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

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CONTRIBUTIONS OF LIVESTOCK SPECIES AND BREEDS TO THE PROVISION OF ECOSYSTEM SERVICES

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I. INTRODUCTION

1. The Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture (Working Group), at its last session, acknowledged the important contributions of livestock species and breeds to the supply of provisioning services and the specific contributions of breeds kept in grassland-based production systems to the provision of regulating, supporting and habitat services related to sustainable grazing and land management. The Working Group recommended that the Commission on Genetic Resources for Food and Agriculture (Commission) request from FAO a range of follow-up actions, including awareness-raising, improvement of the mapping of breed distributions and the description of phenotypic measures and biological functions, improvement of assessment methods for the valorization of ecosystem services provided by livestock and technical support to countries.¹ The Commission endorsed the Working Group's recommendation.²

2. The present document reports on FAO activities in response to the request and links them to other international processes and findings on ecosystem services involving animal genetic resources.

II. FAO ACTIVITIES ON ECOSYSTEM SERVICES PROVIDED BY ANIMAL GENETIC RESOURCES

Ecosystem services in FAO's Strategic Framework

3. Work on ecosystem services is deeply embedded within FAO's Strategic Objective 2: "Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner".³ Within Strategic Objective 2, FAO has established the Major Area of Work – Ecosystem Services and Biodiversity (MAW-ESB) as a facilitating mechanism, designed to encourage cooperation among FAO divisions on subjects of common interest.

4. The MAW-ESB has work streams on, a) valuation and assessment of ecosystem services and biodiversity; b) capacity development for the management of ecosystem services and biodiversity; c) governance and policy actions for maintaining, restoring and enhancing the value of ecosystem services; and d) identification and mainstreaming of incentive measures in policy and practice.

5. Regarding animal genetic resources, the MAW-ESB is facilitating FAO-wide activities on the contribution of pastoralists and their animal genetic resources to integrated land management to help ensure the continued delivery of ecosystem services. A task force on integrated land management has been established and will produce a guidance document and other capacity building tools on landscape management and on valuation and incentive packages for the provision of ecosystem services.

6. The Commission secretariat, in collaboration with the MAW-ESB, is in the process of completing the report on *The State of the World's Biodiversity for Food and Agriculture* (SOW-BFA). Questions on the ecosystem services provided by livestock were included in Part III of the country questionnaire⁴ for *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture*⁵ (Second Report) and were analysed for the preparation of Background Study Paper 66: *Ecosystem services provided by livestock species and breeds, with special consideration to the contributions of small-scale livestock keepers and pastoralists*,⁶ and their analysis will also be included in the SOW-BFA.

7. Country reports received for the SOW-BFA will provide more insight into livestock interaction with associated biodiversity, and regulating and supporting ecosystem services provided by plants, animals, micro-organisms and invertebrates in all production systems, including grassland-based and landless livestock production systems.

¹ CGRFA-15/15/Report, paragraph 36;

² CGRFA-15/15/9, paragraph 18.

³ C 2015/3, paragraphs 41-43.

⁴ http://www.fao.org/ag/againfo/programmes/en/genetics/documents/SoW_Country_report_questionnaire.pdf.

⁵ <http://www.fao.org/publications/sowangr/en/>.

⁶ <http://www.fao.org/3/a-at598e.pdf>.

Awareness raising

8. The MAW-ESB has developed a website on ecosystem services that includes contributions of livestock.⁷ The website defines the concept of ecosystem services and explains their classification into provisioning, regulating, supporting and cultural services. Separate pages address the valuation of ecosystem services, best practices for their management, policies to ensure the equitable sharing of their benefits and possible incentives and other strategies to encourage farmers to protect or enhance them. FAO work on ecosystem services is described and documentation and other resources produced by FAO are made available for download.

9. The lack of large scale, consensual information hinders the recognition of the multiple benefits that pastoralism bring to food security and sustainability and the contribution of pastoralists to the policy dialogue. FAO launched the Pastoralist Knowledge Hub (PKH)⁸ in 2015.⁹ The PKH brings together pastoralists and the main actors working with them to create synergies for dialogue and pastoralist development and provides a platform for knowledge sharing. A primary objective of the PKH is to create awareness of the role of pastoralists and their livestock as providers of ecosystem services. The PKH is supported by the government of Germany and ten intergovernmental and non-governmental partners.¹⁰ The PKH organized seven regional pastoral gatherings¹¹ in 2015 and 2016 to facilitate regional and thematic discussions on issues of common interest to pastoralist communities. FAO has facilitated the links between the PKH and global and regional policy fora, including at the Second United Nations Environment Assembly.

10. In September 2014, FAO held the International Symposium on Agroecology for Food Security and Nutrition.¹² The symposium, which was organized with the support of France, the Swiss Development Cooperation and the Foreign Office of Agriculture of Switzerland, was attended by around 400 persons from more than 60 countries and included numerous interventions related to agro-ecological approaches for livestock production.¹³ The international symposium was followed up in 2015 with regional meetings held in Brazil,¹⁴ Senegal¹⁵ and Thailand.¹⁶

Information, methods and assessments

11. With a view to improve the mapping of breed distributions and the description of phenotypic measures and biological functions, particularly in grassland-based production systems, in order to better target interventions for livestock producers, FAO is consolidating information relevant to pastoralist systems, using methods, tools and data available across multiple FAO units and partner organizations, and organizing its dissemination through the PKH.¹⁷ In particular, FAO is consolidating and generating information on the geographical extent of pastoralist systems and populations, animal mobility patterns, and the distribution of breeds, feed rations and livestock productivity. Country consultation will be used for validation.

12. Because of its intrinsic complexity, biodiversity has received less attention than other criteria, such as greenhouse gas emissions, in environmental assessments of the livestock sector. Nevertheless, livestock has a considerable influence (positive and negative) on wild species and their habitats.

⁷ <http://www.fao.org/ecosystem-services-biodiversity/en>.

⁸ <http://www.fao.org/pastoralist-knowledge-hub/en>.

⁹ <http://www.fao.org/webcast/home/en/item/3904/icode>.

¹⁰ Coalition of European Lobbies for Eastern African Pastoralism (CELEP), International Fund for Agricultural Development (IFAD), International Institute for Environment and Development, International Land Coalition (ILC), League for Pastoral Peoples and Endogenous Livestock Development (LPP), Slow Food, United Nations Environment Programme (UNEP), Vétérinaires Sans Frontières International (VSF), World Alliance of Mobile Indigenous People (WAMIP), World Initiative for Sustainable Pastoralism (WISP).

¹¹ Bolivia, Germany, India, Kenya, Mali, Mongolia, Tunisia.

¹² <http://www.fao.org/about/meetings/afns/en>.

¹³ <http://www.fao.org/3/a-i4327e.pdf>.

¹⁴ <http://www.fao.org/americas/eventos/ver/en/c/287503>.

¹⁵ <http://www.fao.org/africa/events/detail-events/en/c/330741>.

¹⁶ <http://www.fao.org/asiapacific/events/detail-events/en/c/1262>.

¹⁷ <http://www.fao.org/pastoralist-knowledge-hub/en>.

Specific activities on assessing the impact of livestock on biodiversity were conducted within the Livestock Environmental Assessment and Performance¹⁸ (LEAP) project, a multi-stakeholder partnership between governments, the private sector and non-governmental and civil society organizations.

13. LEAP reviewed indicators and methods to assess biodiversity in the context of livestock production¹⁹ and a group of international experts was enlisted to develop principles for the assessment of the impacts of livestock on biodiversity.²⁰ Key principles include the recognition of the complex and multivariate nature of biodiversity and as a consequence, the need for clearly stating the objective and for scoping key biodiversity issues in any assessment. Assessments should consider both beneficial and detrimental impacts of livestock systems and include off-farm impacts, such as those arising from the cultivation of imported feed. Future methodological developments should allow for more comprehensive assessments to reveal trade-offs among different dimensions of agri-environmental sustainability and avoid decisions that inequitably shift the burden to a particular sector of the livestock value chain.

14. FAO has an extensive history of using Farmer Field Schools as a capacity building mechanism. In the current biennium, this mechanism will be expanded, with training for pastoralists, including the development of specific guidelines.

15. Pastoralist communities are highly exposed to environmental conditions and are thus particularly vulnerable to negative effects of climate change. FAO has developed the Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP)²¹ tool to help pastoralist communities to measure and monitor their climate resilience. The tool uses a participatory approach to better understand and incorporate the situations, concerns and interests of family farmers and pastoralists relating to climate resilience. The SHARP tool was developed in the context of Global Environment Facility (GEF) projects working on climate change adaptation, in partnership with universities, farmers, pastoralists, government and NGOs and has been field tested in eight countries in sub-Saharan Africa. SHARP is now being implemented in Angola, Burkina Faso, Mali, Mozambique, Niger, South Sudan and Uganda, with more countries planned for the future.

16. FAO is working on the assessment, management and restoration of dryland forests and agro-silvo-pastoral systems. FAO organized in Rome in January 2015, in collaboration with the International Union for Conservation of Nature and the World Resources Institute (WRI) with funding support from the European Union and the GEF, the first Drylands Monitoring week - "Monitoring and assessment of drylands: forests, rangelands, trees and agro-silvo-pastoral systems".²² More than 80 persons from various countries and international organizations attended. The event assessed the need and the status of monitoring and explored tools and new technologies to have a comprehensive monitoring of drylands (including forests and agro-silvo-pastoral systems). The event led to the "Rome Promise on the assessment and monitoring of drylands for their sustainable management and restoration",²³ through which participants agreed to: a) form an open-ended collaborative network or community of practice to advance monitoring and assessment of drylands, including understanding of their users; b) communicate the value and importance of drylands monitoring to relevant stakeholders, including policy makers and resource partners; and c) develop a dynamic roadmap for collaborative action.²⁴ A second week is being organised in April 2016 to follow-up on the implementation of the Rome Promise road map.

17. The GEF has recently approved the global project on "Participatory assessment of land degradation and sustainable land management in grassland and pastoral areas" for which FAO will be the implementing agency. Since 2014, FAO has been working together with local communities and

¹⁸ <http://www.fao.org/partnerships/leap/en>.

¹⁹ <http://www.fao.org/3/a-av151e.pdf>.

²⁰ <http://www.fao.org/3/a-i5050e.pdf>.

²¹ <http://www.fao.org/in-action/sharp/en>.

²² <http://www.fao.org/partnerships/great-green-wall/news-and-events/news-detail/en/c/274395>.

²³ <http://www.fao.org/forestry/42520-024e29e79642ddafda6941bf053ae9a35.pdf>.

²⁴ <http://www.fao.org/forestry/aridzone/88626/en>.

other partners in the framework of the Action Against Desertification project in support of the Great Green Wall for the restoration of degraded forests and agro-silvo-pastoral systems in six dryland countries of the Sahel using quality seeds of suitable native forest and fodder.²⁵ This work will be scaled up in 2016 and 2017. Valuation of the contribution of the restored areas for livestock feed is planned for 2017.

Valorization of ecosystem services

18. FAO continues to participate in The Economics of Ecosystems and Biodiversity (TEEB) initiative.²⁶ Several FAO staff contributed to the TEEB Agriculture and Food Interim Report,²⁷ which drew heavily from FAO publications and used analytical methodology²⁸ developed by FAO. The report included a case study that undertook a first partial modelling on ecosystem services in pastoral systems, based on the Maasai Steppe ecosystem, as well as a case study of the general ecosystem services provided by poultry, beef and dairy production systems on the global level.

19. The MAW-ESB is consolidating and improving methods for assessment and valuation of ecosystem services provided by sustainable agriculture as a basis for food security and resilient rural livelihoods. Its programme on Incentives for Ecosystem Services (IES) from Agriculture is mapping investments in conservation and intensification programmes to show how these could be combined to offer a more integrated solution to livestock keepers: a) tying public investments in livestock intensification with others investing in soil rehabilitation and agroforestry, b) integrating agrobiodiversity conservation requirements in existing produce certification schemes, c) including forest conservation as a requirement for access to rural credit lines dedicated to investments in reducing GHG emissions from livestock systems. IES supports a coordinated approach to planning and investment in agricultural and environmental measures, considering both public and private users of ecosystem services within the landscape. Country case studies include cattle ranching in Colombia.

Technical support provided to countries

20. FAO has been requested to support countries in taking appropriate measures to recognize and support breeds and livestock keepers that make essential contributions to supporting and regulating ecosystem services and to food security.

21. Within the MAW-ESB, a desk review was conducted on the role of different land uses, including rangelands, to improve water balances in the Zarqa River Basin in Jordan. A workshop was held in Amman with national stakeholders to present, discuss and validate the review findings. Recommendations were made on priorities and potential activities on land restoration and management for increasing water supply.

22. With a view to explore options for supporting the provision of ecosystem services through better grazing management, the role of specific breeds in the provision of such services, and the potential such measures may offer for integrated approaches to livelihood objectives, conservation and restoration of wild biodiversity and semi-natural vegetation types, climate change-related measures, water-related services and sustainable use of animal genetic resources, FAO has been cooperating with the Chinese Academy of Agriculture Science, the World Agroforestry Center and China's Northwest Institute of Plateau Biology on grassland restoration. Restoring degraded grasslands through more sustainable grazing practices and forage production can substantially improve the ecosystem services provided by those grasslands, including increased animal productivity and carbon sequestration. FAO has provided support to the Chinese partners in the development of a Verified Carbon Standard²⁹ that quantifies emission reductions from a range of activities; including improving the rotation of grazing animals among pastures, controlling grazing on degraded pastures, and restoration of severely

²⁵ <http://www.fao.org/in-action/action-against-desertification>.

²⁶ <http://www.teebweb.org>.

²⁷ <http://www.teebweb.org/publication/teebagfood-interim-report>.

²⁸ <http://www.fao.org/gleam/en>.

²⁹ Verified Carbon standards 2014-VM0026, see <http://www.v-c-s.org/methodologies/methodology-sustainable-grassland-management-sm>.

degraded grasslands; and thus supports the provision of incentives. The methodology is currently applied to the Three Rivers Sustainable Grazing Project³⁰ in northern China.

23. According to an informal survey of National Coordinators for the Management of Animal Genetic Resources, several countries have undertaken activities and developed policies that consider the joint interests of livestock production and wildlife and natural ecosystems. For example, in Mozambique, both sectors are covered by the same ministry and cooperate regularly. In the Netherlands, the Dutch rare breeds foundation, together with nature and landscape management organizations, and with regional governments, have taken up initiatives to support herders of heath sheep, the grazing of which helps to maintain a special natural ecosystem. The government of Mexico has a number of programmes that support silvo-pastoralism and other production systems that consider livestock and natural ecosystem in climate change adaptation.

24. FAO continues to host the Globally Important Agricultural Heritage Systems (GIAHS) programme.³¹ GIAHS are defined as "Remarkable land use systems and landscapes which are rich in globally significant biological diversity evolving from the co-adaptation of a community with its environment and its needs and aspirations for sustainable development". The co-evolution of these systems with their environment highlights the provision of ecosystem services by the individual components of these production systems.

25. The GIAHS initiative is a partnership of international resource partners,³² national governments and local stakeholder groups that operates on global, national and local levels to support the conservation of these agricultural systems through promoting their adaptation to evolving economic, social and natural drivers. Activities include promoting international recognition of the GIAHS concept, mainstreaming the GIAHS concept into national planning and policy-making and local pilot projects that include capacity building on conservation and adaptive management.

26. The GIAHS initiative currently has interventions in 19 countries.³³ Among the animal genetic resources addressed in the initiative are the small African zebu cattle, Red Massai sheep, and local goats and donkeys of the Maasai pastoral heritage sites in Kenya and Tanzania; Andean camelids in Peru and local horses in Chile; local cattle, pigs, chickens and ducks in the Chinampa agricultural system and Milpa Solar System of Mexico; local breeds of camels, cattle, goats and sheep herded by the Raika pastoralists and Korangadu silvo-pastoralists in India; sheep and cattle from the mobile pastoral systems of Romania and native cattle from the Aso grasslands in Japan.

Access to resources associated with ecosystem services

27. Responsible governance of tenure will help countries ensure national food security while achieving sustainable livelihoods and environmental protection in the context of sustainable social and economic development. FAO has provided capacity building to support the application of the *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security*³⁴ (VGGT) in Mongolia.

28. FAO, in collaboration with the IUCN and under the VGGT, also developed guidelines on *Improving Governance of Pastoral Lands*. The guidelines provide solutions for securing pastoral governance and tenure while taking into account customary arrangements.

³⁰ <http://www.fao.org/in-action/sustainable-grassland-management-offers-a-better-future-for-qinghai-herders/en>.

³¹ <http://www.fao.org/giahs/giahs-home/en/>.

³² Global Environment Facility, German Bundesministerium für Ernährung und Landwirtschaft, International Fund for Agricultural Development, United Nations Educational Scientific and Cultural Organization and the United Nations University.

³³ Algeria, Azerbaijan, Bangladesh, Chile, China, Ethiopia, India, Indonesia, Iran (Islamic Republic), Japan, Kenya, Mexico, Morocco, Peru, Philippines, Sri Lanka, Tanzania, Tunisia, and Turkey.

³⁴ <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>.

III. CONSIDERATION OF ECOSYSTEM SERVICES IN THE REVIEW AND UPDATE OF THE GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES

29. Since the Fifteenth Regular Session of the Commission, FAO has undertaken various consultations with stakeholders regarding the review and possible update of the Global Plan of Action for Animal Genetic Resources (Global Plan of Action). This process is described in the document *Review and possible update of the Global Plan of Action for Animal Genetic Resources*.³⁵

30. In their responses to the questionnaire for the Second Report four out of 98 countries flagged ecosystem services as an issue that is currently not addressed by the Global Plan of Action for Animal Genetic Resources³⁶ (Global Plan of Action) and should be addressed in the future.³⁷ In addition, eighteen of 129 summaries of Country Reports submitted for the Second Report mentioned ecosystem services as a national priority. A survey conducted in the preparation of this session of the Working Group reflects the increased importance countries attach to ecosystem services. Thirty-six of the 69 responses received addressed the question on the contribution of livestock species and breeds to the provision of ecosystem services.

31. Across all three of these sources of country and stakeholder responses, six particular needs regarding ecosystem services and animal genetic resources were prominent: the need to increase awareness of the contributions of livestock genetic diversity to ecosystem services; to better understand the adaptive traits of livestock breeds in relation to ecosystem services; to enhance the roles of animal genetic resources in combating land degradation and in mitigating the effects of climate change; to promote linkages between adapted livestock breeds and nature conservation; to promote landscape approaches to the management of animal genetic resources; and to address the roles of bees as part of animal genetic resources.

IV. ECOSYSTEM SERVICES PROVIDED BY POLLINATORS, INCLUDING DOMESTICATED HONEYBEES

32. Domesticated bees, besides being an animal genetic resource that provides provisioning services such as honey and beeswax, also fulfil important regulating services as a pollinator.³⁸ Recently, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), with input by FAO and the International Initiative for the Conservation and Sustainable Use of Pollinators (IPI), launched an assessment of pollinators, pollination and food production and approved the *Summary for Policy Makers of the Thematic Assessment of Pollinators, Pollination and Food Production*.³⁹ A summary of the key findings of the assessment as well as the Summary for Policymakers were presented to the Twentieth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) of the Convention of Biological Diversity (CBD).⁴⁰

33. Both wild and managed pollinators have globally significant roles in crop pollination, with crop yield and/or quality depending on the abundance and diversity of pollinators. The vast majority of pollinator species are wild, with over 20,000 species of different taxa, and their numbers and abundance have declined at local and regional scales in North West Europe and North America. A few species of bees are widely managed, and the number of managed western honeybee hives has increased globally over the past 50 years, even though declines were recorded in some European countries and North America over the same period. The western honeybee is the most widespread managed pollinator, and globally there are about 81 million hives producing an estimated 1.6 million

³⁵ CGRFA-AnGR-9/16/2.2.

³⁶ <http://www.fao.org/docrep/010/a1404e/a1404e00.htm>.

³⁷ "In view of the possibility that at some point countries may wish to update the Global Plan of Action, please list any aspects of animal genetic resources management that are not addressed in the current Global Plan of Action but will be important to address in the future (approximately the next ten years). Please also describe why these issues are important and indicate what needs to be done to address them."

³⁸ <http://www.fao.org/3/a-at598e.pdf>, pages 59-60.

³⁹ Decision IPBES/4/1, section IV.

⁴⁰ UNEP/CBD/SBSTTA/20/9.

tonnes of honey annually. Beekeeping provides an important source of income for many rural livelihoods.

34. In their responses submitted for the Second Report, six countries mentioned bees. Poland already includes bees in the Domestic Animal Diversity Information System (DAD-IS).⁴¹ Based on an informal survey undertaken on the Domestic Animal Diversity Network⁴² in April 2016, more than 30 countries have conservation programmes for bee genetic resources. The animal genetic resources programme⁴³ of the African Union Interafrican Bureau for Animal Resources includes bees.⁴⁴

35. SBSTTA recommended that the CBD Conference of the Parties, at its thirteenth meeting (COP 13), welcome the tools and guidance developed by FAO and partners under the IPI. It further recommended that COP 13 request the Executive Secretary, in cooperation with IPBES and FAO to:

- Prepare a regional report for Africa on pollinators and pollination and make the findings available for peer review prior to COP 13, and subject to availability of resources, to review the implementation of the IPI and prepare a draft updated and streamlined plan of action, including capacity-building, based on the IPBES assessment and including the most recent knowledge, for consideration by SBSTTA at a meeting held prior to the fourteenth meeting of the Conference of the Parties;
- Promote efforts to address data gaps and capacity for monitoring the status and trends of pollinators and pollination in developing countries, in particular Africa; and
- Identify and develop proposals for strengthening capacity related to pollinators and pollination, and supplementary regional assessments, in particular for Africa, to be integrated into the updated and streamlined plan of action of the IPI.⁴⁵ COP 13 will consider the SBSTTA recommendations in December of this year.

V. GUIDANCE SOUGHT

36. The Working Group is invited to review the progress made by FAO in its work on ecosystem services provided by livestock species and breeds and the contributions of livestock producers, with special attention to small-scale livestock keepers and pastoralists.

37. The Working Group may wish to recommend that the Commission:

- request FAO and countries to continue:
 - raising awareness of the important roles of livestock producers and of livestock species and breeds in the provision of ecosystem services;
 - improving the mapping of breed distributions and the description of phenotypic measures and biological functions, particularly in grassland-based production systems, in order to better target interventions for livestock producers;
 - strengthening the link between breed conservation and nature conservation, and the collaboration of the agricultural/livestock sector with the environment/wildlife/forestry sector, ensuring full participation of all livestock producers, with special consideration to small-scale livestock keepers and pastoralists; and
 - developing results-based incentive systems to support the continued provision of ecosystem services by livestock producers, with special consideration to small-scale livestock keepers and pastoralists, by improving: a) assessment methods for the valorization of ecosystem services provided by livestock, and b) institutional coordination to tie public investments in productivity enhancements and value-added

⁴¹ <http://dad.fao.org>.

⁴² <https://dgroups.org/fao/dad-net>.

⁴³ <http://www.au-ibar.org/angr>.

⁴⁴ <http://www.au-ibar.org/bee-about/bee-project-summary>.

⁴⁵ UNEP/CBD/SBSTTA/REC/XX/9.

opportunities with programmes and private initiatives supporting the protection of ecosystem services;

- request FAO to investigate the possibilities of including information on honeybee genetic resources in DAD-IS; and
- take note of the IPBES *Summary for Policymakers of the Thematic Assessment of Pollinators, Pollination and Food Production*, consider the implications of the assessment for the work of FAO, and provide guidance to the Conference, as appropriate, as to possible next steps.