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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Item 3 of the Provisional Agenda

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

Thirteenth Session

Rome, 20 – 22 November 2024

SUMMARY PROGRESS REPORT ON THE IMPLEMENTATION OF THE GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES

SUMMARY PROGRESS REPORT ON THE IMPLEMENTATION OF THE GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES

The Commission on Genetic Resources for Food and Agriculture (Commission), at its Nineteenth Regular Session,[1] recommended that FAO continue to support countries, upon their request, in the implementation of the Global Plan of Action for Animal Genetic Resources (Global Plan of Action),[2] especially developing countries and countries with economies in transition, and to work closely with regional and subregional groups, as well as with National Coordinators for the Management of Animal Genetic Resources for Food and Agriculture (NCs-AnGR).

The Global Plan of Action[3] refers to the essential role of FAO in supporting country-driven implementation efforts, in particular in the following areas: facilitating global and regional collaboration and networks; supporting the convening of intergovernmental meetings; maintaining and further developing the Domestic Animal Diversity Information System (DAD-IS);[4] preparing communication products; providing technical guidelines and assistance; contributing to coordinated training programmes; promoting the transfer of technologies related to the sustainable use, development and conservation of animal genetic resources; and coordinating the preparation of global status and trends reports on animal genetic resources.[5]

The document *Review of implementation of the Global Plan of Action for Animal Genetic Resources*[6] gives an overview of activities undertaken by FAO since the Twelfth Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture (Working Group). The present document provides a more detailed description of the activities across six different categories: (i) expert meetings; (ii) workshops for NCs-AnGR; (iii) technical training events and symposia; (iv) FAO technical cooperation projects (TCPs) and extra-budgetary projects; (v) projects funded by the International Atomic Energy Agency (IAEA) and operated by the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture (CJN); and (vi) publications and contributions to scientific conferences.

Table 1 lists the expert meetings that were held during the reporting period. Both meetings were held in Vienna, Austria. The first of these was an expert meeting held with the University of Natural Resources and Life Sciences (BOKU) for a thematic study on genomic assessment of genetic variation and the future of the breed concept, which is foreseen as the basis for a subchapter in the *Third Report on the State of the World's Animal Genetic Resources for Food and Agriculture* (Third Report). The second was a Research Coordination meeting organized by CJN to support its current Coordinated Research Project (CRP) on animal genetics and management of animal genetic resources. The meetings primarily addressed Strategic Priority Area (SPA) 1 of the Global Plan of Action (Characterization, inventory and monitoring of trends and associated risks) and SPA 2 (Sustainable use and development), respectively.

[1] CGRFA-19/23/Report, paragraph 97.
[2] FAO. 2007. *Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration*. Rome. https://openknowledge.fao.org/handle/20.500.14283/a1404e
[3] Ibid., paragraphs 58–61.
[4] http://www.fao.org/dad-is
[5] FAO. 2007. *Global Plan of Action for Animal Genetic Resources and the Interlaken Declaration*. Rome. https://openknowledge.fao.org/handle/20.500.14283/a1404e, paragraphs 22–23, Strategic Priority 14.
[6] CGRFA/WG-AnGR-13/24/3.

TABLE 1
Expert meetings contributing to the development of guidelines, manuals and projects

Meeting	SPA	Date	Location	Countries of participants
Expert meeting on genomic assessment of genetic variation and the future of the breed concept	1	November 2023	Vienna, Austria	Austria, Burkina Faso, Croatia, Ethiopia, Germany, Italy, Netherlands (Kingdom of the), Peru
CJN Second Research Coordination Meeting on the project "Improving efficiency of animal breeding programs using nuclear related genomic information – practical applications in developing countries" (CRP – D31030)	2	June 2024	Vienna, Austria	Argentina, Austria, Bangladesh, Burkina Faso, China, India, Italy, Kenya, Pakistan, Peru, South Africa, Spain, Sri Lanka, United Kingdom of Great Britain and Northern Ireland

Notes: SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources, where SPA1 = Characterization, inventory and monitoring of trends and associated risks, SPA2 = Sustainable use and development; CJN = Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture.

The global and regional workshops and meetings for NCs-AnGR are shown in Table 2. Ten such events were held during the reporting period. Most of the workshops organized by FAO focused on country reporting for the preparation of the Third Report. In addition, several of the events were meetings organized by the European Regional Focal Point (ERFP), with FAO staff members attending as presenters. Because many of the events were focused on the Third Report, priorities associated with SPA 4 (Policies, Institutions and capacity-building) were the most frequently considered. Most of the workshops related to the Third Report also addressed DAD-IS, which relates most closely to SPA 1.

TABLE 2
Global and regional workshops and meetings for National Coordinators for the Management of Animal Genetic Resources

Title of workshop	SPA(s)	Dates	Location	Countries participating
Meeting of the ERFP working groups (organized by ERFP)	1,3	May 2023	Spain	About 20 countries. No list available. Open to Members of the ERFP
General Assembly of the ERFP 2023 (organized by ERFP)	4	August 2023	France	About 20 countries. No list available. Open to Members of the ERFP
First global workshop on the reporting process for the Third Report (two sessions)	4	November 2023	Virtual	82 countries registered
African workshop on the reporting process for the Third Report (two sessions)	4	February and March 2024	Virtual	Approximately 25 countries

Title of workshop	SPA(s)	Dates	Location	Countries participating
Regional capacity building workshop for preparation of questionnaires for the Third Report (Americas)	1,4	April 2024	Panama	Argentina, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Uruguay
Regional capacity building workshop for preparation of questionnaires for the Third Report (Europe and the Near East, jointly organized by FAO, EAAP and ERFP) and ERFP working group meetings (organized by ERFP)	4	April 2024	Cyprus	Europe: No list provided. Open to Members of the ERFP (about 20 countries). Near East:-Iran (Islamic Republic of), Jordan, Lebanon, Palestine, Qatar, Uzbekistan
Regional capacity building workshop for preparation of questionnaires for the Third Report (Africa)	4	May 2024	Kenya	Botswana, Côte d'Ivoire, Democratic Republic of the Congo, Eswatini, Ethiopia, Guinea, Guinea-Bissau, Ghana, Kenya, Malawi, Mozambique, Mauritius, Mali, Namibia, Rwanda, South Africa, Togo, Uganda, United Republic of Tanzania, Zimbabwe
Regional capacity building workshop for preparation of questionnaires for the Third Report (Asia)	2,4	June 2024	Malaysia	Bhutan, Cook Islands, Malaysia, Mongolia, Pakistan, Philippines, Sri Lanka, Thailand, Tonga, Viet Nam
Second global workshop on the reporting process for the Third Report	4	June 2024	Virtual	65 countries registered
General Assembly of the ERFP 2024 (organized by ERFP)	4	August 2024	Italy	About 30 countries. No list provided. Open to Members of the ERFP

Notes: SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources, where SPA1 = Characterization, inventory and monitoring of trends and associated risks, SPA2 = Sustainable use and development, SPA3 = Conservation, and SPA4 = Policies, Institutions and capacity-building; ERFP = European Regional Focal Point; Third Report = *Third Report on the State of the World's Animal Genetic Resources for Food and Agriculture.*

The technical training events and conferences held during the reporting period are shown in Table 3. Eight such events were held. Most of the events were national in scope and directly associated with IAEA TCPs operated by CJN. One particularly special event was the FAO Global Conference on Sustainable Livestock Transformation,[7] which represented the first global technical conference on livestock production organized by FAO in recent memory. The global conference was a holistic event on livestock production but included sessions related to the management of animal genetic resources.

TABLE 3
Technical training events and conferences

Training	Date	Location	Participating countries and number of participants
CJN national training course on artificial insemination for livestock breeding in Sierra Leone	July 2023	Njala, Sierra Leone	Sierra Leone (21 participants)
Global Conference on Sustainable Livestock Transformation	September 2023	FAO headquarters	Global (96 countries, approximately 750 participants)
CJN national training course on bioinformatics analysis for genomic characterization of livestock biodiversity	November 2023	Dakar, Senegal	Senegal (12 participants)
CJN technical workshop on cryopreservation of bovine semen for artificial insemination and conservation of indigenous zebu and taurine cattle	November 2023	Dahra, Senegal	Senegal (8 participants)
CJN national training course on genetic characterization of livestock breeds: Sequence data analysis	March 2024	Ouagadougou, Burkina Faso	Burkina Faso, Madagascar, Mali, Niger (17 participants)
CJN workshop on manual packaging and freezing of bovine semen for artificial insemination	March 2024	Loumbila, Burkina Faso	Burkina Faso (5 participants)
CJN virtual training course on bioinformatics analysis for genomic characterization of livestock biodiversity	March 2024	Virtual	Algeria, Benin, Morocco, Nepal, South Africa (12 participants)

[7] https://www.fao.org/events/detail/fao-global-conference-on-sustainable-livestock-transformation/en

Training	Date	Location	Participating countries and number of participants
Special webinar: Highlights of ILRI's work on animal genetic resources	May 2024	Virtual	Approximately 100 participants online and in-person

Note: CJN = Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture.

The FAO projects that were active during the reporting period and contributed to implementation of the Global Plan of Action are summarized in Table 4. Thirty-four projects are listed. Seventeen of these were FAO TCP country projects, eight were supported by unilateral trust funds (UTF) provided by the beneficiary countries as a way of obtaining technical and policy support from FAO, and the remainder were supported by one or more donors. The projects involved all regions of the world. The overwhelming majority of the projects addressed SPA 2 (Sustainable use and development). Some of the projects addressed a single species, others addressed a few species, and several addressed livestock production or agriculture and rural development in general. In many instances, especially in the case of donor-funded projects, animal genetic resources represented only a relatively small part of a large, holistic project.

TABLE 4
FAO technical cooperation (TCP) and extra-budgetary projects

Title and code	Country	Donor	Duration	SPA(s)
---------- FAO TCP----------				
Technical support for product diversifications of yak wool fiber to improve livestock income and livelihood of highland communities – TCP/BHU/3901/C1	Bhutan	FAO	2022–23	2
Enhancing livestock production efficiency through digitalization and precision farming – TCP/BHU/3903	Bhutan	FAO	2023–25	2
Enhancing livestock production efficiency through digitalization and precision farming TCP/BHU/3903	Bolivia (Plurinational State of), Peru	FAO	2023–25	4
Technical support to develop and implement livestock identification and registration systems (LIRS), Phase II of TCP/RAS/3706	Cambodia, Lao People's Democratic Republic	FAO	2022–23	2
Appui au développement de la filière petits ruminants aux Comores – TCP/COI/3804	Comoros	FAO	2021–23	2
Genetic conservation and promotion of Bactrian camel through providing technical supports for Jafarabad Camel Research Station – TCP/IRA/3803	Iran (Islamic Republic of)	FAO	2021–23	1,2,3

Title and code	Country	Donor	Duration	SPA(s)
Knowledge management on conservation and sustainable management of pollinating insects in Latin America – TCP/RLA/3911	Latin America and the Caribbean	FAO	2023–25	4
Support to smallholder producers, in particular livestock farms TCP/MOL/3803	Republic of Moldova	FAO	2021–23	2
Development of young herders` training system to support good livestock husbandry practices – TCP/MON/3806	Mongolia	FAO	2021–23	2,4
Support the assessment of animal genetic resources – TCP/MON/3707	Mongolia	FAO	2019–22	1
Capacity building of livestock keepers in farm management, hygienic standards and farming practices – TCP/MNE/3801	Montenegro	FAO	2022–24	4
Support development and piloting Pakistan Animal Identification and Traceability System (PAITS) – TCP/PAK/3804	Pakistan	FAO	2021–23	2
Capacity building to increase the quality and quantity of bees products in Rwanda furthering income generation and job creation – TCP/RWA/3802	Rwanda	FAO	2020–23	2
Establishing the basis for the conservation and development of Busha cattle in Stara Planina – TCP/SRB/3802/C2	Serbia	FAO	2020–22	2,3
Support to Sierra Leone for review of cattle settlement policy, protection of livelihood assets through livestock vaccination and improving food security during COVID-19 pandemic – TCP/SIL/3806	Sierra Leone	FAO	2021–23	2
Support to development of tropical Holstein sires using genomic technologies – TCP/THA/3804/C3	Thailand	FAO	2022–23	2,4

Title and code	Country	Donor	Duration	SPA(s)
Cattle and sheep production and management in Tonga – TCP/TON/3802	Tonga	FAO	2020–22	2
---------- Unilaterally-funded projects ----------				
Dairy industry development in Kabul, Logar and Parwan provinces UTF /AFG/080/AFG	Afghanistan	Afghanistan	2014–22	2
Improvement of cattle production through establishment of effective cattle breeding and feeding systems UTF/AZE/010/AZE	Azerbaijan	Azerbaijan	2018–22	2
Development and application of sustainable sheep production and food value chains – UTF/AZE/009/AZE	Azerbaijan	Azerbaijan	2018–23	2
Support to eradication of animal diseases and zoonosis and conservation of animal genetic resources – UTF/BAH/006/BAH	Bahrain	Bahrain	2019–22	1,3
Technical assistance services on development of FFS curricula, livestock extension manual, animal breeding & ai policy; livestock extension policy, vaccination strategy, hatchery act & rules, sustainability model etc. (Package No.: LDDP/SD-77) UTF /BGD/07	Bangladesh	Bangladesh	2021–22	2
Projet d'amélioration de la production cameline par la mise en place d`un centre de développement de l`élevage camelin – UTF/MAU/026/MAU	Mauritania	Mauritania	2014–21	2,4
Strengthening MoEWA's capacity to implement its sustainable rural agricultural development programme UTF/SAU/051/SAU	Saudi Arabia	Saudi Arabia	2019–25	2

Title and code	Country	Donor	Duration	SPA(s)
Transforming the food and agriculture sector to achieve the SDGs for enhanced food security and nutrition – UTF/UAE/009/UAE	United Arab Emirates	United Arab Emirates	2020–24	2
---------- Donor-funded projects ----------				
Improving efficiency of small ruminants production for reduction of the GHG emission intensity – GCP/SEC/014/TUR	Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Türkiye, Turkmenistan, Uzbekistan	Türkiye	2021–24	2
Introduction of new farming methods for the conservation and sustainable use of biodiversity, including plant and animal genetic resources, in production landscapes in selected areas of Cuba (FSP) – GCP /CUB/017/GFF	Cuba	GEF	2019–24	2,3
Resilient islands, resilient communities – GCP /SAP/004/CAN	Fiji, Micronesia (Federated States of), Niue, Palau, Solomon Islands	Canada	2021–25	2
Technical assistance to support the establishment of a national animal identification, registration and traceability systems (NAITS) in Georgia GCP/GEO/009/SWI	Georgia	Austria, Switzerland, FAO	2016–20	2
Support countries in prep of 3rd Report – State of the World`s Animal Genetic Resources (SoW-AnGR) – GCP /GLO/1115/GER-F	Global	Germany	2022–25	4
AniTerrAE – Animals in Territories for AgroEcology: Contribution of differentiation approaches to sustainable and resilient food systems = GCP /GLO/1075/SWI-F	Global	Switzerland	2022–26	2
Resilient islands, resilient communities – GCP/KIR/009/GFF	Kiribati	GEF	2018–25	2
IESA – Atténuer les effets de la Covid-19 sur les communautés pastorales en Afrique de l`Ouest – GCP /INT/732/SPA	Mali, Mauritania, Niger, Senegal	Spain	2020–23	2

Title and code	Country	Donor	Duration	SPA(s)
Ecosystem restoration and sustainable land management in Tongoa Island, Vanuatu – GCP/VAN/003/GFF	Vanuatu	GEF	2021–25	2

Note: SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources, where SPA1 = Characterization, inventory and monitoring of trends and associated risks, SPA2 = Sustainable use and development, SPA3 = Conservation, and SPA4 = Policies, Institutions and capacity-building.

Table 5 shows the 36 projects supported financially by the IAEA. One of the projects was a multicountry CRP, one was a regional TCP in Latin America, and the remaining 34 were IAEA country TCPs. As with the FAO projects (Table 4), SPA 2 was by far the most common general area of focus of these projects. Thirty-two of the 36 projects contributed to the implementation of priorities and actions within this SPA. In many cases, there was a clear focus on technology transfer, which is logical considering the mandate of IAEA to support peaceful uses of nuclear and related technologies in agriculture. Among the other SPA, only six projects addressed SPA 1 and only a single project addressed SPA 3 (Conservation). No project emphasised SPA 4, but capacity-building activities are an important component of IAEA TCPs, as shown in Table 3.

TABLE 5
Projects funded by the International Atomic Energy Agency (IAEA) and operated by the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture

Title and code	Country/countries	SPA(s)
Improving efficiency of animal breeding programs using nuclear related genomic information – Practical applications in developing countries (CRP D31030)	Argentina, Bangladesh, Burkina Faso, China, India, Kenya, Pakistan, Peru, South Africa, Sri Lanka	2
Improving sheep and pig productivity and livestock traceability (BEN5014)	Benin	1,2
Reducing the impact of transboundary diseases and strengthening livestock breeding programme (BOT5026)	Botswana	2
Improving animal production through enhanced application of nuclear and related techniques (BDI5002)	Burundi	2
Improving local poultry production through incorporation of nutraceuticals in feeds and genetic characterization (BKF5021)	Burkina Faso	1
Improving local poultry and local goat productivity through health, diet, reproduction, genetic markers for selection and breeding management (BKF5022)	Burkina Faso	2
Supporting sustainable livestock production (KAM5003)	Cambodia	2
Improving livestock productivity and control of transboundary animal diseases (KAM5009)	Cambodia	2

Title and code	Country/countries	SPA(s)
Improving goat and sheep productivity in rural areas using nuclear-derived techniques for genetic marker identification, reproduction harnessing and feed analysis (CMR5024)	Cameroon	1,2
Improving bovine productivity using artificial insemination (CHD5008)	Chad	2
Applying nuclear and DNA-based techniques to improve productivity of local livestock (IVC5043)	Côte d'Ivoire	2
Applying nuclear and molecular (DNA) techniques to improve local cattle productivity (IVC5044)	Côte d'Ivoire	2
Increasing small scale dairy production through improved feeding, cattle management and higher conception rates, thereby improving rural livelihood and contributing to food security (ERI5010)	Eritrea	2
Improving cattle productivity through improved feeding and enhanced reproduction (INS5042)	Indonesia	2
Using nuclear and nuclear related technologies for sustainable livestock productivity (KN5039)	Kenya	2
Decreasing the parasite infestation rate of sheep (RLA5071)	Latin America and Caribbean	2
Applying nuclear and DNA-based techniques to improve productivity of local livestock (MAG5024)	Madagascar	2
Improving livestock production through artificial insemination and disease control (MAG5027)	Madagascar	2
Supporting genetic improvement of local cattle breeds and strengthening the control of cross-border diseases – Phase II (MAU5007)	Mauritania	2
Sustainable production of sheep and goats in Mexico using nuclear and nuclear related techniques (MEX5033)	Mexico	2
Improving breed characterization of cashmere goats to facilitate the establishment of strategic breeding programmes (MON5025)	Mongolia	1,2
Using nuclear and nuclear related techniques to improve animal health and breeding (MOZ5011)	Mozambique	1,2
Improving livestock productivity through enhanced nutrition and reproduction using nuclear and molecular techniques (NIR5041)	Nigeria	2

Title and code	Country/countries	SPA(s)
Improving the conservation of germplasm of high-performance livestock and native cattle (PAR5011)	Paraguay	1,3
Using nuclear and related techniques in improving the productivity of domestic ruminants (SEN5042)	Senegal	2
Enhancing livestock production and artificial insemination programme to increase milk and meat production in cattle (SIL5022)	Sierra Leone	2
Improving buffalo productivity using assisted reproductive technologies, genetic, molecular, and nutritional analysis, and forage conservation integrated with nuclear derived techniques (SRL5053)	Sri Lanka	2
Improving livestock production and milk quality using artificial insemination (TOG5003)	Togo	2
Enhancing animal production using artificial insemination (TOG5005)	Togo	2
Improving indigenous cattle breeds through enhanced artificial insemination service delivery in coastal areas (URT5031)	United Republic of Tanzania	2
Enhancing artificial insemination services and application of radioimmunoassay techniques to improve dairy cattle productivity (URT5036)	United Republic of Tanzania	2
Enhancing livestock production and health (NHE5003)	Vanuatu	2
Applying nuclear related technology for selecting climate adapted indigenous swine and chicken breeds (VIE 5025)	Viet Nam	2
Improving management of small ruminants (YEM5014)	Yemen	2
Enhancing national food security through the development of climate smart crops and the improvement of livestock productivity using nuclear techniques (YEM5017)	Yemen	2
Establishing an artificial insemination center to enhance the rebuilding of the national herd (ZIM5024)	Zimbabwe	2

Note: SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources, where SPA1 = Characterization, inventory and monitoring of trends and associated risks, SPA2 = Sustainable use and development, and SPA3 = Conservation.

The publications prepared by staff of the Working Group Secretariat and CJN during the reporting period are shown in Table 6. The entries are categorized as FAO publications, scientific and technical papers and contributions to conferences, and book chapters, and ordered by year. In all, 19 publications were produced.

TABLE 6

Publications and conference presentations since the Twelfth Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture

FAO documents
Ajmone-Marsan, P., Colli, L., Ginja, C, Kantanen J. & Lenstra, J.A., eds. 2023. *Genomic characterization of animal genetic resources – Practical guide.* FAO Animal Production and Health Guidelines No. 32. Rome, FAO. https://doi.org/10.4060/cc3079en
Boes, J., Boettcher, P. & Honkatukia, M., eds. 2023. *Innovations in cryoconservation of animal genetic resources – Practical guide.* FAO Animal Production and Health Guidelines, No. 33. Rome. https://doi.org/10.4060/cc3078en
Ruane, J., Mba, C., Boettcher, P., Koskela, J., Mair, G. & Ramasamy, S., eds. 2023. *Case studies of the use of agricultural biotechnologies to meet the needs of smallholders in developing countries.* Rome, FAO. https://doi.org/10.4060/cc8940en
Viljoen, G., Garcia Podesta, M. & Boettcher, P., eds. 2023. *International Symposium on Sustainable Animal Production and Health – Current status and way forward.* Vienna, Austria, 28 June to 2 July 2021. Rome, FAO. https://doi.org/10.4060/cc2530en
Scientific and technical papers and contributions to conferences
2023
Boettcher, P. *et al.* 2023. *Genomic tools for the monitoring of genetic diversity*. Conference presentation at the 39th International Society of Animal Genetics Conference, 2–7 July 2023. Cape Town, South Africa, International Society of Animal Genetics Conference.
Boettcher, P. *et al.* 2023. The role of animal genetic resources in the sustainable livestock transformation. In: *Proceedings of the Twenty-fifth Conference of the Association for the Advancement of Animal Breeding and Genetics*. 26 – 28 July 2023, Perth, Australia. pp. 1–4. http://www.aaabg.org/aaabghome/AAABG25papers/1Boettcher25001.pdf
Leroy, G. *et al.* 2023. Monitoring within-breed genetic variation at global level. In: *Proceedings of the 74th Annual Meeting of the European Federation of Animal Science*, 26 August to 1 September 2023, Lyon, France, European Federation of Animal Science.
Leroy, G. *et al.* 2023. Assessing multifunctionality of livestock breeds and species at global level, 26 August 2023 to 1 September 2023, Lyon, France, European Federation of Animal Science.
Lokugalappatti, L.G.S. *et al*. 2023. Indigenous cattle of Sri Lanka: Genetic and phylogeographic relationship with Zebu of Indus Valley and South Indian origin. *PLoS ONE*, 18(8): e0282761. https://doi.org/10.1371/journal.pone.0282761
2024
Baumung, R. 2024**.** *40 years of DAD-IS, the Domestic Animal Diversity Information System –The current global status of farm animal genetic resources*. NordGen Farm Animals Conference, 7–8 February 2024. Uppsala, Sweden, Nordic Genetic Resource Center.
Baumung, R. 2024**.** *Erhaltung der genetischen Vielfalt von Nutztieren: die globale Perpektive der FAO***.** Conference presentation at the Rinderzucht Austria Seminar,14 March 2024. Salzburg, Rinderzucht Austria.
Boettcher, P. *et al.* 2024. *Preparation of the Third Report on the State of the World's Animal Genetic Resources for Food and Agriculture*. Conference presentation at the European seminar on agrobiodiversity. 9–11 September 2024. Turin, Italy, SAVE – Safeguard for Agricultural Varieties in Europe.
Leroy, G. *et al.* Multifunctionality and provision of ecosystem services by livestock species and breeds at global level. *Animal*, 18(1): 101048. https://doi.org/10.1016/j.animal.2023.101048
Petretto, E. *et al.* 2024. Investigating the footprint of post-domestication dispersal on the diversity of modern European, African and Asian goats. *Genetics Selection Evolution*. 56: 55. https://doi.org/10.1186/s12711-024-00923-5
Rafat, S.A., *et al.* 2024. Identification of genomic regions associated with resistance to gastrointestinal parasites in an indigenous sheep by single-and multiple-locus methods. *Animal Genetics*, 55(2): 286–290. https://doi.org/10.1111/age.13392

Selvam, R. *et al.* 2024. Candidate gene analysis of genetic resistance to gastrointestinal nematodes in sheep through association of single nucleotide polymorphism with phenotypic traits. *Indian Journal of Animal Research*, 58(1): 21–27. https://doi.org/10.18805/IJAR.B-5208
Van Tassell, C.P. *et al.* 2023. The African Goat Improvement Network: a scientific group empowering smallholder farmers. *Frontiers in Genetics*, 14:1200770. https://doi.org/10.3389/fgene.2023.1200770
Woodward-Greene, M.J. *et al.* *2023.* Using the community-based breeding program (CBBP) model as a collaborative platform to develop the African Goat Improvement Network-Image collection protocol (AGIN-ICP) with mobile technology for data collection and management of livestock phenotypes. *Frontiers in Genetics*, 14: 1183240. https://doi.org/10.3389/fgene.2023.1183240
Book chapter
Boettcher, P. 2023. The current state of global dairy production and outlook for the future. In: A. Mäki-Tanila, J. Syväjärvi, T. Ikonen, J. Aro, J. Juga, H. Myllymäki, E. Mäntysaari et al., eds. *Kantakirjasta genomiaikaan: Suomalainen lypsykarjanjalostus 125 vuotta*. Faba osuuskunta. Vantaa, Finland.

At its Eighteenth Regular Session, the Commission requested FAO to invite countries to report on projects that contribute to the implementation of the Global Plan of Action, for consideration by the Working Group and the Commission.[8] FAO repeated the exercise for the current session of the Working Group. Table 7 summarizes the responses to this invitation, which referred to 90 projects in 21 countries.[9] The responding countries represent a wide range of levels of economic development. In general, higher income countries reported greater expenditure on animal genetic resources projects. In common with FAO- and IAEA-funded projects, SPA 2 was the most common target area, and was addressed by 54 of the projects. However, the other SPAs were targeted relatively more frequently than by the projects implemented by FAO or IAEA. For example, conservation (SPA 3) was addressed by 48 projects, almost as many as for SPA 2. Fewer projects addressed SPA 1 (26) and SPA 4 (29), but each still represented more than 25 percent of the activity.

TABLE 7
Ongoing projects reported by countries as supporting the national implementation of the Global Plan of Action for Animal Genetic Resources

Country	Title	SPA(s)	Duration	Budget
Argentina	Genetic Resources Network	4	2019–22	USD 97 409
Argentina	Objective genetic improvement to increase the efficiency of animal production systems	2	2019–22	USD 65 839
Argentina	Estimation of the population size of the breeds of domestic animals in the Argentine Republic	1	2020–22	USD 6 846
Argentina	Red de Recursos Genéticos	1,3,4	2023–27	USD 3 500/year
Argentina	Mejora genética animal: adaptación y resiliencia	2	2023–27	USD 12 000/year

[8] CGRFA-18/21/Report, paragraph 72.
[9] Argentina, Brazil, Colombia, Democratic Republic of the Congo, Finland, Gabon, Italy, Mali, Netherlands (Kingdom of the), Norway, Panama, Philippines, Poland, Republic of Korea, Serbia, Spain, Sri Lanka, United States of America, Uruguay, Yemen, Zimbabwe.

Country	Title	SPA(s)	Duration	Budget
Argentina	Fortalecimiento de la conservación in situ de los RRGG y sus saberes asociados	1,3	2023–27	USD 2 500/year
Brazil	Embrapa genetic resources programme – Animal GRIN	3,4	2021–24	USD 26 000
Brazil	Embrapa genetic resources programme – Gene bank – animal component	3	2021–24	USD 288 000
Brazil	Embrapa genetic resources programme – *In situ* conservation program	2,3	2021–24	USD 912 000
Colombia	*In vivo* conservation of cattle, pig and sheep breeds	3	Continuous	USD 461 332
Colombia	*In vitro* conservation of Criollo breeds	3	Continuous	USD 21 643
Colombia	Genetic improvement of Criollo breeds	2	Continuous	USD 237 377
Democratic Republic of the Congo	Projet de mise à jour de la base des données des ressources génétiques animales par la caractérisation phénotypique et génotypique en République Démocratique du Congo	1	2024–25	USD 550 000
Finland	National AnGR Program (characterization, conservation, sustainable utilization, capacity building and for coordination of the Program)	1,2,3,4	1984–present	€200 000/year*
Finland	Cryoconservation of genetic resources of native farm animal breeds	3	2016–25	EUR 90 000/year
Finland†	OPTIBOV– research project (characterization of native cattle breeds in Europe and Africa)	1,4	2018–present	EUR 470 000
Finland	*In vivo* conservation of native sheep and goat breeds: development of register	3	2021–22	EUR 80 000
Finland	Genomic resources of native domestic animal breeds (research)	4	2021–23	EUR 300 000

Country	Title	SPA(s)	Duration	Budget
Finland	Northern native cattle breeds – Genetic resource and cultural heritage	2	2021–22	EUR 470 000
Gabon	"DON COVID" – Support to small rural breeders (poultry, sheep, goats and pigs) for resilience in the face of the Covid-19 pandemic (IFAD support)	2	2021–22	USD 444 295
Italy	Dairy bovine breeds for the definition of sustainable selection schemes – LATTeco	2	2021–24	EUR 11 282 339
Italy	Italian Biodiversity Environment Efficiency Fitness – I-BEEF	2	2021–24	EUR 8 036 723
Italy	Dual purpose bovine breeds: an alternative model for sustainable animal farming – DUAL BREEDING	2	2021–24	EUR 8 980 677
Italy	Italian Mediterranean Buffalo: Innovative technologies for genetic improvement – BIG	2	2021–24	EUR 3 497 828
Italy	Sheep and goats	2,3	2021–24	EUR 3 001 498
Italy	Sustainable pig farming – SUIS	2	2021–24	EUR 4 538 169
Italy	Future of rabbit farming: welfare and sustainability of Italian rabbit farming – CUNFU	2	2021–24	EUR 1 903 737
Italy	Innovation and biodiversity in equidae – EQUINBIO	2	2021–24	EUR 2 992 949
Italy	Biodiversity preservation in Italian poultry breeds – TUBAVI	3	2021–24	EUR 1 490 317
Mali	Projet d'appui au développement de l'elevage au Mali	2	2018–24	USD 60 million
Netherlands (Kingdom of the)	Centre for Genetic Resources, the Netherlands (CGN) – National program Animal Genetic Resources www.wur.nl/cgn	1,2,3,4	2022–26	EUR 6 000 000

Country	Title	SPA(s)	Duration	Budget
Norway	Subsidies to production animals of endangered local breeds of cattle, sheep, goats and horses.	2,3	Annually	NOK 28 000 000[b]
Norway	Production and storage of semen from Norwegian endangered sheep breeds	2,3	Annually	NOK 320 000[b]
Norway	Country contribution to ERFP	4	Annually	EUR 2 700[b]
Norway	National AnGR Program (characterization, conservation, sustainable utilization, capacity building and for coordination of the Program)	1,2,3,4	Annually	NOK 2 500 000[b]
Norway	Support to the national centres for the three endangered Norwegian horse breeds	1,2,3,4	Annually	NOK 7 000 000[b]
Norway	Support to the national gene bank for egg laying hens	3	Annually	NOK 800 000[b]
Norway	Support to breed societies for the local endangered livestock breeds and to conservation herds for geese	1,2,3,4	Annually	NOK 700 000[b]
Norway	Production and storage of seemen from Norwegian endangered cattle breeds	2,3	Annually	NOK 2 000 000[b]
Norway	Production and storage of semen from Norwegian Coastal Goat	2,3	2020–21	NOK 140 000
Norway	Upgrade of the pedigree database for endangered local cattle breeds, The Cow Register	1,2,3	2022	NOK 900 000
Norway	Publication of the 30 year's anniversary book for the conservation work on AnGR	2,4	2022–2023	NOK 1 000 000
Norway	Breeding and conservation of the Norwegian Brown Bee	2,3,4	2023–25	NOK 286 000
Norway	Pre-project on market mapping for milk from endangered local dairy cattle breeds	2,3	2023–24	NOK 160 000

Country	Title	SPA(s)	Duration	Budget
Norway	Mapping the frequency of pollednes among the AI bulls of Western Red Polled Cattle	1,3	2023–25	NOK 40 000
Norway	Dual purpose production on Norwegian endangered dairy cattle breeds	2,3	2023–24	NOK 380 000
Norway	Let the cow live – an exhibition about the Norwegian endangered dairy cattle breeds	4	2023	NOK 200 000
Norway	Logistics and utilization of wreckage wool from Old Norwegian Short Tailed Sheep	2	2023–24	NOK 300 000
Panama	Manejo ecológico del bovino criollo guaymí en sistemas productivos de la agricultura familiar Ngäbe Buglé	2	2020–24	USD 37 450
Panama	Conservación y uso de la biodiversidad del ganado Guaymi y Guabalá de Panamá	2,3	2020–24	USD 22 730
Panama	Estudios genómicos de los recurzos zoogenéticos y su interacción con efectos bióticos y abióticos	1	2020–24	USD 15 995
Panama	Fortifying the infrastructure of the biotechnology laboratory in the Gualaca livestock experimental station	1	2023–26	USD 1 847 225
Philippines	Assessment and documentation of native animal production systems in the Philippines	2	2023–24	PHP 5 000 000
Philippines	Genetic structure analysis and development of genetic screening protocols for traceability of the Philippine native pig populations	2	2023–26	PHP 19 041 054
Poland	Coordination and co-implementation of activities related to the protection of genetic resources of farm animals within the scope entrusted by the minister responsible for agriculture	1,2,3,4	2011–22	PLN 2 483 923

Country	Title	SPA(s)	Duration	Budget
Poland	Collecting, storing and supplementing basic collections of biological material of selected species of farm animals as part of the activities of the National Bank of Biological Materials	3	2016–22	PLN 2 483 923
Poland	Characteristics of the genetic diversity of a small population on the example of the native breed of Carpathian goats	1	2019–22	PLN 300 000
Poland	Processing of raw materials from goats, including native breeds, in small processing plants and cheese dairies	2	2020–23	PLN 100 000
Poland	Development of a fattening system for pigs of native breeds with the use of mixtures and feed additives of domestic origin in order to produce pork of high quality and health-promoting value for humans	2	2020–23	PLN 1 589 10
Poland	Development and implementation of an innovative method of preparation and evaluation of the utility value of stallions of the Greater Poland and Lesser Poland breeds in stationary conditions	1	2021–22	PLN 5 000 599
Poland	The use of sheep grazing to reduce the occurrence of invasive plants	2	2021–23	PLN 350 000
Republic of Korea	Conservation and management of animal genetic resources	2,3	2014–24	USD 857 143/year
Republic of Korea	Livestock life resource conservation and management institution operation 2024 (Animal Genetic Resources Research Center)	2,3,4	2014–24	USD 64 286/year
Republic of Korea	A study on the management and development of livestock genetic resources for efficient conservation	1,3,4	2020–23	USD 285 714

Country	Title	SPA(s)	Duration	Budget
Republic of Korea	Development of advanced technology about conservation and management of animal genetic resources	1,2,3,4	2020–24	USD 1 182 143
Republic of Korea	Establishment and operation of livestock cluster integration system	2,3,4	2022–26	USD 1 042 857
Republic of Korea	Investigation of Digital Sequencing Information (DSI) in native and rare livestock	1,2	2024–28	USD 497 857
Serbia	Genomic tools for conservation of local sheep populations	1	2022–23	…
Serbia	Indicators of genetic diversity of autochthonous sheep and goat breeds from Slovakia, Austria, Czech Republic, Serbia and Montenegro	2,3,4	2023–25	…
Spain	Development plan and National Program for the conservation, improvement and promotion of livestock breeds	1,2,3,4	2008–present	…
Sri Lanka	National Artificial Insemination Program	4	continuous	USD 1 000 000/year
Sri Lanka	Eastern White Cattle preservation project	4	2022–present	USD 100 000
United States of America	National Animal Germplasm Program	1,2,3,4	1999–present	USD 18 547 000‡
Uruguay	Conservación de Cerdos Pampa Rocha, un proyecto integral de enseñanza, investigación y vinculación con el medio	1,2,3,4	2016–24	USD 90 000
Uruguay	Development of tools for nematode control	2,4	2017–22	USD 88 000
Uruguay	SMARTER – “SMall RuminanTs breeding for Efficiency and Resilience – EU Horizon 2020	2	2018–23	USD 7 500
Uruguay	High-density genotyping in Uruguayan Creole cattle as a tool for the genetic management of herds	2,3	2020–22	USD 9 000

Country	Title	SPA(s)	Duration	Budget
Uruguay	Caracterización, utilización y conservación del bovino Criollo Uruguayo como recurso ganadero nacional	1,2,3,4	2022–26	USD 9 000
Yemen†	Improving the productivity, quality, care and feeding resources of livestock under central highland conditions	2	1997–26	USD 47 700
Zimbabwe	In situ conservation of Indigenous and locally adapted AnGR	3	Continuous	USD 250 000
Zimbabwe	In situ / ex situ of pasture accession	3	Continuous	USD 250 000
Zimbabwe	Semen Production at Matopos Research Institute (UNDP/GCF)	3	Continuous	USD 450 000
Zimbabwe	Estimation of genetic diversity and farmer preferred traits in beef cattle and goats; efforts towards breed improvement in smallholder systems of Zimbabwe (LIPS ZIM)	1	2022	USD 2 300
Zimbabwe	Farmer perceptions and determinants of artificial insemination technology under communal farming systems. A case study of Beitbridge, Zimbabwe (LIPS ZIM)	2	2022	USD 2 900
Zimbabwe	Dry season feeding strategies: Mucuna pruriens a solution to enhanced goat productivity? (LIPS ZIM)	3	2022	USD 2 000
Zimbabwe	Evaluation of forage and cereal based diets on growth performance of goats during dry season: Gwanda and Beitbridge. (LIPS ZIM)	3	2023	USD 1 500
Zimbabwe	Agronomic evaluation of cowpea landraces/ accessions for forage production under semi-arid conditions in Zimbabwe (LIPS ZIM)	3	2022–24	USD 2 000

Country	Title	SPA(s)	Duration	Budget
Zimbabwe	Screening and evaluation of seven (7) lab-lab accessions (LIPS ZIM)	3	2022–24	USD 1 000
Zimbabwe	National strategies and action plans on AnGR for Zimbabwe (MEAS III)	4	2022–23	USD 20 000
Zimbabwe	Breed improvement through Artificial Insemination in Matobo and Insiza Districts, Matabeleland South(ZAKIS)	2	2022–23	USD 6 000

Notes: SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources, where SPA1 = Characterization, inventory and monitoring of trends and associated risks, SPA2 = Sustainable use and development, SPA3 = Conservation, and SPA4 = Policies, Institutions and capacity-building.

[*]Current value; budget has been increasing over time.

[†]Multicountry project of the Nordic Genetic Resources Center; Finnish part indicated here.

[‡]Total budget over the life of project; current annual budget = USD 1 250 000.