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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

Twelfth Session

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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 Eighteenth Regular Session,¹ requested FAO, in partnership with relevant stakeholders and donors, to continue supporting countries, especially developing countries and countries with economies in transition, in the implementation of the Global Plan of Action for Animal Genetic Resources² (Global Plan of Action), and, considering specific regional priorities and needs, in the development and implementation of national and regional strategies and studies.

The Global Plan of Action³ 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 DAD-IS;⁴ developing 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 Eleventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture (Working Group). This document provides a more detailed description of the activities across six different categories: (i) expert meetings; (ii) workshops for National Coordinators for the Management of Animal Genetic Resources (NC-AnGR); (iii) technical training events and symposia; (iv) FAO technical cooperation projects (TCP) 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. All meetings were held in Vienna, Austria. Two of these were Research Coordination meetings organized by CJN to support the two Coordinated Research Projects (CRP) on animal genetics. The third was an expert meeting held with the University of Natural Resources and Life Sciences (BOKU) for the preparation of the document *Methods for estimation of within-population genetic variation*.⁷ The meetings addressed either Strategic Priority Area (SPA) 1 of the Global Plan of Action (Characterization, inventory and monitoring of trends and associated risks) or SPA2 (Sustainable use and development), or both.

The global and regional workshops and meetings for NC-AnGR are shown in Table 2. Ten such events were held during the reporting period. Because of the global COVID-19 pandemic, most of these activities were held virtually. In-person events have been taking place since May 2022. Most of the workshops organized by FAO focused on the Domestic Animal Diversity Information System (DADIS). The meetings listed were organized by the European Regional Focal Point (ERFP), with members of FAO staff as participants. As with the expert meetings (Table 1), SPA1 was a common topic of these events, although SPA4 (Policies, institutions and capacity-building – 3 events) and SPA3 (Conservation – 1 event) were also addressed.

¹ CGRFA-18/21/Report, paragraph 72.

² www.fao.org/docrep/010/a1404e/a1404e00.htm

³ Global Plan of Action for Animal Genetic Resources, paragraph 58–61.

⁴ <http://www.fao.org/dad-is>

⁵ Global Plan of Action for Animal Genetic Resources, paragraph 22–23, Strategic Priority 14.

⁶ CGRFA/WG-AnGR-12/23/3.

⁷ CGRFA/WG-AnGR-12/23/4/Inf.3.

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

Meeting	SPA ^a	Date	Location	Countries of participants
CJN ^b Third Research Coordination Meeting on “Application of nuclear and genomic tools to enable the selection of animals with enhanced productivity traits” (CRP - D31028)	1,2	June 2021	Virtual	Argentina, Bangladesh, China, India, Italy, Kenya, Peru, Serbia, South Africa, Sri Lanka, Tunisia, United States of America and United Kingdom
CJN First Research Coordination Meeting on “Improving efficiency of animal breeding programs using nuclear related genomic information – practical applications in developing countries” (CRP - D31030)	2	April 2022	Vienna, Austria	Argentina, Austria, Bangladesh, Burkina Faso, China, Italy, Kenya, Pakistan, Peru, South Africa, Spain, Sri Lanka, United Kingdom
Expert meeting on demographic, pedigree and genomic approaches for estimation of within-population genetic variation	1	September 2022	Vienna, Austria	Austria, Brazil, Croatia, Germany, Netherlands, United States of America

^a SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources.

^b CJN = Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture

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

Title of workshop	SPA	Dates	Location	Countries participating
Meeting of the ERF ^b working group “Information and Documentation” (organized by ERF)	1	June 2021	Virtual	No list provided, open to Members ERF (see https://www.animalgeneticresources.net/index.php/countries/), about 20 countries
National Coordinators’ Workshop DAD-IS ^c Training	1	July 2021	Virtual	127 registrations from 78 Countries

Title of workshop	SPA	Dates	Location	Countries participating
General Assembly of the ERFP 2021 (organized by ERFP)	4	September 2021	Virtual	No list provided, open to Members ERFP (see https://www.animalgeneticresources.net/index.php/countries/), about 30 countries
DAD-IS National Coordinators' Workshop	1	September 2021	Virtual	72 registrations from 52 countries
National Coordinators' Workshop (Russian speaking)	1	November 2021	Virtual	Azerbaijan, Kyrgyzstan, Uzbekistan, Tajikistan, Kazakhstan, Ukraine
Latin America and the Caribbean working group meeting on Sustainable Development Goal indicators 2.5.1b and 2.5.2	1	April, May and October 2022	Virtual	Argentina, Brazil, Colombia, Costa Rica, Dominican Republic, Guatemala
Atelier régional sur l'état, les tendances et les risques associés liés aux ressources zoogénétiques	1,4	May 2022	Tunis, Tunisia	25 participants from Algeria, Libya, Mauritania, Morocco, Tunisia
Meeting of the ERFP working groups (organized by ERFP)	1,3	June 2022	Paris, France	No list available, open to Members ERFP (see https://www.animalgeneticresources.net/index.php/countries/), about 20 countries
General Assembly of the ERFP 2022 (organized by ERFP)	4	September 2022	Porto, Portugal	No list provided, open to Members ERFP (see https://www.animalgeneticresources.net/index.php/countries/), about 30 countries
Global national coordinator workshops on DAD-IS	1	November 2022	Virtual	123 registrations from 73 countries

^a SPA = Strategic Priority Area of the Global Plan of Action for Animal Genetic Resources.

^b ERFP = European Regional Focal Point

^c DAD-IS = Domestic Animal Diversity Information System

The technical training events and symposia held during the reporting period are shown in Table 3. Twenty such events were held during the reporting period. Most of the events were held virtually, with the exceptions being national training courses organized remotely by CJN, which did not require international travel. Most of the events were global in scope, which may also have been related to the virtual format. Half of the events listed were from the series of webinars⁸ organized by FAO and the Nordic Genetic Resources Center (NordGen) to build capacity on issues discussed in the practical guide on innovations in cryoconservation of animal genetic resources.⁹ One particularly special event

⁸ <https://www.fao.org/animal-genetics/events/intergovernmental-technical-working-group-on-angr/webinars/en/>

⁹ <https://doi.org/10.4060/cc3078en>

was the IAEA/FAO International Symposium on Sustainable Animal Production and Health, which is held approximately every 10 years and addresses animal genetic resources as well as other aspects of animal production and health.

Table 3. Technical training events and symposia

Training	Date	Location	List of participating countries (number of participants)
CJN ^a national training on “Genetic evaluation of livestock	March 2020	Lomé, Togo	Togo (16 participants)
CJN Virtual National Training Course on “Phenotype recording and conventional breeding methods for Cashmere goat improvement”	June 2021	Virtual	Mongolia (11 participants)
IAEA/FAO International Symposium on Sustainable Animal Production and Health – Current Status and Way Forward	June-July 2021	Virtual	Global (>3000 registered participants from 169 countries)
CJN Virtual Regional Training Course on Genetic characterization of livestock breeds - Bioinformatics analysis of multi locus genotype data”	July 2021	Virtual	Burkina Faso, Niger, Côte d'Ivoire, Senegal, Benin (26 participants)
CJN National Training Course on “Artificial Insemination in cattle and reproductive status evaluation including early pregnancy diagnosis”	August 2021	Bujumbura, Burundi	Burundi (30 participants)
GenRes Bridge ^b training	October 2021	Virtual	Albania, Belgium, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Jordan, Latvia, Lithuania, Montenegro, Netherlands, Norway, Portugal, Republic of Türkiye, Romania, Slovenija, Spain, Sweden, The Netherlands, Ukraine, United Kingdom (46 participants)

Training	Date	Location	List of participating countries (number of participants)
CJN Virtual Regional Training on “Bioinformatics data analysis for biodiversity and genome-wide association studies in livestock”	November 2021	Virtual	Bangladesh, India, Mongolia, Pakistan, Sri Lanka (24 participants)
Cryoconservation webinar: Building a gene bank strategy	May 2022	Virtual	Global
Cryoconservation webinar: Choice of biological material to be preserved	May 2022	Virtual	Global
Cryoconservation webinar: Economics of gene banking	May 2022	Virtual	Global
Cryoconservation webinar: Construire une stratégie de banque de gènes	June 2022	Virtual	Global
Cryoconservation webinar: Databases and documentation	June 2022	Virtual	Global
Cryoconservation webinar: Developing and using gene bank collections	June 2022	Virtual	Global
Cryoconservation webinar: Implementation and organization	June 2022	Virtual	Global
Cryoconservation webinar: Sanitary issues and recommendations	July 2022	Virtual	Global
Cryoconservation webinar: Cuestiones y recomendaciones sanitarias	July 2022	Virtual	Global
Cryoconservation webinar: Legal issues: Acquisition, storage and transfer of gene bank material	December 2022	Virtual	Global

Training	Date	Location	List of participating countries (number of participants)
DAD-IS training – East Africa Genetic Group	December 2022	Virtual	Burundi, Democratic Republic of Congo, Djibouti Eritrea, Ethiopia, Kenya, Rwanda, Somalia. South Sudan, Sudan, Tanzania and Uganda
Cryoconservation webinar: Preservation, collection, use, and quality evaluation of gonadal tissues, diploid, germ, and somatic cells	December 2022	Virtual	Global
Webinar: Genomic characterization of animal genetic resources	December 2022	Virtual	Global

^a CJN = Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture

^b GenRes Bridge is the short name for “Genetic resources for a food-secure and forested Europe” a European Union sponsored project promoting cooperation among European focal points for animal, forest and plant genetic resources.

The active FAO projects during the reporting period that contributed to implementation of the Global Plan of Action are summarized in Table 4. Twenty-six projects are listed. Fifteen of these were FAO TCP country projects; six were supported by unilateral trust funds (UTF) provided by the beneficiary countries, and the remainder were supported by one or more donors. The projects involve all regions of the world. Among the SPA, the overwhelming majority of the projects addressed SPA2, on sustainable use and development. Some of the projects addressed a single species, others addressed a few species and several addressed livestock production in general.

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

Title and code	Country	Donor	Duration	SPA ^a
----- FAO TCP-----				
Capacity development of an integrated agroecological production system in small ruminant livestock - TCP/BHA/3701/C1	Bahamas	FAO	2019-2020	2
Elaboration d’une stratégie de compétitivité de la chaîne de valeur viande du Tchad - TCP/CHD/3706/C2	Chad	FAO	2019-2020	2
Étude de faisabilité pour la création et le fonctionnement d’un Centre national d’amélioration génétique - TCP/DJI/3704/C3	Djibouti	FAO	2019-2020	2
Appui au développement de l’aviculture familiale au Gabon - TCP/GAB/3702	Gabon	FAO	2019-2021	2

Title and code	Country	Donor	Duration	SPA ^a
Genetic Conservation and promotion of Bactrian camel through providing technical supports for Jafarabad Camel Research Station - TCP/IRA/3803	Iran	FAO	2021-2023	1,2,3
Support to sustainable rural and peri-urban family poultry development- TCP/KYR/3703	Kyrgyzstan	FAO	2019-2021	2
Support to smallholder producers, in particular livestock farms TCP/MOL/3803	Moldova, Republic of	FAO	2021-2023	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	2019-2021	1
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
TCPF: Establishing the basis for the conservation and development of Busha cattle in Stara Planina - TCP/SRB/3802/C2	Serbia	FAO	2020-2022	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	2021-2023	2
Development of an animal establishment registration system and an animal identification and traceability system in Suriname - Phase II - TCP/SUR/3701	Suriname	FAO	2015-2016	2

Title and code	Country	Donor	Duration	SPA ^a
Cattle and sheep production and management in Tonga - TCP/TON/3802	Tonga	FAO	2020-2022	2
----- Unilaterally-funded projects -----				
Improvement of cattle production through establishment of effective cattle breeding and feeding systems UTF/AZE/010/AZE	Azerbaijan	Azerbaijan	2018-2022	2
Development and application of sustainable sheep production and food value chains - UTF/AZE/009/AZE	Azerbaijan	Azerbaijan	2018-2023	2
Support to eradication of animal diseases and zoonosis and conservation of animal genetic resources - UTF/BAH/006/BAH	Bahrain	Bahrain	2019-2022	1,3
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	Kingdom of Saudi Arabia	2019-25	2
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 -----				
IMAGE –Innovative management of animal genetic resources - GCP/GLO/680/EC	Argentina, Austria, Colombia, Egypt, France, Germany, Hungary, Italy, Morocco, Netherlands, Poland, Portugal, Spain, Switzerland, United Kingdom	European Union	2016-20	3

Title and code	Country	Donor	Duration	SPA ^a
Improving efficiency of small ruminants production for reduction of the GHG emission intensity - GCP/SEC/014/TUR	Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan, Uzbekistan	Turkey	2021-24	2
Technical Assistance to support the establishment of a National Animal Identification, Registration and Traceability Systems (NAITS) in Georgia GCP/GEO/009/SWI	Georgia	Switzerland, Austria and FAO	2016-20	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
Support to smallholder producers, in particular livestock farms - GCP/GLO/680/EC	Moldova, Republic of	European Union	2021-23	2

^aSPA = Strategic priority area of the Global Plan of Action for Animal Genetic Resources.

Table 5 shows the 24 projects supported financially by the IAEA. Two were multi-country CRP, 21 were IAEA country TCP and one was a regional TCP. As with the FAO projects (Table 4), SPA2 was by far the most common general area of focus of the projects. Twenty-two of the 24 projects contributed to the implementation of priorities and actions within this SPA. By comparison, only six projects addressed SPA1, the next most commonly addressed SPA. Only a single project addressed conservation (SPA3), a trend that was highlighted in the *Synthesis progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2020*.¹⁰ Similar to the FAO projects, regional representation was broad and a wide range of species were addressed. Relative to the FAO projects, in some cases there was a clear focus on technology transfer, which is logical considering the mandates of IAEA to support peaceful uses of nuclear and related technologies in agriculture.

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 ^a
Application of nuclear and genomic tools to enable the selection of animals with enhanced productivity traits (CRP D31028)	Argentina, Bangladesh, China, India, Kenya, Peru, Serbia, South Africa, Sri Lanka, Tunisia	1,2
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

¹⁰ CGRFA-18/21/10.2/Inf.5.

Title and code	Country/countries	SPA ^a
Building capacity to improve dairy cows using molecular and nuclear techniques (BGD5030)	Bangladesh	2,4
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
Supporting sustainable livestock production (KAM5003)	Cambodia	2
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
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
Decreasing the parasite infestation rate of sheep (RLA5071)	Argentina, Bolivia, Brazil, Costa Rica, Cuba, Dominican Republic, El Salvador, Mexico, Paraguay, Peru, Uruguay, Venezuela	2
Applying nuclear and DNA-based techniques to improve productivity of local livestock (MAG5024)	Madagascar	2
Supporting genetic improvement of local cattle breeds and strengthening the control of cross-border diseases - Phase II (MAU5007)	Mauritania	2
Improving breed characterization of cashmere goats to facilitate the establishment of strategic breeding programmes (MON5025)	Mongolia	1,2
Improving livestock productivity through enhanced nutrition and reproduction using nuclear and molecular techniques (NIR5041)	Nigeria	2

Title and code	Country/countries	SPA ^a
Enhancing genetic characterization and improving productivity of cattle by enhanced reproduction and better feeding - PHASE-II (PAP5003)	Papua New Guinea	1,2
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
Improving indigenous cattle breeds through enhanced artificial insemination service delivery in coastal areas (URT5031)	Tanzania	2
Enhancing artificial insemination services and application of radioimmunoassay techniques to improve dairy cattle productivity (URT5036)	Tanzania	2
Improving and promoting bovine milk production through artificial insemination (TOG5001)	Togo	2
Improving livestock production and milk quality using artificial insemination (TOG5003)	Togo	2
Improving management of small ruminants (YEM5014)	Yemen	2
Establishing an artificial insemination center to enhance the rebuilding of the national herd (ZIM5024)	Zimbabwe	2

^a SPA = Strategic priority area of the Global Plan of Action for Animal Genetic Resources.

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 according to year. In all, 22 publications were produced. The lists of authors of the publications demonstrate the breadth of the cooperation and collaboration between FAO and outside partners.

Table 6. Publications and conference presentations since the Eleventh Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture

<i>FAO documents</i>
FAO. 2022. <i>Genomic characterization of animal genetic resources – A practical guide</i> . P. Ajmone-Marsan, P. Boettcher, L. Colli, C. Ginja, J. Kantanen & J.A. Lenstra, eds. FAO Animal Production and Health Series. Rome. https://doi.org/10.4060/cc3079en
FAO. 2022. <i>Innovations in cryoconservation of animal genetic resources – A practical guide</i> . J. Boes, P. Boettcher & M. Honkatuia, eds. FAO Animal Production and Health Series. Rome. https://doi.org/10.4060/cb3078en
<i>Scientific and technical papers and contributions to conferences</i>
2021
Cao, J., Baumung, R., Boettcher, P., Besbes, B., Scherf, B. & Leroy, G. 2021. Monitoring and progress in the implementation of the Global Plan of Action on Animal Genetic Resources. <i>Sustainability</i> , 13: 775. https://doi.org/10.3390/su13020775

Deng, J., Xie, X-L., Wang, D-F., Zhao, C., Lv, F-H., Li, X., Yang, J. et al. (2020). Paternal origins and migratory episodes of domestic sheep. <i>Current Biology</i> , 30: 1-11. https://doi.org/10.1016/j.cub.2020.07.077
Halvorson, K., Baumung, B., Leroy, G., Chen, C. & Boettcher, P. 2021. Conservation of honeybees and other pollinators: A global survey. <i>Apidologie</i> , 53: 535-547. https://doi.org/10.1007/s13592-021-00841-1
Kurukulasuriya, M. S., Notter, D. R., Silva, P., Periasamy, K., Pichler, R., Dematawewa, C. M. B., Ariyaratnee, et al. 2021. Crossing indigenous goats with a larger imported breed increases vulnerability to natural infection with gastrointestinal strongyle parasites. <i>Livestock Science</i> , 244: 104539. https://doi.org/10.1016/j.livsci.2020.104359
Manomohan, V., Saravanan, R., Pichler, R., Murali, N., Sivakumar, K., Sudhakar, K., Nachiappan, R.K. & Periasamy, K. 2021. Legacy of draught cattle breeds of South India: Insights into population structure, genetic admixture and maternal origin. <i>PLoS One</i> , 16(5):e0246497. https://doi.org/10.1371/journal.pone.0246497 .
Raschia, M.A., Donzelli, M.V., Medus, P.D., Cetrá, B.M., Maizon, D.O., Suarez, V.H., Pichler, R., Periasamy K. & Poli, M.A. 2021. Single nucleotide polymorphisms from candidate genes associated with nematode resistance and resilience in Corriedale and Pampinta sheep in Argentina. <i>Gene</i> , 770: 145345. https://doi.org/10.1016/j.gene.2020.145345
2022
Baumung, R. 2022. The Commission on Genetic Resources for Food and Agriculture and international agreements on the sustainable management of animal genetic resources. 9th Congress of Rare Breeds International. Cordoba, Spain, 17-23 October 2022.
Baumung, R., Besbes, B., Leroy, G., Looft, C., Mottet, A., Boettcher, P. & de' Besi, G. 2022. Tiergenetische Ressourcen und ihr Beitrag zur Erreichung der Sustainable Development Goals. Herbstagung 2022 BOKU Centre of Agricultural Sciences, Vienna, Austria, 18 November 2022.
Baumung, R., Boettcher, P., Reising, C.A., Mottet, A., Leroy, G. 2022. Adaptándose al cambio climático. El papel de los recursos genéticos animales. XXIII Simposio Iberoamericano Conbiand Sobre Conservación Y Utilización De Recursos Zoogenéticos. Cordoba, Spain, 17-23 October 2022.
Baumung, R., Boettcher, P., Reising C.A., Okore, C. & Leroy, G. 2022. Resilience of animal genetic resources in the face of climate change and extreme events. Proceedings of the 73th Annual Meeting of the European Association for Animal Production. Porto, Portugal, 5-9 September 2022.
Baumung, R. & Scherf, B. 2022. Die Kommission für genetische Ressourcen für Ernährung und Landwirtschaft und internationale Vereinbarungen über den nachhaltigen Umgang mit tiergenetischen Ressourcen. Proceedings of the Kongress zur Zucht und Erhaltung alter und bedrohter einheimischer Nutztierassen. Bonn, Germany, 26–28. September 2022
Boettcher, P.J., Ajmone-Marsan, P., Baumung, R., Boes, J., Colli, L., Ginja, C., Honkatukia, M., Kantanen, J., Leroy, G. & Lenstra, J.A. 2022. New FAO guidelines for the management of animal genetic resources. 12th World Congress on Genetics Applied to Livestock Production, Rotterdam, The Netherlands, 3-8 July.
Chen, Z.H., Xu, Y.X., Xie, X.L., Wang, D.F., Aguilar-Gómez, D., Liu, G.J., Li, X. et al. 2022. Whole-genome sequence analysis unveils different origins of European and Asiatic mouflon and domestication-related genes in sheep. <i>Communications in Biology</i> , 4(1):1307. https://doi.org/10.1038/s42003-021-02817-4
Kurukulasuriya, M., Silva, P., Pichler, R., Thiruvankadan, A.K., Ramasamy, S. & Periasamy, K. 2022. Population structure and genetic relatedness of Sri Lankan Jaffna Local sheep with major South Indian breeds. <i>Small Ruminant Research</i> , 206: 106571. https://doi.org/10.1016/j.smallrumres.2021.106571 .
Leroy, G., Blackburn, H., Danchin-Burge, C., Tejerina Ampudia, F., Hiemstra, S.J., Ligda, C., Boettcher, P. & Baumung, R. 2022. Genebank collections in relation to risk status in livestock species. 12th World Congress on Genetics Applied to Livestock Production, Rotterdam, The Netherlands, 3-8 July 2022.

Leroy, G., Boettcher, P., Besbes, B. & Baumung, R. 2022. Monitoring of avian genetic resources worldwide: trends and challenges. 26th World's Poultry Conference. Paris, France. 7-11 August 2022.
Lv, F.H., Cao, Y.H., Liu, G.J., Luo, L.Y., Lu, R., Liu, M.J., Li, W.R. et al. 2022. Whole-genome resequencing of worldwide wild and domestic sheep elucidates genetic diversity, introgression, and agronomically important loci. <i>Molecular Biology and Evolution</i> , 39(2): msab353. https://doi.org/10.1093/molbev/msab353 .
Mullen K.R., Matentzoglou N., Rando H.M., Vasilevsky N., Haedel M., Mungall C.J., Hu Z.L., Leroy G., Tammen I., Nicholas F.W., Toro S. 2022. Abyssinian to zebu: Classifying animal breeds with the vertebrate breed ontology (VBO). International Conference on Biomedical Ontology, Rocky Mountains. Aspen Snowmass, United States of America, 2-4 December 2022
Toro, S., Matentzoglou, N., Mullen, K. R., Vasilevsky, N., Rando, H. M., Haedel, M., ... & Nicholas, F. W. 2022. Classifying animal breeds with the vertebrate breed ontology (VBO). In International Conference on Biomedical Ontology, Ann Arbor, United States of America, 25-28 September 2022.
<i>Book chapter</i>
Boucher, S., Garreau, H., Boettcher, P. & Bole, G. 2021. Rabbit breeds and lines and genetic resources. In L. Fontanesi, ed. <i>The Genetics and genomics of the rabbit</i> . pp 23-37. Engham, UK, CABI. https://cabidigitalibrary.org/doi/book/10.1079/9781780643342.0000

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.¹¹ Table 7 summarizes the responses to this invitation, which were from 17 countries.¹² The countries represented a wide range of levels of economic development. In general, higher income countries reported greater expenditure on animal genetic resources projects. Some countries reported having single projects addressing all aspects of animal genetic resources, whereas other countries reported multiple projects, each addressing single species and specific activities. In common with FAO and IAEA funded projects, SPA2 was the most common target area, being addressed by 33 projects, followed by SPA3 (16), SPA1 (12), and SPA4 (9).

Table 7. Ongoing projects reported by countries that support national implementation of the Global Plan of Action for Animal Genetic Resources.

Country ^a	Title	SPA ^b	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
Brazil	Embrapa Genetic Resources programme – Animal GRIN	3,4	2021-24	USD 26 000

¹¹ CGRFA-18/21/Report, paragraph 72.

¹² Argentina, Brazil, Ethiopia, Finland, Gabon, Italy, Kenya, Philippines, Poland, Qatar, Serbia, Spain, Togo, Tonga, United States of America, Uruguay, and Yemen.

Country ^a	Title	SPA ^b	Duration	Budget
Brazil	Embrapa Genetic Resources programme - Gene Bank - Animal Component	3	2021-24	USD 288 000
Brazil	Embrapa Genetic Resources programme - <i>In situ</i> Conservation Program	2,3	2021-24	USD 912 000
Finland ^c	National AnGr Program (characterization, conservation, sustainable utilization, capacity building and for coordination of the Program)	1,2,3,4	1983-present	€200 000/yr ^d
Finland	Cryoconservation of genetic resources of native farm animal breeds	3	2016-25	€90 000/yr
Finland	OPTIBOV-research project (characterization of native cattle breeds in Europe and Africa)	1,4	2018-22	€390 000
Finland ^e	OPTIBOV-research project (characterization of native cattle breeds in Europe and Africa)	1,4	2020-22	€470 000
Finland	<i>In vivo</i> conservation of native sheep and goat breeds: development of register	3	2021-22	€80 000
Finland	Genomic resources of native domestic animal breeds (research)	4	2021-23	€300 000
Finland	Northern Native Cattle breeds – Genetic Resource and Cultural Heritage	2	2021-22	€470 000
Gabon	Support project for the development of family poultry farming in Gabon,	2	Until 2022	...
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	Until 2022	...

Country ^a	Title	SPA ^b	Duration	Budget
Gabon	Support project for small peri-urban breeders with the support of South Korean cooperation (CAFACI),	1,2,3	Until 2022	...
Gabon	Field project on phenotypic and molecular characterization of hens and goats, Gabon sheep	1	Until 2022	...
Italy	Dairy bovine breeds for the definition of sustainable selection schemes - LATTEco	2	2018-21	€13 362 500.24
Italy	Italian Biodiversity Environment Efficiency Fitness - I-BEEF	2	2018-21	€9 172 341.80
Italy	Dual purpose bovine breeds: an alternative model for sustainable animal farming – DUAL BREEDING	2	2018-21	€7 914 689.41
Italy	Conservation. Health and Efficiency Empowerment of Small Ruminant – CHEESR	2,3	2018-21	€3 292 466.41
Italy	Sustainable Pig Farming - SUIS	2	2018-21	€4 049 813.86
Italy	Future of Rabbit farming: Welfare and sustainability of Italian rabbit farming - CUNFU	2	2018-21	€1 648 498.85
Italy	Innovation and Biodiversity in Equidae – EQUINBIO	2	2018-21	€2 214 843.60
Italy	Biodiversity preservation in Italian Poultry Breeds - TUBAVI	3	2018-21	€1 227 278.10
Italy	Dairy bovine breeds for the definition of sustainable selection schemes - LATTEco	2	2021-24	€11 282 338.76
Italy	Italian Biodiversity Environment Efficiency Fitness - I-BEEF	2	2021-24	€8 036 722.94
Italy	Dual purpose bovine breeds: an alternative model for	2	2021-24	€8 980 676.96

Country ^a	Title	SPA ^b	Duration	Budget
	sustainable animal farming – DUAL BREEDING			
Italy	Italian Mediterranean Buffalo: Innovative technologies for genetic improvement - BIG	2	2021-24	€3 497 828.20
Italy	Sheep and Goats	2,3	2021-24	€3 001 498.23
Italy	Sustainable Pig Farming - SUIS	2	2021-24	€4 538 169.38
Italy	Future of Rabbit farming: Welfare and sustainability of Italian rabbit farming - CUNFU	2	2021-24	€1 903 736.75
Italy	Innovation and Biodiversity in Equidae – EQUINBIO	2	2021-24	€2 992 948.61
Italy	Biodiversity preservation in Italian Poultry Breeds - TUBAVI	3	2021-24	€1 490 317.01
Poland ^c	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
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

Country ^a	Title	SPA ^b	Duration	Budget
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	Developing the assumptions for a uniform program for mountain areas of the program supporting cultural grazing	2	2021	PLN 200 000
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
Serbia	Establishing the basis for the conservation and development of Busha cattle in Stara Planina (FAO)	2,3	2020-22	USD 65 000
Spain	Development plan and National Program for the conservation, improvement and promotion of livestock breeds ¹ ,	1,2,3,4	2008-present	...
United States of America	National Animal Germplasm Program	3,1,2,4 ^f	1999-present	USD 16 347 000 ^g
Uruguay	SMARTER – “SMall RuminanTs breeding for Efficiency and Resilience – EU Horizon 2020	2	2018-23	USD 6 900
Uruguay	High-density genotyping in Uruguayan Creole cattle as a tool for the genetic management of herds	1	2021-22	USD 9 000

Country ^a	Title	SPA ^b	Duration	Budget
Uruguay	Development of tools for nematode control	2	2017-22	USD 88 000
Yemen ^c	Improving the productivity, quality, care and feeding resources of livestock under central highland conditions	2	1997-2026	USD 47 700

^aEthiopia, Philippines and Togo reported on past projects; Kenya, Qatar and Tonga reported on future projects.

^bSPA = Strategic priority area of the Global Plan of Action for Animal Genetic Resources.

^cAlso reported on projects completed prior to 2021.

^d Current value; budget has been increasing over time.

^eMulti-country project of the Nordic Genetic Resources Center; Finnish part indicated here.

^fSPA ranked in order of importance within project.

^gTotal budget over life of project; current annual budget = USD 1 192 600.