contribution of scientists, nature conservation and environmental organisations and the business community.

16. The Government of Thailand has planned for policies and measures to strengthen nature conservation, land reform, land use and farming systems which take into account land production capacity and the conservation of water and natural resources including biodiversity.

[1] Ministries of Agriculture, Nature Management and Fisheries, Housing, Spatial Planning and the Environment, Foreign Affairs/Development

17. The Republic of Belarus has included a number of measures aimed at biodiversity conservation in the agricultural sector:
    - annually, it develops a series of activities oriented to the prevention of erosion, which is considered one of the important steps in the conservation of biodiversity;
    - a special protecting regime has been established over lake and river protected sites for ensuring a favorable water regime and preventing water pollution;
    - different approaches for protecting agricultural plants against pests and insects are widely disseminated and used;
    - reclamation methods have been altered: drainage of unmanaged lands and clear-cutting of untouched forests are prohibited, only reconstruction of the existing reclamation systems is permitted for technological improvement using a two-way regulation of the water regime aimed at maintaining land moisture within improved areas at the optimal level.

18. The Canadian Government submission comprises an Action Plan for Biodiversity developed by the Department of Agriculture and Agri-Food Canada (AAFC) which presents biodiversity concepts, biodiversity issues in agriculture, context and challenges, a framework for AAFC actions, and a set of actions supported by appendices presenting, *inter alia*, highlights of the Canadian Biodiversity Strategy and examples of current AAFC biodiversity initiatives. It is a working plan that will be reviewed and updated every three years to reflect new developments in biodiversity conservation and sustainable agriculture. As the next step in developing a federal response, a document will be prepared, in consultation with the agri-food sector and all key stakeholders who could play a role in implementing suggested actions, to describe work done in collaboration with other federal departments on shared biodiversity issues.

19. The Canadian Action Plan is guided by five principles: precaution, shared responsibilities, competitiveness, integration, and continuous improvement. These are presented in Annex 1. This action plan forms part of a series of federal modules, including forestry, wildlife, aquatic areas and protected areas, that respond to the Canadian Biodiversity Strategy (1995), which in summary, directs federal and provincial governments to:
    - maintain the agricultural resource base through research, policy and programme reform, and economic incentives;
    - conserve biological resources through *ex situ* facilities (e.g. seed and field genebanks);
    - develop *in situ* conservation mechanisms for wild relatives of crops, domestic animals and microbial organisms; and,
    - promote sustainable farm practices that are compatible with wildlife.

20. Canada's action plan identifies areas where the AAFC department is already fulfilling elements of the strategy and identifies actions the department will pursue to further contribute to the conservation and sustainable use of biological resources within its scientific and fiscal capabilities. The activities described are identified under four main goals each having specific objectives (16 in total), and a corresponding set of actions (see Table 2). The goals are to:
    - Promote sustainability in agro-ecosystems while respecting natural ecosystems;
    - Increase awareness and understanding of biodiversity in agriculture;

Corporation, Economic Affairs, Transport, Public Works and Water Management, Education, Culture and Science.

- Conserve and facilitate access to genetic resources that are important to agriculture, and share knowledge, expertise and technologies in a fair and equitable way;
- Integrate biodiversity conservation objectives in departmental policies, programmes, strategies, regulations and operations.

21. The Government of Latvia highlights the impact of political and economic changes, and related human impact, on the agricultural landscape: (i) the transformation from the situation where the majority of the rural population lived in homesteads to the promotion of intensive collective farms post World War II has resulted in two contrasting landscapes: areas extensively farmed exhibiting a mosaic landscape, and vast regions of uniform drained fields with intensive use of agricultural inputs; (ii) during the last 45 years some 2 million hectares of agricultural lands have been abandoned which have reverted to scrub and deciduous trees, and there has been an increase in forest lands from 25% to 44% of the country's land area; (iii) under the land reform process, being implemented since the early 90's, almost all agricultural lands and one half of forest land are expected to become privately owned. Wider use of intensive technologies is expected which, together with the transformation of old forests, swamps and floodplains traditionally cultivated as meadows and pastures, could lead to considerable loss of biodiversity. In some places it is seen as necessary to develop and apply special measures to protect ecosystems and habitats, maintain ecological functions and to regenerate degraded ecosystems.

22. Despite the fact that agriculture is of great importance to the national economy of Latvia, it is acknowledged to cause significant environmental problems, including: soil and water pollution with organic materials and pesticide residues, soil erosion, reduction of biodiversity and degradation of rural landscapes. In this regard, it is recognised that:
    - environmental policy in the agricultural sector should be based on national programmes for rural development and should take into account the negative impacts of agricultural production;
    - it is necessary to elaborate special laws for the protection of species and their habitats, in accordance with relevant international conventions;
    - the adoption of new regulations, in particular, on protected areas and objects is required;
    - detailed regulations on protected belts are required for the development of the concept of ecological corridors in Latvia as well as for the protection of water ecosystems and migrating species.

23. Latvia points, out that while ensuring *in-situ* conservation of endangered species, through, for example, the creation of protected territories and reserves, it is important to also develop a protection system for those genetic resources not found in the reserve or, whose protection requires special methods. Instruments used to achieve these goals comprise:
    - regulation on the protection of species and biotopes;
    - contracts and contractual commitments between local government and land users to preserve location of protected species and the enforcement of these agreements;
    - introduction of tax relief for land owners to protect values of nature;
    - establishment of a regular inventory and monitoring system of the most endangered species in order to prepare methods for their protection; as well as,
    - promotional activities, such as: teaching a caring attitude towards nature; preparing nature protection specialists; and organising educational and informative activities with the public and mass media.

24. The Government of Latvia recognises the urgency of elaborating a law on the protection of species and habitats in line with corresponding international conventions (Ramsar, Berne, Washington, Bonn and Rio). The adoption by the Cabinet of new regulations on the management of protected areas and protection measures for threatened species are also seen as a priority. In this regard it is seen as important to improve the system of agreements between landowners and municipalities and to find ways of compensating landowners for loss of income due to restrictions in the use of their land. It is proposed that a law on regional development should be elaborated to ensure the coordination between different interests and the involvement of local people in the protection of biodiversity. By such an act, it is also necessary to support the protection of characteristic landscapes, valuable territories and sites for biodiversity and the concept of ecological corridors. Regulations on protection belts are seen as important for the development of ecological corridors as well as the protection of water ecosystems and migrating species. Latvia also notes that the improvement of legal measures should be backed up by scientific evidence and supported by planning of sustainable biodiversity-friendly development at the landscape scale.

25. Equally important as the elaboration of appropriate laws, Belarus cited examples of their application and enforcement. For example, in areas covered by the regime of protection over lake and river protected sites, works that result in pollution of water reservoirs were prohibited, stock-breeding farms and stocks of mineral fertilizers and organic compounds were removed, and manure repositories and liquid manure tanks, settling tanks and refineries were built. Under this regime thousands of hectares are being recultivated and lands along water bodies planted with barrier forests.

26. The United States Government's submission consists of three main sections on domestic activities; international assistance programmes by the United States Agency for International Development (USAID); and a bibliography on pollinator biology, in response to the request for case studies (Annex 3 of decision III/11). Although it is not an exhaustive compilation, the sample of different activities and instruments related to the conservation and sustainable use of agricultural ecosystems includes both domestic and international activities and covers all of the thematic areas listed in Appendix II of Decision III/11. The section on domestic activities provides examples of numerous ongoing programmes by organisations and bodies in four areas:
    - Research and development of methodologies that promote the conservation of biodiversity in agricultural ecosystems;
    - Programmes to facilitate access by agriculturalists to information that promotes the conservation and sustainable use of biodiversity;
    - Policy incentives that promote the conservation of biological diversity in agricultural ecosystems;
    - Baseline date and monitoring to assess the impact of programmes and policies and to ensure compliance: it is noted that meaningful indicators are needed for system resiliance and diversity that can be used to evaluate the *status quo* and establish time trends.

27. Recognising that biodiversity in agricultural ecosystems is enhanced when crop heterogeneity is increased through time and space and that a heterogeneous landscape increases the quality and quantity of habitat available to a wider variety of species, the United States notes that the synergy among components in agricultural landscapes is not well understood. Efforts are thus needed to analyze pollution prevention and natural resource conservation regulations for contradictions and disincentives to sustainable agriculture and to

refocus public and private research, education and technology development on long-term, multi-facted and inter-disciplinary approaches that integrate profitable agricultural systems and enterprises with the stewardship of biological diversity.

28. The United States outlines a number of policy incentives that promote the conservation of biological diversity in agricultural ecosystems:
    - The conservation provisions of the 1996 Farm Bill which simplifies and improves the flexibility and efficiency of existing conservation programmes and addresses high priority environmental protection goals;
    - Under the Inter-agency Wetlands Memorandum of Agreement, the definition of agricultural land was expanded to include not only cropland and pastureland, but also rangeland, native pastureland, other land use to support livestock production and tree farms;
    - The Sustainable Agriculture Task Force of the President's Council on Sustainable Development is developing an integrated vision of sustainable agriculture, including the sustainable use of biodiversity focusing on sustainable production practices and systems. The Council will recommend to the National Action Strategy goals and actions in the areas of agriculture-related research and education, technology, farming practices and systems;
    - The Government Performance and Results Act of 1993 requires that federally-funded agencies develop and implement an accountability system based on performance measurement, including setting goals and objectives and measuring progress towards achieving them. Goal 4 of the Cooperative Research and Extension Service is to develop, transfer and promote the adoption of efficient and sustainable agricultural, forestry and other resources conservation policies, programmes, technologies and practices that ensure that ecosystems achieve a sustainable balance of agricultural activities and biodiversity.

29. The goals and aims of USAID's international development programmes on agricultural biodiversity include those aimed at *in situ* and *ex situ* conservation and sustainable use of agricultural biodiversity and those aimed at mitigating the negative impacts of unsustainable agricultural practices on adjacent biodiversity. These programmes recognise and emphasise the interdependence of natural resources management, biodiversity conservation and sustainable development. They are designed to help countries identify appropriate sustainable management regimes for targeted ecosystems and habitats, integrated with larger scale land use or coastal planning and development efforts. They are linked to other focal areas of USAIDS's global strategy for sustainable development including population and health, democracy and humanitarian assistance. Two strategic goals include:
    - reducing long term threats to the global environment, particularly loss of biodiversity and climate change; and,
    - promoting sustainable economic growth locally, nationally and regionally by addressing environmental, economic and development practices that impede development and are unsustainable.

III. Partnerships and Responsibilities

30. The Canadian Action Plan pursues sectoral and broad-based partnerships and opportunities with other federal

departments, provinces, producer organisations, the research community, and local communities. It defines a strategy for working with such partners on issues related to biodiversity from an agricultural perspective. The key issues identified are outlined in Table 1. Partnerships are recognised as being increasingly important in finding ways for addressing the environmental challenges that face the sector, within fiscal and technical realities.

31. Thailand highlights the need for shared responsibility for the collection, conservation and research on plant genetic resources between the agricultural, forestry and health sectors (medicinal plants). For example, it has a national sub-committee for coordination of research and development on plant genetic resources consisting of 21 members from 17 institutions and, in addition, working groups are created on an *ad hoc* basis. In the same direction, in Venezuela there is no formal and established national institution which takes direct responsibility for plant genetic resources management, and different public and private institutions, universities and private collectors share this responsibility and develop activities in this area.

32. The United States encourages research and development of methodologies and technologies that enable individual producers to make more informed decisions about how they can promote the conservation and/or enhancement of biological diversity on their lands. On the basis of past experience, the United States Government notes that the owners and operators within the agricultural and forestry industries will take advantage of opportunities that increase both profitability and environmental protection and that sustainable management practices will be used, if and when, the policy, regulatory, and market context provide positive incentives; and, when information on profitable sustainable practices are available.

33. In achieving the objectives of the Convention on Biological Diversity, USAID employs a wide variety of programmes and methods in an integrated operational approach. This approach involves civil society in all aspects of the process, from identifying problems and suggesting solutions to overseeing implementation and evaluating results.

IV. Approaches and Activities for the Conservation and Sustainable Use of Agricultural Biodiversity,

(a) Conservation Approaches

34. On the basis of the country submissions, e*x situ* and *in situ* conservation are seen as being complementary and mutually supportive approaches to agricultural biodiversity management and integrated conservation and sustainable management strategies are favoured. A focus is placed on *in-situ* conservation because this allows natural selection and the process of evolution to continue. However, *ex-situ* conservation is considered to be an indispensable supplementary strategy. Gene banks, herbaria, zoological and botanic gardens are seen to offer long-term prospects for the conservation of certain crops and collections. In this regard, the sovereign rights of states over their own biological resources was also highlighted, as well, as the provisions agreed laid down in the Global Plan of Action for the Conservation and Utilisation of Plant Genetic Resources for Food and Agriculture (Leipzig, 1996), and the ongoing negotiations to bring the International Undertaking on Plant

Genetic Resources in line with the Convention on Biological Diversity.

35. Conservation is recognised as being important at the ecosystems, species and genetic levels. Programmes, activities and instruments for the conservation and sustainable use of agricultural biodiversity include landscape protection and management, integrated natural resources management and planning, and both *in situ* and *ex situ* conservation of animal, plant and genetic resources. Scales of consideration vary from landscape to genetic levels and from short to long term. A terrestrial ecosystem classification system and mapping effort has recently been completed for Canada which includes three hierarchical levels: ecozones, ecoregions and ecodistricts. In addition, a sub-regional unit for "agro-ecological resources areas" has been developed for certain areas.

36. Canada defines an agro-ecosystem as:

> "….an ecosystem under agricultural management : an open, dynamic system connected to other ecosystems through the transfer of energy and materials"[1].

Typically, agro-ecosystems involve the cultivation of annual crops or the maintenance of livestock populations, and cause major changes to the natural ecosystems they displace. However, agro-ecosystems continue to interact dynamically with, and obtain benefits from surrounding natural ecosystems. They are characterised by interspecies relationships, nutrient cycling and biodiversity, similarly to natural ecosystems.

(b) Conservation and sustainable use of agro-ecosystems and landscapes

37. This section regroups the information provided by countries that address the elements of decision III/11 and its annexes on abiotic/physical factors (land and water resources, climate - air, precipitation, temperature), ecological resources (wildlife habitats and populations and border habitats for natural organisms beneficial to agriculture) and natural resources management considerations at the agro-ecosystems level (approaches; impacts of different production and farming systems on biodiversity).

38. With regard to integrated land resources management, Latvia notes that, in order to ensure the protection of species diversity under natural conditions, it is necessary to protect the natural biotopes and habitats of wild plants and animals and those biotopes created by traditional cultivation methods. It notes that maintenance of biodiversity favours the stability of agro-ecosystems (agrocenose) which reduce or exclude the need to use chemicals and rely, for example, on the diversity of insects and of plants for sustained yields. Latvia outlines a number of instruments and activities for the elaboration and implementation of conservation methods in agriculture and forestry management, including land and soil resources management, agricultural inputs and cropping systems, improvement of the knowledge base and education. The restoration of degraded landscapes is also discussed.

39. The biodiversity programme for Latvia highlights

- the potential for the development of biodynamic farming and development of nature tourism which will provide important additional income for farmers;
- the creation of a system of protected sites and landscape elements;

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[1] AAFC, Canada (1997) Agriculture in harmony with nature-strategy for environmentally sustainable agriculture and agri-food development in Canada

- using sustainable farming methods which minimise threats to wild animals and their habitats, such as restricting the use of agro-chemicals;
- integrating landscape ecology principles into land use planning at the local level, and promoting mosaic landscape character which is typical of Latvia.

40. The latter is one of the main reasons for the high biodiversity support programme (reduced taxes, education programmes for farmers and local decision makers etc.) for farmers who use traditional low input farming methods and maintain habitats important for threatened species of plants and animals. Latvia notes the importance of cultivating a positive attitude to nature, from pre-school institutions up through revised curricula incorporating principles of biodiversity conservation and sustainable use, especially in fields connected to forestry, agriculture and energy.

41. The harmonisation of the development of agriculture in accordance with the demands of agricultural protection is seen as a priority in Latvia. Meadows are cited as examples of protected areas with relatively strong protection regimes, for instance, those with the status of ornithological or botanical reserves and meadows in floodplains of inland waters, which are also protected to some extent by existing legislation on protection belts along water courses. As there is much abandoned land around agricultural fields in Latvia, it is noted that there is currently no need to create border habitats for beneficial organisms.

42. Canada provides two examples of natural ecosystems providing benefits to agriculture: (i) preserving wetland and riparian buffers on farms provides valuable wildlife habitat and helps to protect groundwater resources while providing a measure of protection against drought; and (ii) farm shelterbelts and woodland habitats attract beneficial insects or predators that feed on agricultural pests and conserve soil moisture by preventing wind and water erosion. Biodiversity can also be a source of weeds, pest and other problems for producers but these can sometimes be resolved by making simple changes to common practices.

43. The loss and fragmentation of habitats in agro-ecosystems are major factors in the loss and decline of critical habitats for many of North Americas's wildlife flora and fauna, including endangered and threatened species. 85% of the decline in Canada's original wetland has been attributed to drainage for agriculture and wooded areas have also been affected. Despite the removal of about 0.5 million hectares of marginal land from annual crop production, the cultivation of the remaining 4.7 million hectares of marginal land in the Prairies remains a concern. In term of land use pressures, urban encroachment also plays a role. Canada recognises that the protection of natural habitats is not a guarantee that biodiversity important to agriculture will be preserved. Research is needed to better understand the association between land use patterns and biodiversity conservation.

44. Assistance provided by the Government of Canada is focused on conserving ecosystems and their functions through increased host country capacity and leadership through:
    - the identification and setting of priorities for critical ecosystems;
    - management of protected areas and areas in which natural resources are used sustainably; and,
    - integration of these ecosystems into larger landscape and policy contexts to ensure their continued productivity for future generations.

45. There are two ongoing projects on conservation at ecosystem level in Greece (i.) conservation of important habitats and their wild flora and fauna - aiming to promote environmental sound agricultural activities in specific areas, according to their ecological importance and (ii) set aside farmland - whereby land is set aside for at least 20 years to respond to the environmental purpose by creating biotopes and natural parks in areas of ecological interest and by protecting water resources from agricultural pollution. Greece also has some important environmentally sound projects in preparation which concern: soil protection from erosion, the conservation of rural landscape, the management of abandoned farmland and education.

46. The Republic of Belarus develops annually activities oriented to the prevention of erosion, which include land cultivation across the slope, transformation of eroded slopes into grasslands, cultivation techniques; and planting of barrier forests alongside fields. It has identified a number of areas that need to be addressed in order to reduce adverse effects of agriculture on biodiversity at ecosystems level produced by agriculture, including:
    - examination of the process of formation of natural floodplain biocenosis in relation to natural water-supply and reclamation measures; and,
    - computerisation of the process of improving and optimizing an inadequate ecological situation as likely when carrying out conservation measures.

47. The Government of Latvia reports on the status of its water resources, including water quality and sustainable use, irrigation management and the use of farm waste. Anthropogenic influences have been shown to be weak for 10%, moderate for 87% and very strong for 3% of Latvian rivers. Eutrophication by biogenous substances is shown to be the greatest problem. The main sources are untreated municipal wastewater, which has been increasing since the 1950's, and runoff from agricultural lands, which since 1990 has decreased significantly and consequently so has corresponding pollution. Point and diffuse- source polluted runoff from collective farms and incorrect and uncontrolled use of mineral fertilisers as well as lack of responsible management of water courses were the main reasons for the contamination of water resources.

48. The United States outlines a coordinated programme on water quality aiming to protect the nation's water from contamination by agricultural chemicals. Its efforts accelerate the adoption of environmentally sound and cost-effective voluntary production practices, provide research and extension support to develop new farming systems to protect water quality and use resources efficiently and provide special grants for management systems to prevent pollution of soil and water resources.

49. The country submissions recognise the need for monitoring and assessing the impact of different farming systems (arable, livestock, mixed agriculture and aquaculture and agroforestry etc) and agricultural practices (technologies, management practices, activities and decisions of farmers),as well as, the performance and results of agricultural strategies, programmes and activities, on agricultural biological diversity at ecosystems, species and genetic levels, including pollinators and soil micro-organisms.

50. Despite the emphasis on landscapes and ecosystems, the country reports pay more attention to identifying effects of different agricultural practices, with negative and positive impacts on biodiversity, than to the situation and impacts of different types of production systems and levels of production: arable, livestock, mixed agriculture and aquaculture, including agro-forestry, agrosilvopastoral systems, etc.

(c) In situ conservation of animal, plant and microbial genetic resources

51. This section regroups those aspects that address plant, animal and microbial biological resources at species and genetic levels, as well as, technological, socio-economic and cultural management considerations/ agricultural practices at the production unit and/or commodity level, including principles of sustainable use. Items addressed, see Annex 2 of decision III/11, include soil erosion control, sustainable tillage and farming, agroforestry, farm inputs, use of farm waste, irrigation management, marketing conditions, as well as, biocontrol organisms, wildlife populations important to agriculture, wild relatives of domesticated species and other wild species.

52. Domesticated species represent a small fraction of the world's biota but are estimated to provide over 90% of the world's food supply and there is serious concern worldwide about the decline of genetic variation of crops and breeds of livestock as a result of selective breeding and human activity and by environmental conditions upon the wild relatives of agricultural crops and animals. *Inter alia*, Canada notes that a broad genetic base for agricultural species is required to produce new varieties of crops, domesticated animals and micro-organisms to ensure competitiveness of its agriculture and to provide it with the ability to adapt to changing environmental and marketing conditions, threats of plant and animal diseases and pests, as well as, changing societal and nutritional needs. Resiliance and sustainability of agro-ecosystems are also highlighted.

53. Forest genetic resources: Thailand has established forest reserve areas for *in situ* conservation of forest species and its 40 experimental stations, under the research centres of the Department of Agriculture, have reserved patches of land for natural growth of wild plant species. On-farm conservation is conducted by farmers, sometimes with the support of the government. Thailand's forest genetic resources which are mostly located within natural parks, reserves and other conservation units, however, are seriously threatened due to poor boundary demarcation, encroachment and poaching. Although natural forest areas exhibit high species diversity, only some 15% of the estimated 10,000 species have been enumerated and limited quantitative population data is available. Many are valuable sources of commercial timber and populations of several species have severely declined and are unable to regenerate due to habitat destruction, illegal occupation of land and exploitation of protected species. Even self- sustaining natural populations, including some ornamental palms, are facing the same threats. Several forestry species are taken directly from the wild for planting by local people and for use as a source of timber and wood products.

54. Wild species and wild relatives: Canada, Thailand and Latvia note that wild species, as well as local species and breeds of cultivated plants, domesticated animals and micro-organisms constitute a valuable gene pool for widening the genetic base and, through selection and breeding, as sources of adaptation to stress conditions and resistance to pests and diseases. Thailand provides information on wild species and wild relatives of crop plants that are found in the country's 15 different ecosystem types which span extremes of elevation and climate. Some wild species of orchids and other wild plants are collected for commercial purposes especially those with potential value as raw materials for chemical and pharmaceutical industry (i.e. contraceptive drugs). In Thailand, among the wild species of rice, *Oryza granulata*, *O. rufipogon* and *O. munita*, the latter has been used in yield improvement of cultivated rice. Moreover, large scale production of some wild species e.g. *Amorphophallus* and *Dioscorea*, as sources of carbohydrates and chemical drugs, have been recently tried.

Latvia is rich in wild sources of foods such as berries, mushrooms, fishes, shellfish and game animals, and the country's investment policy supports the cultivation of neglected crops such as mushrooms, cranberries, medical herbs and buckwheat.

55. Canada notes that the protection of threatened and endangered species is a priority issue internationally. However, it is noted that most invertebrates, micro-organisms and lower plants have not been evaluated to determine their status. Many of these wild species are important agents in the regulation of ecological processes that contribute to sustainable agriculture, however their functions in the environment are not well understood. It is noted, for example, that soil biota, such as arthropods, bacteria and fungi break down organic matter and minerals making nutrients available in the soil, while terrestrial arthropods, such as insects, spiders and mites, are extremely diverse and beneficial to the environment and agriculture, as pollinators of agricultural plants and as regulators of insect pests. Since many of these organisms are sensitive to habitat change, climatic variation and other environmental stresses, they can also be effective indicators of environmental conditions. Canada outlines a number of species of wild plants , fish, reptiles and birds that are endangered and have the potential to be affected by agricultural development.

56. Thailand notes that landraces are major sources of genetic material for crop improvement that are highly adapted to agricultural practices relying on low levels of cultivation, low soil fertility and environmental fluctuations. They are genetically diverse and stable and are exploited for their differences in seed type, time of seeding and date of maturity etc. Examples of landraces of rice, maize, sugar cane and durian are mentioned. Old cultivars are also noted as being important materials for crop improvement in view of specific useful traits. However, farmers only maintain those that perform well, which highlights the need for Government support to store seeds and germplasm of old cultivars in genebanks.

57. Despite the importance placed on animal biodiversity in decision III/11 (paragraphs 16(b), 20 and item 3 of Annex 2 of decision III/11) very little information has so far been provided on the activities, instruments, issues and priorities relating to the *in situ* conservation and sustainable use of animal genetic resources (cattle, ruminants, fish, birds, and so on). Greece reported that it has an ongoing project on the conservation of biological diversity and genetic variability which focuses on the conservation of endangered animal races as well as the conservation of endangered cultivated plant varieties. Likewise, with regard to microbial genetic resources (paragraphs 16(c) and item 3 of Annex 2 of decision III/11), except for a brief mention in some reports on soil micro-organisms important to agriculture, very little information has been provided on microbial genetic resources.

58. Both Canada and the United States highlight the growing threat of harmful exotic plant, animal and insect species (introduced, alien/non-indigenous species) to biodiversity, the environment in general and the economy, such as the Leafy Spurge (*Euphorbia esula*), which contains chemicals poisonous to cattle and has been introduced from Europe and portions of Asia and now widely invades native rangelands. The United States submitted two publications on exotic pests and the development of a national strategy and actions for invasive plant. Examples cited besides the Leafy Spurge are the Kudzu Vine (*Pueraria lobata*), the Cajeputs tree (*Melaleuca quinquenervia*), Purple Loose strife (*Lythrum salicaria*) and the Zebra mussel (*Dreissena polymorpha*).

59. Although biotechnology has concentrated on the transfer of agronomically valuable traits such as disease and pest resistance, the safety of biotechnology and potential adverse effects of genetically modified organisms, for instance on wild relatives and the major field crop species is a matter of concern internationally. The major biotechnology focus in Canada has involved micro-organisms, for instance, to improve the nitrogen fixing process of certain growing plants (legumes) and the development of more effective animal vaccines. As the use of biotechnology will certainly increase, a concerted effort is required to increase knowledge on the biology and ecology of native species and on how they might be affected by new, introduced genetic traits.

60. In this section, the substantive findings are also noted of the comprehensive case study provided by the Government of Morocco on the Conservation and Sustainable Utilisation of Plant Genetic Resources Diversity in the Maghreb region. The concerned project assessed the situation regarding the conservation and sustainable use of (i.) cultivated plants (cereals, fodder crops, legumes, fruit trees, horticultural crops, wild relatives of species and other wild species), (ii) forest genetic diversity and native flora (deciduous and coniferous forests and other native species of economic and medical importance; and (iii) rangelands, pasture and fodder plants. It provided an analysis of the legal issues concerning plant genetic resources and of socio-economic issues regarding their conservation. It also presented proposed strategies, priorities in particular vulnerable species targeted, and recommended actions and institutional arrangements for the three subsectors, and, a feasibility study for a proposed programme on the conservation and sustainable use of plant genetic resources.

(d) Ex-situ conservation

61. *Ex situ* conservation is seen by the Government of Canada to support the development of less environmentally damaging agricultural practices, for instance, through enhancing agricultural productivity in existing agricultural lands and reducing encroachment on natural habitats. Efforts provide:
    - critical back up and characterisation of *in-situ* biodiversity including the multitude of major and minor crops that collectively constitute the bulk of the worlds food supplies;
    - the genetic resources necessary for the development of more productive agricultural crop varieties and animal breeds; and
    - resources for the development of more environmentally sustainable practices.

62. Although the present status of the natural habitats and populations of wild species in Latvia are favourable for *in situ* conservation of agricultural biodiversity, Latvia recognises the importance of maintaining vital populations of local breeds of domestic animals and plants and, where necessary, to ensure the *ex situ* conservation of selected wild species of animals and pants which may become endangered in the future. The importance and the capacities and expertise of Latvias' botanical gardens and zoos are noted in this regard. Research and practical work on the maintenance and improvement of local breeds of domestic animals in Latvia are conducted by the Agricultural University, the cattle breeding and veterinary scientific research institute and by decentralised experimental cattle breeding stations. Information provided on bee selection and conservation is outlined in paragraphs 75-83. Botanical gardens of the Academy of Sciences and of the University of Latvia both play an important role to maintain collections of wild introduced and decorative plants species and breeds. The maintenance and further selection of local, domesticated plant breeds are decentralised in numerous state-run

stations and research institutes. Finally, the Biology Faculty of the University of Latvia holds the national collection of microorganism stocks.

63. Thailand also highlights the capacities and roles of its two principal genebanks, the national rice storage laboratory, which maintains some 10351 accessions of 78 rice species under short, medium or long term (base collections) conservation, and the National genebank. The latter has a capacity of 40-50,000 accessions, though presently holds some 4,000 accessions of indigenous materials and some materials exchanged with CGIAR and other centres of principal crops, primarily of maize, okra, legumes, capsicum, grasses, and fast growing trees such as Leucaena . Main users are national researchers and farmers and some use is made by private companies and plant breeders. Collecting activities are selected according to crop priority set according to status of the species (endangered, threatened or rare). The report highlights constraints and opportunities: storage conditions, cost, replication of material in other genebanks, viability testing and regeneration materials.

64. Venezuela reported on the activities of its two principal public institutions, the National Fund of Research on Agriculture and Cattle (FONAIAP) and the National Center for Conservation of Plant Genetic Resources (CNCRF), which share the responsibility of plant genetic resources in the country, and on the achievements of the National Programme on Plant Genetic Resources. The CNCRF initiated its activities in 1992 and its general objective is the conservation of wild species, particularly those important for medicinal and aromatic purposes, traditional fruits and any plant genetic resource at risk of disappearance. The FONAIAP created the national programme on plant genetic resources in 1992 with the objectives to organize and control the plant genetic resources needed for agriculture and research, and to increase the potential and actual use of plant genetics from cultivated and potential vegetal species. The main accomplishment of the National Program is the description of the majority of the FONAIAP's plant germplasm collections to facilitate the use of the materials to plant breeders. They also have constituted the main active collections of vegetal species cultivated in the country and have increased the genetic patrimony through the exchange of germplasm. Some Venezuelan universities also develop activities in the area of plant genetic resources. In addition, some private institutions and private collectors maintain collections which are used for improvement. Main users of the collections are public and private plant breeders and researchers from the Universities or research institutions.

65. In Canada, AAFC operates genebanks for major food crops and hardy ornamentals in partnership with public and private sector organisations. AAFC also maintains microbial collections of mainly plant and animal diseases for the diagnosis and monitoring of genetic changes in pathogens. There are also microbial collections of fungi and bacteria that promote plant growth to assist in the understanding of microbial biodiversity and enable sustainable crop and animal production patterns to be devised.

(e) Transformation of unsustainable agricultural practices into sustainable practices

66. Agricultural practices are acknowledged to have negative and positive impacts on biodiversity conservation. Intensification of agriculture on existing agriculture land in some areas is seen as a strategy to slow expansion to more fragile lands and to conserve remaining natural habitats. In this context, intensification of agriculture may be encouraged in agricultural lands of high natural resource endowment and potential. Other key areas are the reform of unfavourable economic and land tenure policies or the provision of education and training in

sustainable agricultural practices and technologies at national and community levels. Table 1 presents a list of agricultural activities that countries cite as having negative effects on, or presenting risks to biodiversity and a list of proposed agricultural issues and practices to conserve and enhance biological diversity.

67. In Belarus, the application of inorganic fertilisers has declined due to difficult economic conditions faced by farmers and agricultural enterprises, and their use (average application/hectare) lies within European standards. Traditional agriculture includes leguminous crops in the rotation, and it is recommended that at least 25% of the cultivated land is cropped with leguminous plants. Only biological farms are actively involved in looking at nutrient uptake by plants. In Latvia, also for economic reasons, it is also observed that there has been a 70% reduction in the use of organic fertilisers which has led to reduced organic matter content of soils. There has also been a dramatic decline in liming despite the need for balancing soil acidity.

68. The Republic of Belarus identified a number of areas that need to be addressed in order to reduce adverse effects on biodiversity produced by agriculture practices, including:
    - monitoring of prolonged influence of pesticides upon soil micro-flora and soil biological activity and the prediction of possible evolution of the most harmful for agricultural plants and their disease agents;
    - study of fungi-antagonists against the most dangerous plant diseases in an effort to develop biological control methods;
    - elaboration of ecologically-appropriate methods for the introduction of nitrogen fertilizers within specific soils and landscapes.

69. In Latvian agriculture, the emphasis has been on effective use of fertilisers and pesticides for maximum yield and reduced loss of nutrients by runoff. Latvian regulations and norms concerning the use of pesticides and the presence of contaminants in agricultural products in general are even more strict that most European countries. In Belarus, there still remains a confrontation between agriculture and the utilization of chemical compounds which act negatively on plants and animals. Different approaches for protecting agricultural crops against pests and insects are beginning to be used in Belarus. Disposal of old pesticides in storage is still problematic. As agriculture is expected to recover in countries such as Latvia and Belarus, increased use of pesticides will have to be carefully monitored and integrated pest management (IPM) may rapidly become an appropriate option.

70. On the other hand, in Latvia, little research attention has been paid to soil organisms, mycorrhiza, pollinators, non-target insects and plants, although the Agricultural University of Latvia is monitoring the impact of different agricultural practices on the system soil-yield taking into consideration biodiversity aspects. Research is being conducted by farmers and agricultural institutes to study the effects of tillage at different depths and by different equipment with a view to improving productivity, reducing soil erosion and use of chemicals. Biological farming is developing sustainable methods for the cultivation of soils heavily polluted by weed seeds, seriously degraded by over-exploitation and reduced organic matter content. Soil micro-organisms and nematodes are still weakly identified in Latvia. A few years ago, Belarus developed methods of producing rhizotrophin using nitrogen accumulating bacteria, unfortunately, work was halted due to limited funds.

71. Canada notes that while new pest control products are generally more selective, less persistent and less toxic to non-target organisms, some pesticides are known to adversely affect biodiversity for instance, some insecticides

such as carbofuran harm birds, others harm beneficial soil fauna and insects such as pollinators and, some pesticides such as DDT, chlordane, and toxaphene lead to accumulated residues and impaired biological function. Regulations regarding safe applications and use and labelling requirements can help to decrease pesticide use and pesticide damage substantially. Simultaneously, the use of integrated pest management approaches encourage more natural approaches to pest control. IPM is the focus of Canada's research activities related to pest management.

72. Greece has an ongoing conservation project on the reduction of pollution caused by agricultural practices and aiming to promote biological farming methods. In order to achieve this goal, various areas are identified throughout the country: riversides, lakes shores and coastal areas, islands, mountainous and semi-mountainous areas of the inlands. Incentives such as providing subsidies for the conversion from conventional to biological farming methods were set to stimulate local participation to the project.

73. Soil erosion by water and wind and soil degradation as a result of inappropriate agricultural practices are reported worldwide to result in landscape degradation, loss of biodiversity and contamination of water bodies with silt, chemicals and nutrients, leading in extreme cases to eutrophication. It is proposed that legal instruments, guidelines and standards and monitoring programmes are needed to enforce the adoption of sustainable measures for soil erosion control . These should include cause-oriented measures, the precautionary approach, as well as effect-oriented measures, including measures to mitigate damage, reclaim and restore damaged land and water resources and planning of rural landscapes.

74. A wide number of appropriate practices are proposed by the different countries, including, soil and water management, sustainable tillage; appropriate drainage, managed grazing, and safe use of agricultural chemicals (pesticides and herbicides), as well as, safe use of fertilisers (see Table 1).

IV POLLINATOR BIODIVERSITY

75. The Republic of Belarus reports that bee keeping is the major source for the pollination of agricultural and other plants. There are about 460,000 bee colonies in the country, though the numbers are decreasing due to economic considerations. Currently, a draft bill is being drafted in the Republic of Belarus on beekeeping which is expected to improve the situation

76. Latvia reports that about 300 species of wild solitary bees, numerous butterflies, flies, and beetles are the main pollinators and that the pollinator species communities depend on the morphology of flowers, climatic conditions, time of day , etc. It further reports that the local breed of bees is seriously endangered, the pureness and maintenance of positive characteristics are threatened due to crossing with European and American breeds introduced during recent decades. The introduction of bees from the south has also caused widescale metization of local populations of the honeybee *Apis mellifera*.. The restoration of the local variety of bee started in 1993 by a single bee farm situated in an isolated area through artificial mating and selection of bee families with features characteristic of local bees. The company Apiculture Laboratory Ltd., which belongs to the company Latvian Bee, deals with the maintenance and protection of the genetic purity of the local bee breed.

77. The following information was provided by the Government of the United States on the basis of its literature survey which contains some 270 articles.

78. Of the estimated 240,000 species of flowering plants, 91% require the services of pollinators to set fruit and seed. Roubik's survey (1995) indicated that the world's major crops are pollinated by 44 genera of animals including: bees (72.7%), flies (18.8%), bats (6.5%), wasps (5.2%), beetles (5.1%), birds (4.1%), butterflies and moths (4.4%) and thrips (1.3%). Honeybees are not always the most efficient pollinators, yet they are mistakenly credited for the majority of all insect pollination.

79. The contribution of wild species to the pollination of crops is difficult to evaluate, and documentation is conspicuously lacking worldwide. Despite farmers reliance on managed European honeybees (Apis mellifera) of the 73% of crops pollinated by bees, it is estimated that 15% are pollinated by honeybees and 58% rely on other wild bee species (pollen bees).

80. In the last 50 years and in particular in the last five to ten years, losses of managed honeybee colonies and of populations of many pollen bees have been shown to be dramatic as a result of mite infestations and disease, destruction of potential nesting sites, pesticide exposure. Cross breeding for instance of American and European honeybee colonies with African honeybees is also problematic as it has been shown to render them unmanageable. According to literature surveys, declines of wild bee species have been documented in Austria, Britain, Canada, Costa, Rica, Germany, Italy, Poland, and the former Soviet Union. The IUCN estimates that 26% of the bat species worldwide are threatened with extinction. Some of these bat species are important pollinators in ecosystems with depauperate pollinator faunas including some oceanic islands.

81. The majority of the available literature focuses on information specific to European honeybees. There is limited documentation of the management and/or utilisation of the 20,000 species of pollen bees or other insects. It is estimated that less than 2/3 of the world's bee species have been named and described. Literature is even more scant regarding the more than 1,000 species of unconventional vertebrate pollinators from birds and bats, to lemurs and geckos. It consists primarily of descriptive, often anecdotal, accounts of pollination ecology. In addition to their role as pollinators and dispersers of seeds, bats are also a primary predator of vast numbers of insect pests that cost farmers and foresters billions of dollars annually and are critical lemenst in natures delicate web of life. USDA Forest Service has one of many bat research and public information programmes. (<http://www.fs.fedus/outdoors/wildlife/wif4.htm>)

82. In developed countries, it is recognised that wild pollinators will have to play an increasingly important role in pollinating crops that have historically been pollinated by managed honeyebees.

83. Recommendations for the promotion of best conservation practices, technologies and educational programmes to either maintain or promote the re-establishment of pollinators include the following:

    Research and development

    - research and development of alternative pollinator species for effective crop pollination
    - development by plant breeders of new varieties attractive to native pollinators

- site and specific studies as optimal pollinator faunas will vary according to location climate, plant vectors and other factors.

Data collection

- identification of population density and habitat requirements of native pollinators for efficient fruit and seed set;
- census and monitoring of pollinators in habitats adjacent to agricultural areas;
- identification of the need for greenbelts or nectar corridors and the availability of alternative pollinator food resources at times when crops are not being grown.

Taxonomic research

- nomenclature and descriptions of pollinator species;
- identification of species or races of wild pollinators with beneficial characteristics such as greater resistance to parasites or diseases, more efficient pollination habitats and greater domestication potential.

Promote reduced use of toxic chemicals

- develop data and identify and encourage practices, for instance through integrated pest management programmes, to help growers and those applying pest control to select chemicals less toxic to pollinators and to apply them only when needed or when pollinators are less active.

Raise awareness and education of the public on the benefits that pollinators provide

- promote the establishment of pollinator gardens and other retreats for birds, bees and butterflies and promote native pollinator conservation practices.

Concluding Remarks

84. Table 1 below presents an overview and summary of the issues and priorities identified by countries. Table 2 presents a list of areas of consideration, with examples of objectives and programmes or projects, both ongoing and planned, that have been reported by countries. The information has been grouped under the following headings:

- Promotion of sustainable agricultural systems and agro-ecosystems;
- Promotion of sustainable agricultural practices (to increase productivity, arrest degradation, restore and enhance biodiversity)
- Mobilisation of indigenous and local farming communities for the development, maintenance and use of their knowledge and practices with specific reference to gender roles;
- Partnerships for information exchange, scientific knowledge, understanding and access to genetic resources
- Identification and establishment of instruments/mechanisms to promote the conservation and sustainable use of agricultural biological diversity and agro-ecosystems.

These tables provide an appreciation of the scope and content of decision III/11 and of the different activities, instruments, issues and priorities identified by those Governments and Parties that have provided inputs to date. They also identify those areas of decision III/11 for which substantive information and understanding is available and for which actions have been proposed and those areas that have not been substantively reported on

and for which further investigations, research and understanding is required before appropriate actions can be developed and implemented.

Table 1: ISSUES AND PRIORITIES IDENTIFIED BY COUNTRIES[1]

Agricultural Practices/Actions which Threaten Biodiversity	Proposed Practices/Actions to Benefit Biodiversity
Unsustainable farming systems: - over exploitation of natural resources - soil and water erosion and soil fertility decline - homogenisation: monocultures and exotic breeds - poorly adapted exotic plants and domestic animals -	Sustainable farming systems - research into environmental-ly-sound, cost-effective, integrated and heterogeneous systems - mixed enterprises: crop-aquaculture, agroforestry, agrosilvopastoral, etc - participatory breeding using local species and wild relatives - crop rotations and diversified systems - soil and water conservation - identification of socio-economic, legal and policy constraints
Unsustainable agricultural practices - inappropriate tillage practices - contamination of water sources/damage to aquatic ecosystems by soil erosion, drainage, pesticide and fertilizer runoff from agricultural lands - drainage and subsequent loss of wetlands - grazing pressures: overgrazing lead to species loss, soil compaction and land degradation/desertification - excessive/improper use of fertilizers - excessive/improper use of pesticides	Sustainable practices - conservation tillage, inter- cropping, mixed agriculture - nitrogen fixing plants and micro-organisms - organic and green manuring, natural mulching - soil, water and plant nutrient management - sustainable irrigation and drainage - protection of wetlands - controlled grazing/stall feeding - integrated pest management, biological control agents - identification of socio-economic, legal and policy constraints and introduce incentives
Habitat conversion and fragmentation - land use pressures - cultivation of marginal land - limited agricultural land base and intensification - reduced wildlife habitat - slash and burn agriculture in the tropics;	Habitat protection and management - participatory land use planning control of agricultural expansion - protected areas (IUCN range) and wildlife species - land reform policies wetlands and wildlife habitat management

[1] This table is indicative and does not necessarily include every item reported in the national submissions

Agricultural Practices/Actions which Threaten Biodiversity	**Proposed Practices/Actions to Benefit Biodiversity**
- loss of wetlands, deforestation etc.	- research into ecosystem dynamics and sustainable agricultural systems/practices
<u>Wild species at risk</u> - threatened and endangered species - inadequate evaluation of invertebrates, micro-organisms and lower plants - toxic contaminants and atmospheric pollution - introduced exotic (non-indigenous) plant animal and insect species; loss of native species through competition by invasive species - climate change	- protection of animal, fish, plant, tree species at risk - taxonomic research - controlled, safe use of agricultural chemicals (pesticides and herbicides) - controlled use of fertilizers - controlled use of fossil fuels and burning of agricultural residues - controlled introduction of exotic species - research and action to identify vulnerable species and ecosystems and reduce greenhouse gas emissions
<u>Diversity of domesticated species</u> - declining genetic variation of crops and livestock breeds - selective breeding- narrowed genetic base - threats to wild relatives of agricultural crops and domesticated animals - threats to microbial organisms and fungi	- agricultural diversification - increased use of indigenous plant species and varieties and animal races and breeds in breeding programmes - conservation of wild relatives of domesticated plants and animals research and action to identify, understand functions of, and conserve micro-organisms and fungi
<u>Introduced Exotic species</u> - threats of harmful exotic species (weed plants, loss of habitats for rare/endangered animal, birds and insects, fire risk, infestations, economic costs, etc) -	- research into impact of introduced species - controlled introduction of exotic species - promote use of native ornamental and conservation species -eradicate infestations and restore natural ecosystems
<u>Use of Living modified organisms</u> - safety of biotechnologies - adverse effects of GMO's - negative effects on wild relatives - inadequate knowledge	- research on impact of bio-technologies on ecosystems, and species development including wild relatives - policy development and regulation of use of GMO's - develop safe new varieties resistant to pests and diseases
<u>Atmospheric changes</u> -release of greenhouse gases- methane (ruminant animals/manure), CO2 (fossil fuels)	- reduced emissions of greenhouse gases - conservation of forests and other vegetation to increase carbon sink function

Table 2: EXAMPLES OF NATIONAL PROGRAMMES AND ACTIONS (ONGOING AND PLANNED) 1

DECISION III/11	AREA OF CONSIDERATION (extracted from decision III/11 and country reports)	OBJECTIVES + ACTION PLANS (references from Canada report and GPA)	EXAMPLES OF PROJECTS PROPOSED
Paras. 17(a), 9, 14 15(a),(g),(h), (I), (m)+(n) Annex 2, item: 1.(iii) to (vii) 2.(I),(iii)+(iv) 3.(i.) 4. (i.),(ii)+(iv) 5.(i.)+(ii) 7.(i.)+(ii) 8. 9 10 11 Annex 3 (I)	**Promotion of sustainable agricultural systems and agro-ecosystems** (attention to animal, plant and micro-organisms) • Integrated natural resources planning and management (multi-disciplinary, systems approach) - land and water resources management (land use pressures, marginal land; restore degraded landscapes) - climate and atmosphere (greenhouse gas emissions; temperature, precipitation e.g. effect vegetation cover) • Protected areas management • Habitat and wildlife management (border habitats, etc) • Integration with terrestrial, inland waters and marine and coastal ecosystems; • Integrated production systems (aquaculture, agroforestry, mixed livestock and crops, etc) • Developing assessment methods and indicators • Monitoring impacts of development projects and production systems on ecosystems and biomes • Partnerships and fora between stakeholders		Latvia: (1) Establish a Centre for Agricultural Biodiversity (1 yr) ECU 38,000: to develop a concept for study, monitoring and management. of agrobiodiversity; integrate biodiversity considerations into agricultural practices and environmental planning; facilitate implementation of Biodiversity Conser-vation Action Plan; create an agrobiodiversity information system. (2) Define and map landscape structure and habitats of importance in agricultural lands and develop methods of detection using satellite images. (3) Estimate and compare impact of various land use patterns and farming methods on biodiversity. Greece: (1) Conservation of important habitats and their wild flora and fauna: to promote environmental sound agricultural activities in specific areas, according to their ecological importance. (2) Set aside farmland (20 yrs): to create biotopes and natural parks in areas of ecological interest and protect water resources from agricultural pollution

[1] This table is indicative and does not necessarily include every item reported in the national submissions

DECISION III/11	AREA OF CONSIDERATION (extracted from decision III/11 and country reports)	OBJECTIVES + ACTION PLANS (references from Canada report and GPA)	EXAMPLES OF PROJECTS PROPOSED
Paras. 17(b), 4, 15(e),(g),(I), (k),+(l), 16(a),(b),+(c), 17(a)+(b) Annex 2, items: 1.(i)-(iii) 2. (ii), (iii), +(v) 3.(i.) to (iv) 4. (ii)+(iii) 6. (i.) to (v) 7 (i.) +(ii) 8 Annex 3 item (ii)	**Promotion of sustainable agricultural practices (to increase productivity, arrest degradation, restore and enhance biodiversity** (attention to animal, plant and micro-organisms) • Tillage practices (soil, water, plant nutrient balance, symbiotic soil micro-organisms, etc) • Agricultural inputs and costs - fertilisers - pesticides and herbicides - irrigation (water use efficiency) - energy (mechanisation, use of fossil fuels etc) • Integrated pest management, biocontrol agents • Soil and water conservation • Farm waste management • Genetic resources activities (plant, animal , microbial) - ex situ conservation (botanical gardens, zoos, etc) - in situ conservation - sustainable management - wild relatives and other wild species (sources of food, genetic variation etc) - control of exotics • Wildlife populations (pollinators, soil micro-organisms, nematodes) • Partnerships and fora: extension, research and farmers (local and indigenous groups)	*Increase biodiversity through new crop development and crop diversification* (develop new crop varieties; conduct research on alternative crops; develop native grasses and legume eco-vars with conservation partners; promote development of niche markets for minor crops, heritage varieties, rare animal breeds and sustainable, new and diversified agri-food products *Minimise adverse impacts of agricultural practices on agro-biodiversity* (encourage development and transfer of (bio) technologies; develop IPM technologies; encourage conservation of natural lands within agro-ecosystems; *Minimise risks to biodiversity from exotic living modified organism with novel traits* (assess impact of agricultural products with novel traits; prevent introduction and spread of alien/domestic animal and plant pests and diseases that threaten cultivated, domesticated and wild species *Enhance efforts to identify and evaluate genetic diversity that can improve agricultural productivity and sustainability* (study the nature and extent of genetic diversity and selected agronomic traits; identify and prioritise indigeneous wild plant species of value to the agri-food sector and develop partnerships to ensure their conservation GPA: Broadening genetic base of major crops; increasing range of genetic diversity available to farmers; strengthening the capacity to develop new crops adapted to local environments; exploring and promoting use of under-utilised crops; deploying	Canada: Managing community pastures by managing wild and domestic biological resources and conserving habitats Greece: (1) Reduction of pollution caused by agricultural practices: to promote biological farming methods in different ecoregions; provide incentives i.e. subsidies for the conversion from conventional to biological farming methods to stimulate local participation (2) Conservation of biological diversity and genetic variability: to conserve endangered cultivated plants varieties and endangered animal races. Etc.

DECISION III/11	AREA OF CONSIDERATION (extracted from decision III/11 and country reports)	OBJECTIVES + ACTION PLANS (references from Canada report and GPA)	EXAMPLES OF PROJECTS PROPOSED
		genetic diversity to reduce crop vulnerability GSMFAGR; Development of inventories which consider the status of farm animal genetic resources and measures for their conservation and sustainable use	
Paras. 17 (c), 8, 10, 13, 15(f),(g),(i.)+ (l) Annex 2, items: 8, 10, 13,	**Mobilisation of indigenous and local farming communities for the development, maintenance and use of their knowledge and practices with specific reference to gender roles** • Capacity building • Participation/empowerment • Build on traditional knowledge, practices and innovations • Transfer of technology • Access to genetic resources • Partnerships and fora between stakeholders	Promote biodiversity considerations in farm -level decision making (support development of environmental management tools; develop expertise and promote measures to conserve soil and enhance wildlife habitat; provide tree and shrub seedlings; assess impact of policy and economic instruments; support and work with multi-stakeholder groups; enocourage cooperation between farm organisations and conservation groups)	
Paras 8, 10, 15(i)+ (j) Preamble and Para. 24 + Annex 2, item 9	**Partnerships for Information Exchange, Scientific Knowledge, Understanding and Access to GR** • Clearing-house mechanism • Development and transfer of technology-research, extension, farmer contacts • Support of enabling agencies • Research-case studies • Public awareness and understanding • Education **Understanding Relationships** • agriculture and biodiversity • trade and agricultural biodiversity (trade policies, relationship between market forces	Improve the accessibility and use of scientific and technical information on biodiversity (develop systematic treatments, guides and taxonomic catalogues; develop GIS referenced databases and inventories and explore cross references; use modern info. technologies; complete a range condition assessment database for all community pastures; participate in biodiversity info. management initiatives (e.g. Species 2000, BIN21, ITIS, OECD) Improve scientific and technical capacities of ex situ conservation mechanisms; enhance opportunities for collaboration (improve facilities for conservation and study of seed crop genetic resources; maintain crop specific genebanks; develop partnerships; develop and encourage implementation of a national system for	Canada: (1)Environmental programming by funding initiatives and working with local and regional wildlife groups on habitat improvement. (2) Research, development and transfer of innovative technologies that promote the environmental sustainability of the agri-food sector Latvia: (1) Ensure capacity building on environmental technologies in the use of high resolution satellite images and GIS technology for nature management and monitoring. (2) Elaborate educational materials for farmers on the importance of biodiversity and

DECISION III/11	AREA OF CONSIDERATION (extracted from decision III/11 and country reports)	OBJECTIVES + ACTION PLANS (references from Canada report and GPA)	EXAMPLES OF PROJECTS PROPOSED
Para 11 + Annex 3, item: (i.) + (ii)	and biodiversity-friendly practices) • poverty, socio-economic issues, environment • cultural diversity and biodiversity **Case studies** • pollinators • soil micro-organisms important to agriculture	conservation of valuable farm animal genetic resources; continue to sample native woody plant populations and conduct ex situ conservation of native plant material); implement activities of GPA Promote information sharing on agro-biodiversity issues (incorporate biodiversity issues into existing information, education and awareness programmes; work with stakeholders to develop info. materials) Build partnerships within and with other countries to improve research capabilities and understanding of biodiversity in agro-ecosystems (implement MOU to support sustainable development in natural resources sectors; build partnerships; study impact of agricultural management technologies on soil biodiversity; provide diagnostic tools and ID services for introduced insects, arachnids, fungi and plants; improve Govt's analytical capacity to predict impacts of policy and programmes on biodiversity; develop guidelines for non-trade distorting incentive measures to conserve agro biodiversity) Collaborate with other countries to develop and share knowledge, expertise and technologies derived from use of GR in a fair and equitable way (develop economic valuation methods to assess benefits derived from use of GRFA; transfer knowledge, expertise and technologies derived from use of GR to other countries on mutually agreed terms; participate in international networks (e.g. crop networks of IPGRI) and fora (COP-CBD, FAO-CGRFA) to ensure co-operation to conserve, exchange and use GR; Facilitate use of and access to AAFC samples of	conservation measures of vulnerable habitats and threatened species. Latvia: (1) Diversity of pollinators and sustainable agriculture (3 yrs) US$97,000 (Aim: identify causes of change in pollinator abundance and diversity; estimate economic cost of reduced pollination; promote sustainable agriculture and pollinator diversity (2) Mycorrhiza and sustainable agriculture (2 yrs) US$47,000 (Aim: evaluate influence of agricultural practices on the biodiversity of mycorrhizal fungi, develop recommend-ations for sustainable agriculture; raise environ-mental awareness of farmers

DECISION III/11	AREA OF CONSIDERATION (extracted from decision III/11 and country reports)	OBJECTIVES + ACTION PLANS (references from Canada report and GPA)	EXAMPLES OF PROJECTS PROPOSED
		genetic resources (develop/update catalogues and inventories of collections; develop mechanisms to facilitate access to samples/specimens; provide access to GR in situ in community pastures)	
Paras 15(b), (c), (d), (i), (l), (m) 18, 19, 20 21, 22 23 24	**Identification and Establishment of Instruments/Mechanisms** • Policies (national and international); support/incentive measures, internalise environmental costs, impact assessments) • Legislation (national and international) revised IU, access and benefit sharing; PIC -hazardous chemicals; biosafety; introduction of exotic species) • Programmes (FAO Global System on PGRFA; FAO Global Strategy for Management of Farm Animal Genetic Resources (GSMFAGR)) • Guidelines and standards e.g. agro-chemicals • Services: research, extension, marketing • Indicator development and assessments (EIA, etc) • Funding mechanisms • Collaboration WTO/CTE, FAO, UNEP, GEF, UNESCO, etc	Include principles of biodiversity conservation and sustainable use in agricultural policies and programs (identify opportunities for integration; support adoption of programmes that do not favour particular commodities or encourage intensive monocultures; examine instruments as incentives; promote national image and provide incentives for green agri-food system and conservation of agrobiodiversity) Work with other countries/participate in international fora to promote conservation and sustainable use of biological resources and their diversity (encourage involvement of agri-food sector in developing positions and negotiations; participate in negotiations for biosafety protocol) Include conservation and sustainable use of biodiversity in assessment processes (improve current EA guidelines and methodologies; improve consideration of biodiversity in EA of agricultural policy and programmes; consider vulnerable species and rare, fragile or unique ecosystems in EA) Adopt and implement appropriate measures to safeguard biodiversity in community pastures (develop and adopt innovative techniques and range management practices for ecosystem conservation; protect species at risk and their habitats; revegetate using native species; protect wetlands)	Latvia: (1) Monitoring of biodiversity in agricultural lands (1 yr) ECU 37,400: to estimate agricultural influence on biodiversity. (2) Prepare recommendations on regulations and measures to preserve biodiversity through sustainable agricultural development for concerned ministries (Env. Agric, Rural Devt.) (3) Provide guidelines for creation of a monitoring system to trace the distribution of vulnerable habitats and landscape features important for biodiversity and estimate impact of future regulations and policies on sustainable farming practices Canada: (1) Regulation to prevent introduction/spread of animal and plant pests and diseases and ensure safety of biotechnology products. (2) Policy integration by considering biodiversity objectives in proposed projects, policies and programmes. (3)Develop agri-environmental indicators to enhance the information base and provide info. on conditions and trends related to agriculture and sustainable practices.

Annex 1: Guiding Principles
outlined in Canada's Action Plan on Agricultural Biological Diversity
(Agriculture and Agri-Food Canada-AAFC, 1997)

"It is recognised that a number of environmental, social, economic and political considerations need to be taken into account in the implementation of the Action Plan for Biodiversity of Agriculture and Agri-Food Canada (AAFC) Since there may be circumstances where these considerations may be given different priorities, AAFC's action plan will be guided by the following principles:

- **Precaution**: Where there are threats of serious or irreversible damage to biodiversity, lack of scientific certainty should not be used as a reason for postponing mitigative actions that are cost effective or justified for other reasons.

- **Shared Responsibility:** Actions to address biodiversity issues in agriculture need to involve other federal departments, provincial governments, intergovernmental organisations, international funding agencies, private sector enterprises, universities and other research institutions, non-governmental conservation groups, producer associations, producers and local communities.

- **Competitiveness:** Measures to address biodiversity issues should be sensitive to the competitiveness of the agri-food sector and market forces, the quality of life in rural communities, and Canada's ability to provide a high-quality food supply.

- **Integration:** Biodiversity should be considered at the earliest stages of development, and through the entire life cycle of departmental plans, policies, programmes and projects.

- **Continuous Improvement:** This action plan will evolve as scientific and economic understanding of biodiversity and its relationship with agriculture increases and as technologies are developed. It should provide the starting point to identify opportunities to conserve and sustainably use biodiversity in the agricultural sector."

Annex 2: Submission by the Government of Norway

The following submission from the Government of Norway that was received by the Executive Secretary on 28 August 1997 is attached here in full as there has been no time to incorporate the information into this Information document.

CONVENTION OF BIOLOGICAL DIVERSITY: PRELIMINARY REPORT FROM NORWAY ON ONGOING ACTIVITIES AND MEASURES FOR MAINTENANCE OF BIOLOGICAL DIVERSITY IN AGRICULTURAL PRODUCTION

- follows the indicative list of thematic areas in Annex 2 to COP Decision III/22

Background

The Norwegian topography, nature and climate limit the land area suitable for settlement and farming. The total agricultural area is approximately one million hectares, which is less than three per cent of the total land area. However, agriculture forms the main basis for economic activity and hence for settlement in many areas. In one out of four municipalities, agriculture directly or indirectly employs more than 50 % of the population.

Because of the geographical and topographical conditions the farmland is divided into scattered and relatively small plots, some of which are very hilly. Only limited areas have fairly wide stretches of flat land. The average farm-size is 10 hectares of cultivated land. Grass is the most important crop and covers more than 55 percent of the farmland. About 35 percent of the farm area is used for cereal production, and the remaining land is used for other fodder crops, potatoes and vegetables. Milk and meat production are the cornerstone of Norwegian farming. However, the size of the stocks is small compared to other countries. Norwegian regulations promoting grain production in central parts of the country and the best agricultural areas, and livestock production in less favoured areas have been an important instrument of regional policy in securing existing farm-land and agriculture production throughout the whole country.

In northern and western Norway, and in the mountainous regions, the production possibilities are limited. In these areas livestock production dominates. Cereal production is concentrated in the relatively flat regions of eastern Norway and some in the south-western and middle regions.

Objectives

The question of biological diversity in agriculture is complex. Both diversity of wild and domestic species and terrestrial and aquatic ecosystems are affected by increased pressure on cultivated land.

Disposal of land resources has been important for maintaining the ecosystems based on natural and traditional cultivated habitats. It has therefore been an important objective to protect the land resources and to improve the production capacity in terms of sustainability.

The aims have also been to reduce the total pressure on the environment from agricultural activities and to stimulate sustainable use and maintenance of genetic resources for future research, breeding and biotechnological development.

Measures

1. Land resources
The management of land is based on the principle of integrated land and resource management.

Both legislative, financial and administrative instruments are used to protect the biological diversity of the agricultural landscape.

The revised *Land Act of May 12th 1995* facilitates use of all land in the country so that forests and mountains, and arable land, can be utilised to the best benefit of society. Furthermore, importance is attached to achieving sustainable farming which implies that all cultivated land shall be kept in proper condition in order to avoid damage to nature, biological diversity and valuable cultural landscape. The regulations for environmentally friendly farming practices are under preparation. In addition; farmers have to comply with provisions like:

- min. 0,4 hectare of spreading area per animal manure unit
- all cows and cattle should be grazing outside for at least 8 weeks every year.
- all farmers should make balanced plans for fertiliser management

The Acreage and Cultural Landscape Scheme which was introduced in the late 1980's, aims to agricultural policies and payments in a more sustainable direction, both ecologically and economically. The financial support encourages the maintenance of farmland in production . In order to secure environmental considerations and to avoid damages to the existing landscape, there are certain obligations which have to be fulfilled, e.g. :

- streams and rivers should not be canalised or channelled underground
- open ditches should not be closed
- forest margins and other areas of fringe vegetation should not be tilled
- stone walls, clearance cairns and remnants in fields should not be removed
- land grading is not to be undertaken
- paths are not to be closed or tilled
- fringe vegetation is not to be sprayed with chemicals

The consequence of not following the requirements is denial of financial support for up to 3 years.

In certain areas, requirements and measures need to be more vigorous than in others to take care of the biological diversity. Several specific supporting measures have therefore been established in order to secure cost-effectiveness and targeting. To obtain these kinds of measures farmers have to sign an agreement with the local agricultural authorities.

When receiving the *Extended Support to Landscape Maintenance and Development* the farmers are not allowed to use fertiliser or pesticides if they receive payment, unless it is a part of the management plan. Eligible measures are:

- conservation of biological diversity
- improvement of public access throughout the country-side
- preservation of cultural relics and the surrounding areas
- maintenance of areas characterised by traditional agricultural practises

The *Environmental Adaptation Programme* aims to promote a change from grain production to extensive farming based on grass production (or other crops which give good erosion control) on land susceptible for soil erosion. The farmers must sign a contract to enter the program and will receive an annual payment for the contract-area. Use of tillage and fertiliser are restricted and use of pesticides is forbidden.

The *Environmental Adaptation Programme* goes further than the *Grants for Amended Soil Management*. The objective of the latter measure is to encourage amended soil management routines and/or sowing of vegetation in areas particularly susceptible to erosion. To be approved for payment the soil is not to be to tilled in the autumn, and / or counter-erosion vegetation have to be sown. e.g. ploughing.

A support scheme of *Grants for Improvement of Environmental Technical Facilities* is established to prevent erosion, runoff and pollution from agriculture. It has been important to improve the storage facilities for manure and silage. Also other eligible measure have been added, as establishing of hedgerows/windbreaks, vegetation zones, sedimentation ponds, constructed wetlands etc. Measure's impacts on landscape diversity and recreation value will be given increased priority in the future.

Grants for Summer-Mountain Farming aims to encourage the upkeeping of a traditional milk production in mountainous regions in order to conserve the agricultural landscape by grazing of cows and cattle and using of agricultural buildings.

Grants are also provided to encourage conversion to and maintenance of *Organic Agricultural Production*. Organic farming encourages biological diversity and use of varieties with naturally resistance to pests and diseases. The system requires a balance between the amount of livestock and the area of land under cultivation. Soil fertility is maintained chiefly by recycling the organic material. Synthetic fertilisers and synthetic/chemical plant protection products are not used.

The advisory service and research on organic farming is also supported by this scheme.
The most important goals of organic farming are:

- to manage natural resources so as to avoid detrimental effects on the environment, and to maintain long-term fertility of the soil
- to secure genetic diversity and multiplicity of species
- to create an environment which allows livestock to carry on all aspects of its innate behaviour

The scheme of *Quality Systems in Agriculture* (QSA) has been introduced by the farmers' organisations. These are to be established at farm level, and will guarantee a certain quality of the agricultural production and the products, including environmental and ethical quality. The system will help the farmers to document towards consumers and authorities how the production of the agricultural products have been carried out.

A scheme named *Environment and Resource Plan* (ERP) is also launched as an element of t the total quality system (QSA). The ERP will be a tool for farmers to take environmental considerations. The plan contain detailed schemes for tillage, use of fertilisers, pesticides, landscape etc. Both ERP and QSA are measures on voluntary basis implemented by the Norwegian Farmer Union and supported by governmental funding.

2. Water resources
The main agricultural regarding water is on water supply, irrigation, fishing and leisure activities. There is a private right of ownership to the water resources. The regulations regarding water resource management are not managed by the Ministry of Agriculture. Sustainable use of water in agriculture is promoted by integrated management, i.e. in plant production, the use and the quality of water is focused.

3. Plant, animal and microbial genetic resources.
Plant and animal genetic resources are being preserved in different ways. In co-operation through the Nordic Gene Bank for Agricultural and Horticultural Plants (NGB) the Nordic countries preserve plant material ex situ. Seeds are kept dry at -20 C. Fruit trees, berries and landscape plants are preserved in clonal archives and potatoes are preserved in vitro at - 20 C. The work on preserving genetic resources of domestic animals has also been developed.

Traditional livestock breeds (poultry) are kept in national «gene banks» and local farmers who preserve traditional breeds are supported by the government. The strategy on preserving these genetic resources will be further developed.

4. Wildlife.
Agricultural land is scattered and divided in relatively small farm units, which gives large boarder strips suitable for wildlife. Regulation for maintaining and enhancing conditions for the wildlife is an integrated part of land resources management and is described under item 1.

According to statutory provisions given May 2nd 1997 on the legal basis of the Land Act, there are restrictions on cultivation of new arable land. Similar provisions are given regarding building of roads for agricultural purposes. The aim of these regulations is to limit destruction and disturbance of the habitat of natural ecosystems.

5. Air and climate.
Emissions dangerous to the ozone layer occurred in agriculture mostly in connection with livestock farming, and in addition from wetlands, ponds etc. Development of environmental sound productions methods contributes to reduce such emissions.

6. Farm inputs.
Pesticides
Pesticides used in arable farming and in fruit production are essential for combating harmful organisms to plants. Use of pesticides in agriculture may however also cause exposure to non-target organisms. During and after application of pesticides, a considerable amount may end up in soil, ground water, surface water and non-target vegetation . The presence of pesticides in these environmental areas may constitute risk to biological diversity and the ecosystems.

The government has since 1990 conducted an *Action Plan to Reduce the Use of Pecticides*.
In order to limit the negative effect of pesticides, the pesticide regulations require an approval of pesticides before marketing. The approval procedure of pesticides is based on a risk-benefit evaluation and there is need of a five-year re-registrations of all pesticides on the market.

There is also requirements of authorisation for sales and application of pesticides and restrictions on pesticide application on cultivation on the fringes of cultivated land. Furthermore there are developed tests for spraying equipment, consultation and warning programmes based on integrated pest methods, and treshold values. Also monitoring of pesticides residues in surface and groundwater from cultivated land has been conducted.
Even though the sales of pesticides has been reduced, pesticide residues are found in water-samples.

The *Action Plan* is now being evaluated and further measures in order to reduce pesticide use and promote use of non-chemical plant protection techniques are to be launched.

Nutrient balance
Nutrient balance concerning the amount and compound of manure and artificial fertilisers is a premise for good fertilising practice. The farming of liivestock is regulated in order to keep it in proportion to the area suitable for spreading of manure. Farmers are obliged to work out plan for fertilising in order to be qualified to get full financial support. A program is running for working out prognoses of contents of nitrogen in soil as background for extension services to farmers.

A program to save energy in greenhouse production is run to implement new and better methods of production. Energy-efficiency research also emphasises improved farming equipment and farming methods in general.

There is a need for supplementary irrigation only, and in general there is enough water due to sufficient rainfall in most of the country. In some areas which lye in rainshadded districts, irrigation is more common. For irrigation in greenhouses, equipment has been developed to resirculate water in order to prevent pollution from discharges of surpluses of water rich on nutrients.

7. Wild sources of food.

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8. Traditional knowledge
Through the *Extended Support to Landscape Maintenance and Development* there is also given financial support to performance and teaching of traditional agricultural practices.

Knowledge about sustainable agriculture has increased among farmers and on all levels in the authorities and still need to be further encouraged. In addition, priority is given to develop better co-operation between the

agricultural sector and the environmental authorities, and to include the farmers organisations in such network. Progress in this work relies on further research.

9. Marketing conditions for agricultural products
Improving marking conditions for products which fulfil environmental requirements, is done by a program which focuses on the quality of the products and the productions methods. For production according to directive for organic farming there are systems to approve each farm, the productions methods and labelling the products for consumer information.

10. Land-use pressures
Even if urban areas represent a small share of the land use in Norway, they are competing with agricultural areas and valuable biological resources. Urban expansion has to some extent resulted in loss of high productive farmland and rare nature. The government has therefore enforced a strict soil-protecting policy. The main aim is to take care of areas with high and variable environmental qualities.

Maintaining diversity-friendly practices on agricultural land in Norway is mostly promoted by strict regulations of land for other purposes (traffic, building etc.) and by combating abandonment of land in rural districts. Furthermore land-use pressure is restricted through comprehensive land resources management and development of more environmental friendly practices, to item 1.

11. Agroforestry.
Agroforestry as defined internationally is not in use in Norway, but forest and mountainous areas are much in use summertime's for pasture. Such use of land is very important for the agriculture in many rural districts by securing the basis for the production, including traditionally production as a support for tourism industry, special cultural interest and to maintain the characteristics of cultural landscape in rural districts.

Future challenges

Mapping of vegetation and soil, research, extension services to farmers.
A registration program of changes in agricultural areas and registration of changes caused by rural development, cultivation of afforestation shall be performed in 1998. This system will improve the basis for evaluation of the results of the different measures for maintaining of biological diversity. Agroecological zones based on information on climatic conditions and soil information should then be established as a basis to develop the policy on Land resources.

In the future programs the emphasis on protection of land that has the highest vulnerability will be increased.

The priority will be laid on maintenance of the diversity of different ecosystems and landscape categories more than the number of species. When some ecosystems appear to be rich in number of species others may contain very few. However what is common for this kind of landscape is the connection between the ecosystem and a traditional agricultural practice which may be essential to the existence of the ecosystems and the different species.

Norway has not yet included information on the two areas identified by COP3 as deserving case studies, namely pollinators and soil micro-organisms.