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des  
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pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

## Item 4 of the Provisional Annotated Agenda

### COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

### INTERGOVERNMENTAL TECHNICAL WORKING GROUP ON ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE

First Session

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### THE STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE

#### CONTENTS

I.	Introduction	<i>para.</i> 1-4
II.	Process for developing the <i>Report</i>	5-6
III.	Key elements of the <i>Report</i>	7-8
	State of Diversity	9-16
	State of Capacity	17-18
	State of the Art	19
	Global Outlook	20
IV.	Monitoring and Reporting	21-22
V.	Possible recommendations for the Eighth Session of the Commission	23
		<i>page</i>
<i>Appendix 1:</i>	Work Plan for preparing the <i>Report of the State of the World's Animal Genetic Resources</i>	8

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## THE STATE OF THE WORLD'S FARM ANIMAL GENETIC RESOURCES

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### I. INTRODUCTION

1. The purpose of this document is to assist the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture (Working Group), in considering the preparation of a periodic *Report of the State of the World's Animal Genetic Resources*, and in making subsequent recommendations to the Commission on Genetic Resources for Food and Agriculture. The document describes how the *Report* could be prepared and identifies its possible coverage. It is proposed that the first *Report* be prepared by a country-driven process, drawing in particular upon country reports. Two options are described. The first largely draws together existing but extremely dispersed information and data. The second would also update and enhance critical country data and information, as part of the development of country reports. Both options provide for substantive support, where necessary, to governments in the preparation of their country reports.

2. The development of the Global Strategy for the Management of Farm Animal Genetic Resources, over the past four years, has established a framework<sup>1</sup> that can ensure the cost-effective preparation of country reports, and the *Report on the State of the World's Animal Genetic Resources*.

3. Animal genetic resources contribute significantly to food and agriculture production, and must be wisely used, developed and conserved, as part of efforts to achieve and sustain world food security. FAO initiated the Global Strategy to increase awareness of the many roles and values of these resources, and to assist countries in their wise management. The *Report* would play a crucial role in advancing the Global Strategy, as part of efforts to achieve global food security by:

- Providing the Commission with regular systematic information on the state of animal genetic resources for food and agriculture, as the basis for its policy and management decisions.
- Establishing essential baseline data and information on the status of animal genetic diversity, which will expose gaps, and help to establish country, regional and global priorities for the management of animal genetic resources, as part of the overall objective of achieving and sustaining global food security.
- Assessing national capacity to manage these resources, identifying priorities for national capacity-building.
- Examining the methodologies and technologies that are being employed, or are available, to use, develop and conserve these resources, in a sustainable manner.
- Increasing awareness of the many roles and values of animal genetic resources, and thereby promoting their better use, development and conservation.

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<sup>1</sup> Described in more detail in document CGRFA/WG-AnGR-1/98/2.

- Promoting collaboration and cooperation among governments and non-governmental organizations involved in the management of animal genetic resources.
  - Assisting in the identification and deployment to farmers of animal genetic resources that can increase production and productivity across the full range of available production environments.
  - Improving understanding of the status of breeds that are currently not of value to farmers, and of wild relatives of domesticated animals, to provide the foundation for an Early Warning System for Animal Genetic Resources at risk of being lost, and identify opportunities for the future use of these resources.
  - Identifying situations where an emergency response could be considered, to prevent the loss of animal genetic resources at risk.
  - Establishing the capacity and the information base for long-term monitoring and regular reporting on the state of animal genetic resources. This information will also be made available to the Conference of the Parties to the Convention on Biological Diversity, thus providing a basis to harmonize future reporting on genetic resources in different international forums.
4. When the Commission has agreed a set of indicators for the evaluation of the implementation of the Global Strategy, these indicators will be incorporated in the structure of data-collection for the *Report*, so that automatic reporting can be generated, in future, from data maintained in DAD-IS.

## **II. THE PROCESS FOR DEVELOPING THE REPORT ON THE STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES**

5. The coverage and methodology for the *Report of the State of the World's Animal Genetic Resources* would be harmonized with those of the *Report of the State of the World's Plant Genetic Resources*, the first edition of which was prepared for the Leipzig International Technical Conference on Plant Genetic Resources, so as to allow the development of a comprehensive understanding of the state of agricultural biological diversity, in general.
6. The process for developing the *Report* would be country-driven, thereby also increasing national and regional capacity to use, develop and conserve animal genetic resources for food and agriculture. Preparation of the *Report* would include the following activities and responsibilities:
- The Global Focal Point would initiate the necessary mobilization of financial resources, and develop and distribute guidelines to facilitate the preparation of country reports. Mobilization of financial resources, and preparation of the guidelines, would occur in 1999.
  - The Global Focal Point would continue to use the Domestic Animal Diversity Information System (DAD-IS) as the clearing-house mechanism for the Global Strategy, including to distribute country guidelines. The System would provide the basis to prepare country reports and the *Report*. The Global Focal Point and Regional Focal Points would further develop the system to ensure that it is capable of acting as the country and global data and information system for animal genetic resources, and ensure that DAD-IS is operating by 2000, in all countries preparing country reports.

- Each established Regional Focal Point would convene training sessions, as required, to enhance the use of DAD-IS, and assist countries to develop their country reports. These sessions would begin in 2000, in association with other training workshops held to advance aspects of the Global Strategy.
- National Focal Points would provide the interface with Regional Focal Points and the Global Focal Point. National Focal Point Coordinators would establish within-country networks, to collect and analyze country data and information for all important farm animal species, and oversee preparation of country reports, using the guidelines provided by the Global Focal Point. DAD-IS would provide a country-secure, networked system for storing animal genetic resources data and information, and a mechanism to cost-effectively synthesize country data and information to produce the *Report*. It is anticipated that all country reports could be completed by the end of 2002.
- The Global Focal Point would encourage international organizations and non-government organizations and other stakeholders to contribute to the preparation of the *Report*, by establishing electronic conferencing and other mechanisms.
- The Global Focal Point, in collaboration with Regional Focal Points and countries, would synthesize all data and information collected, prepare the *Report*, and present it to the Commission at its tenth session, in 2003.

### **III. KEY ELEMENTS OF THE REPORT ON THE STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES**

7. Preparation of the *Report of the State of the World's Animal Genetic Resources for Food and Agriculture* would establish essential baseline information in three major areas:

- The State of Diversity;
- The State of Country Capacity to manage animal genetic resources; and
- The State of the Art, and the available methodologies and technologies to assist farmers, breeders and scientists to better use, develop and conserve animal genetic resources, and thereby contribute to global food security and rural development.

8. The *Report* would also establish the critical baseline data and information required for long-term monitoring and reporting on the status of animal genetic resources. It would contain a global outlook to examine potential future roles for animal genetic resources and project likely developments, and would help stimulate sustainable intensification of production systems.

#### **The State of the Diversity of Animal Genetic Resources**

9. The *Report* would provide a reasoned estimate of the level of existing diversity and of its rate of loss. The information required would be obtained by undertaking breed surveys and characterization assessments for the most important domestic animal species for food and agriculture. FAO is preparing descriptors and survey and assessment guidelines, and has developed a framework for collecting and storing inventory data and information. At present, partial inventory information on more than 4000 mammalian and avian breeds is stored in DAD-IS, but the database is far from complete, and it would require a significant investment to develop it to the point where it could provide a solid basis for sound decision-making. The preparation of the *Report* would provide the opportunity objectively to identify, describe and

inventory breeds and further develop the DAD-IS database. Countries would be asked to assemble several types of information when preparing or revising their breed inventories, including providing information on the regional isolation of breeds and on the production environment under which they are developing, use patterns, differences in morphological and physiological characteristics, animal numbers, breeding patterns and technologies being used, development of breed improvement strategies, and historical information on the origin of the livestock and the degree of genetic isolation.

10. Another essential element in determining the State of Diversity would be reporting on the status of comparative breed characterization case studies. The objective of comparative studies is to better predict relative performance under particular production environments, and adaptive fitness characteristics developed in response to the primary stressors operating in these production environments. The results are used to configure genetic development activities directed at realizing rapid and sustainable production and productivity gains. In particular, evaluation of the relative performance of locally adapted breeds and exotic breeds, over total lifecycles, is critical for policy-making. Too frequently, locally adapted animal genetic resources are replaced by exotic genetic material, without an objective assessment of their long-term production and productivity potential. Consequently, the impact of the introduction of exotic genetic resources often cannot be objectively measured or assessed. At the national level, comparative assessments provide farmers with an objective basis for the use and development of locally adapted breeds, and for considering the potential of specific exotic genetic resources. As part of the preparation of country status reports, all countries would be asked to describe their capacity to undertake comparative assessments, provide case studies of assessments already undertaken, and collate and report on the results of comparative studies conducted to date, utilizing the reporting guidelines developed to enable objective reporting. Countries would also be asked to outline their priorities for future use of animal genetic resources by production environment assessment activities, so that this could be taken into account, when setting priorities for the implementation of the Global Strategy.

11. Consideration of the State of Diversity would also include an assessment of existing *ex situ* conservation storage conditions and capacity, including levels of expertise, and training needs, in the light of the available technologies. It would identify which species and breeds of domestic animals were adequately represented in storage facilities, and gaps, priorities and duplication. Opportunities for using advanced technologies, and for enhancing global and regional collaboration, would be examined. The level of characterization and other information on the stored genetic material available at each storage facility would be assessed, and the conditions for accessing this information, and the genetic material itself, described.

12. The extent of diversity amongst breeds within each important farm animal species would be another essential element of the *Report*. The Informal Panel of Experts was asked to determine the most appropriate and cost-effective mechanism for determining domestic animal diversity, and identifying unique characteristics. It proposed a project called "Measurement of Domestic Animal Diversity" (MoDAD), which requires collecting blood and/or skin tissue samples from the fourteen domesticated animal species most important to food and agriculture. Genetic material (DNA) would be extracted from the blood samples, analyzed for variation in molecular markers, and the data used to estimate genetic distances among sampled breeds. Some independent studies are underway in various countries, but the coordination of the field sampling, sample assaying, data analysis and reporting, necessary to ensure comparable results, does not exist. During preparation of country status reports, countries would be asked to report on the status of their capacity to undertake measurements of animal genetic diversity, and report on existing work that has been undertaken in their country. This information would be synthesized at the Global Focal Point, to assist in setting priorities for future research, and to determine opportunities for greater collaboration and coordination (including of work underway), and further use of existing data, as part of the implementation of the Global Strategy.

13. The State of Diversity would determine the relative status of populations within each breed, with the aim of identifying and ranking those breeds at greatest risk of loss. Without a comprehensive survey and assessment, it is impossible accurately to determine the rate of loss of animal genetic resources. As the results of the survey conducted by FAO, and presented in the *World Watch List for Domestic Animal Diversity* show, an estimated one-third of all breeds of livestock are currently at risk of being lost. With so many breeds potentially at risk, a solid foundation is required on which to base country, regional and global conservation activities, to ensure that scarce financial resources are used effectively. Countries would be asked to provide status reports on their breeds, based on the best available data and information, in both *in situ* and *ex situ* conditions. If financial resources are available, countries will be requested to conduct surveys to identify those breeds most at risk. The Global Focal Point and Regional Focal Point would synthesize country data and information to provide a global and regional overview of the status of breeds, and would identify gaps and unnecessary duplication of effort.

14. Once entered in DAD-IS and synthesized in the *Report*, this spectrum of information will greatly assist efforts to sustainably use, develop, conserve and access the animal genetic resources for food and agriculture which are best for each major production environment. This will support efforts to achieve sustainable intensification of the various agroecosystems, those with high input-output potential as well as those often large and important but also sometimes fragile medium-and lower-input ecosystems.

15. Two options for developing the database for the *Report* exist:

- Under Option 1, country status reports would draw largely on existing data, which would be collated and analysed, using the many different in-country sources.
- Under Option 2, countries would update or further develop their breed surveys and the other critical data and information, so as to provide a current comprehensive baseline picture of the state of the diversity.
- Both Options 1 and 2, would require basic training and enhanced national capacity to support the collection, synthesis and collection of data, as provided for in line 2.1 and 2.2 of *Appendix 1*, “Work Plan and Indicative Extra Budgetary Needs”.

16. Under Option 2, there would be an additional requirement for generating critical data over the same period, 2000 to 2002, as shown in line 2.3 of *Appendix 1*. These additional data would not only significantly improve the basic management data and information on animal genetic resources, but would help develop national capacities to manage their resources.

### **State of Capacity to Manage Animal Genetic Resources**

17. The sustainable use, development and conservation of animal genetic resources depends on a wide range of relevant management and technical capacity. The *Report* would include an assessment of each participating country’s overall capacity in, *inter alia*, population and quantitative genetics; valuation of animal genetic resources and options for development and conservation; livestock systems; animal breeding and sustainable breed development, characterization and recording; animal health; *in situ* and *ex situ* conservation; biotechnology; communications; and data and information management. The assessment would also cover country capacity to conduct animal genetic research and provide relevant education and training. The *Report* would also assess existing national capacities to increase awareness of the roles and values of animal genetic resources, provide incentives measures, and create the legislation, regulations and policies framework necessary to achieve national animal genetic resources goals and objectives.

18. The *Report of the State of the World's Animal Genetic Resources* would provide an opportunity to assess the effectiveness of country, regional and global collaboration. Effective implementation of the Global Strategy requires collaboration and coordinating at all levels for this important sector of agrobiodiversity. An assessment of existing mechanisms would help to identify options to enhance future collaboration and coordination among countries and regions, and among governmental and non-government organizations.

#### **State of the Art - Methodologies and Technologies**

19. The Report would include an assessment of available technologies and methodologies relevant, *inter alia*, to: characterize, better use and develop national animal genetic resources; plan and implement *in situ* and *ex situ* conservation programmes, especially for small populations at risk; enhance data and information management and communications; establish or improve comparative breed assessments, and animal production recording; and identify and develop sustainable production systems for medium to low-input production systems, as well as for high-input systems. The assessment would also cover national capacities to utilize the available animal breeding and conservation technologies, which would assist both countries and donors to establish priorities for enhancing technical capacity.

#### **A Global Outlook for Animal Genetic Resources**

20. The *Report* would also include a critical Global Outlook, which would examine the future potential of animal genetic resources, their conservation and sustainable utilization. Changes in market demand, environment conditions and national, regional and international legislation and policies, will influence the future use and development of animal genetic resources, as will advances in biotechnology and other technologies. An examination of the major influences that will potentially significantly shape the use, development and conservation of animal genetic resources is essential, and looking to the future, to plan the wise use and development of animal genetic resources, including the conservation of genetic resources not currently of interest to farmers. The objective of the Global Outlook would be to provide countries with sound information and an analysis of options, to help them develop their future national animal genetic resources programmes.

### **IV. MONITORING AND FUTURE REPORTING ON THE STATUS OF ANIMAL GENETIC RESOURCES**

21. Practical and cost-effective monitoring systems will be required, as part of the implementation of the Global Strategy. Monitoring and reporting on each of the major livestock species and breeds is essential, to evaluate progress toward management objectives, and to regularly identify breeds that are at risk. Monitoring is also crucial, as the use of modern technologies can rapidly change the genetic security of locally adapted breeds. The preparation of country reports and of the first *Report of the State of the World's Animal Genetic Resources* will provide countries with a solid foundation to manage their animal genetic resources. This process will also facilitate country and global efforts to monitor and periodically report on the status of their genetic resources. By the end of the process for the preparation of the first *Report*, DAD-IS will have expanded to a country and global data and information management system for animal genetic resources, which will, in future, provide cost-effective synthesis of country data and information. This will facilitate periodic updating of the *Report*, and assist the Commission on Genetic Resources for Food and Agriculture to evaluate progress in implementing the Global Strategy and monitoring the status of genetic resources for food and agriculture generally.

22. The *Report of the State of the World's Animal Genetic Resources* will also be made available to the Conference of the Parties to the Convention on Biological Diversity.

#### **V. POSSIBLE RECOMMENDATIONS TO THE EIGHTH SESSION OF THE COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE**

23. The Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture may wish to recommend to the Commission that it:

- Initiate immediate preparation of a country-based *Report of the State of the World's Animal Genetic Resources*, as a necessary activity within the Global Strategy.
- Endorse the proposed "Work Plan for the *Report of the State of the World's Animal Genetic Resources*", under option 1 or option 2, as given in *Appendix 1* to this document.
- Encourage countries and international organizations to collaborate to secure the necessary financial resources to undertake preparation of the *Report*.



**WORK PLAN FOR PREPARING THE REPORT OF THE STATE  
OF THE WORLD'S ANIMAL GENETIC RESOURCES<sup>1</sup>**

<b>ACTIVITY</b>	<b>PLANNED DATE</b>
<b>1. Enabling:</b>	<b>1999</b>
1.1 Prepare detailed budget and mobilize resources <sup>2</sup>	
1.2 Prepare SoW Guidelines for Country use <sup>3</sup>	
1.3 Upgrade DAD-IS functionality <sup>4</sup>	
1.3 Training for 150 National Co-ordinators <sup>5</sup>	<b>2000</b>
 <b>2. Country Action:</b>	 <b>2000-2002</b>
 <b>Option 1</b>	
2.1 Country Network training <sup>6</sup>	
2.2 Data collation, synthesis and reporting <sup>7</sup>	
 <b>Option 2 (Additional)</b>	
2.3 Complete critical data collection <sup>8</sup>	<b>2000-2002</b>
 <b>3. Synthesis and Reporting:</b>	 <b>2000-2002</b>
3.1 Collation and analysis	
3.2 Preparation of SoW Report	<b>2001-2003</b>

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<sup>1</sup> Assumes implementation of the Regular Programme Work Plan, for implementing the core activities required to develop the World Strategy.

<sup>2</sup> Including mobilization of resources and generation of involvement through the Informal Stakeholders Mechanism.

<sup>3</sup> Specific Guidelines developed, which assist countries to execute an effective and efficient SoW, and subsequently to update this at low cost; and also to enable efficient regional and global analysis and reporting.

<sup>4</sup> Development of the DAD-IS prototype "Action Planner" module and reporting functionality, enabling the system to be used by countries as the primary information collation, synthesis and reporting tool for the SoW, at country, regional and world levels, with the necessary beta field testing.

<sup>5</sup> Comprehensive training courses for National Co-ordinators in each region, in the SoW modalities, and use of the Guidelines and the enhanced DAD-IS functionality.

<sup>6</sup> Support for National Focal Point to train Country Networks in the SoW modalities and the use of Guidelines and enhanced DAD-IS functionality.

<sup>7</sup> The collation by countries of existing but dispersed data on the characterization, utilization, and *in situ* and *ex situ* conservation for all genetic resources of all important farm animal species, together with country level synthesis and reporting, utilizing DAD-IS as the enabling tool.

<sup>8</sup> Additional and systematic collection of critical base-line data, necessary for designing and implementing cost-effective country strategies for animal genetic resources management.