

2013

**REGIONAL INCEPTION
WORKSHOPS REPORT
Southern Africa**

African Union, Interafrican Bureau for Animal
Resources



**AFRICAN UNION
INTERAFRICAN BUREAU
FOR ANIMAL RESOURCES
AU-IBAR**



EUROPEAN COMMISSION

Strengthening the Capacity of African Countries to Conservation and Sustainable Utilisation of African Animal Genetic Resources

Report of the Regional Inception Workshop of the Project Animal Genetics

**Gaborone, Botswana
26th to 27th November 2013**

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Our partners have worked tirelessly to ensure a successful workshop. We are confident that the mix of scientists, practitioners and policy makers from the regions will prove very stimulating.

We further extend our gratitude to ILRI-SLU and FAO who have given invaluable support during the preparation of this workshop.

Acronyms

AnGR	Animal Genetic Resource
APU	Animal Production Unit
AU	African Union
AUC	African Union Commission
AU-IBAR	African Union-Interafrican Bureau for Animal Resources
CAADP	Comprehensive Africa Agriculture Development Programme
CBD	Convention on Biological Diversity
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
DAD-IS	Domestic Animal Diversity Information Service
DAGRIS	Domestic Animal Genetic Resources Information System
DREA	Department of Rural Economy and Agriculture
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization
GPA	Global Plan of Action
ILRI	International Livestock Research Institute
MS	Member States
RECs	Regional Economic Communities
SADC	Southern African Development Community
SLU	Swedish University of Agricultural Sciences
SoW	The State of the World's Animal Genetic Resources for Food and Agriculture

Executive summary

AU-IBAR is currently implementing a project "Strengthening the Capacity of African Countries to Conservation and Sustainable Utilization of African Animal Genetic Resources" that seeks to strengthen the capacity of AU Member States and Regional Economic Communities to sustainably use and conserve African animal genetic resources through institutionalizing national and regional policy, legal and technical instruments. The approach of the project is to fast track the implementation of the Global Plan of Action adopted in 2007 as the main strategy to ensure sustainable utilization of AnGR and halt their erosion.

One of the activities of the Genetic project during the inception phase was to organise Regional Inception Workshops that represent a major milestone of the project. These platforms will interactive opportunities and exchange between the project team, key partners and the stakeholders. This is geared towards the promotion of necessary synergies that will ultimately contribute to the successful implementation of the program. The **second report on the State of the World's Animal Genetic Resources for Food and Agriculture in Africa** will provide baseline information for the project against which the project outputs will be measured.

The African Union-Interafrican Bureau for Animal Resources (AU-IBAR) thus organized three Regional Workshops in Ouagadougou (West and Central Africa), Kigali (East Africa) and Gaborone (Southern Africa). The workshops were organized to launch two initiatives on animal genetic resources (AnGR) in Africa; the first one was the project **"Strengthening the Capacity of African Countries to Conservation and Sustainable Utilization of African Animal Genetic Resources"** funded by the European Union and to be implemented by AU-IBAR while the second was the FAO Technical Cooperation Project (TCP) **"Assistance for Regional Initiative on Animal Genetic Resources in Africa"**. The workshops were jointly organized with ILRI-SLU and FAO.

The Southern African region Inception workshop was held at Cresta Hotel –Gaborone from the 26th – 27th November 2013. Key issues were discussed during the meetings this include the following;

1. The AU-IBAR genetic project and the implementation strategy
2. FAO's Global Plan of Action (GPA) initiatives and Country reports
3. ILRI-SLU – Training for trainers (champions) and initiatives spearheaded by the collaboration

Through these open interactions between countries, experiences, ideas and challenges were shared and a suitable way forward in relation to their participation in the upcoming genetics project, FAO's request for submission of country reports and establishment of knowledge sharing hubs were some of the key issues deliberated upon and road maps developed.

Introduction

During its fourteenth regular session, the FAO Commission on Genetic Resources for Food and Agriculture requested an update of the State of the World's Animal Genetics Resources for Food and Agriculture to be presented in November 2014. Countries are consequently invited to submit their reports to FAO no later than the 31st January 2014 and at the same time to update their Animal Genetic Resource Inventories by 30th April 2014. The main objectives of the process leading to the report on the *"State of the World's Animal Genetic*

Resources” are to determine the state of global farm animal genetic resources, to evaluate policies and technologies for their utilization, to identify country priorities for immediate action, and to build local capacity to manage these resources.

Animal Genetic Resources (AnGR) for food and agriculture are essential for Africa food security, and contribute to the livelihoods of hundreds of millions of people. However, genetic improvement programs in Africa, by governments, non-governmental organizations, bilateral aid agencies, and the private sector, have favoured the use of exotic breeds for crossbreeding, upgrading, or replacement. These programs have mostly been implemented without clear policies, regulatory frameworks, strategic thinking and a long term view and were only motivated by the objective of rapid productivity gain resulting in indiscriminate, uncoordinated or uncontrolled crossbreeding activities. Moreover, the trans-boundary nature of the spatial distribution of livestock breeds calls for a harmonised legal and technical frameworks of exploiting the genetic attributes of Africa’s livestock. Genetic resources are a global concern and of public interest that require global governance mechanisms.

On 18th July 2013, the African Union Interafrican Bureau for Animal Resources (AU-IBAR) on behalf of the African Union Commission (AUC) signed with the European Commission (EC) a € 14,929 million grant for a joint management project through the signature of a contribution agreement for the implementation of the "Strengthening the Capacity of African Countries to Conservation and Sustainable Utilisation of African Animal Genetic Resources" project. The project aims to strengthen the capacity of countries and Regional Economic Communities to sustainably use and conserve African animal genetic resources through institutionalising national and regional policy, legal and technical instruments. The project will strengthen the inherent capacities of Regional Economic Communities (RECs) and the end-users at community level to improve the utilization of AnGR and rural livelihoods through:

- Establishment of the status and trends of animal genetic resources in Africa.
- Development of Policy frameworks for the sustainable use of AnGR.
- Supporting and strengthening national and regional conservation and improvement strategies and initiatives
- Increasing knowledge, attitude and practice of the contribution of livestock and livestock sector to economic growth, food security and poverty reduction.

The main beneficiaries of the action will be livestock owners in target countries, especially those who rely on livestock production for their livelihoods, and members of breeders' associations. Other beneficiaries will be technical staff and decision makers of national, regional and continental institutions and research centres involved in policy development, design of intervention strategies and support tools, and implementation of specific activities. Indirect beneficiaries will be local communities benefitting from biodiversity conservation measures.

One of the activities of the current project during the inception phase is to organize Regional Inception Workshops. Regional Workshops provide opportunities for communication, exchange and sharing of information as well as building of the project team and partnerships within the framework of its implementation. These workshops serve to promote the necessary synergy and map the way forward for the

successful implementation of the project. Another important component of the workshops was to assist National Coordinators of AnGR in Member States finalize and submit their Country Reports as contribution to the Second Report on the State of the World's Animal Genetic Resources for food and agriculture (SoW-AnGR).

The primary objectives of this workshop were to;

1. Create common understanding, among National Coordinators of AnGR on the project goal, objectives and outcomes as well as roles and responsibilities of partners and stakeholders involved
2. Discuss the project's Result Areas, Activities, implementation strategy and the required information and make necessary adjustments
3. Familiarize AU Member States with FAO's requirements and guidelines for the preparation of National Reports for the SoW-AnGR and update their Animal Genetic Resource Inventories
4. Highlight needs and challenges specific to the respective regions (Southern, Eastern and Western Africa).

These objectives were achieved through interactive discussions held between the collaborating institutions and the participants. Two detailed presentations prepared by the AU-IBAR genetics team were presented and discussed in detail. During the workshop, FAO provided guidance on drafting, compilation and submission of the 2nd SoW-AnGR to the participants. All National Coordinators were reminded of the requirements needed whilst uploading the data in DAD-IS. Deadlines for the various FAO activities were highlighted:

- National reporting on legal and policy frameworks affecting the management of animal genetic resources by 27th December 2013
- Submission of the draft country reports by 31st January 2013
- Updating of the country data in DAD-IS by 30th April 2014.

This document summarizes the discussions that took place during the Regional Inception Workshop for the Southern African region. Attached in the annexes are the list of participants and the workshop's agenda.

Workshop proceedings

Opening ceremony

A total of 18 participants drawn from eleven member states in the Southern Africa region; Zimbabwe, Seychelles, Mauritius, Namibia, Swaziland, Botswana, Mozambique, Lesotho, Malawi, Madagascar and Angola attended the regional inception workshop in Gaborone, Botswana. In addition, three participants representing the European Commission, COMESA and SADC were present.

The Chief Animal Production Officer – Rd. Simplicie Nouala facilitated the opening session, introducing the director General of AU-IBAR – Prof. Ahmed El-Sawalhy to the participants and inviting him to official open the Regional Inception Workshop for the Southern African Region.

The director of AU-IBAR officially opened the workshop by welcoming all the participants. He proceeded to give a brief overview of the newly launched Genetics projects, its objectives and project time span. He particularly thanked the EU for funding the project and its continued support towards animal resources development in Africa. He presented the objectives of the Regional Inception Workshops and highlighted the challenges faced by the animal resources sector, and the need for collaboration and concerted efforts on the utilization and conservation of AnGR.

Remarks by Ministry of Agriculture

The Director of Animal Production in the Ministry of Agriculture, Dr. Motsu spoke of the great enthusiasm the ministry has towards working together with AU-IBAR on the genetics project. He emphasized on the shortage of well-trained personnel in animal breeding and the need to focus to resolve this issue. He pointed out that the project should be based on functionality and sustainability to enable the impact to be felt within the region. He encouraged the establishment of the genetic co-operatives within the continent. He also talked about the Livestock Improvement Act and the establishment of the Animal Production Advisory Board whose mandate includes advice on AnGR. Botswana has facilities for semen storage as part of its efforts on the conservation of AnGR. The country also has a vibrant livestock recording and traceability system.

Remarks by SADC

Dr. Hulman highlighted the significance of the Regional Indicative Strategic Development Plan (RISDP) and Regional Initiatives for the SADC region. The priorities for these include ensuring equitable and sustainable use of the environment and natural resources and optimal utilization of farm AnGR, which are considered a priority in the SADC region. He noted that one of the key roles of SADC was to design and implement improved conservation and breeding programme with the aim to improve livelihoods and food security among livestock keepers through sustainable utilization and conservation of FAnGR in the SADC Region. SADC was also committed to undertaking research and development for the SADC region through the newly-established CCARDESA.

He echoed similar sentiments to identify areas of synergy with AU-IBAR and work towards a common goal.

Remarks by CCARDESA

Dr. Baitisi Podisi represented CCARDESA in the workshop. He highlighted the roles of CCARDESA within the Southern African region. These included:

- Coordination and implementation of regional R&D programmes
- Facilitation of collaboration among NARES and CGIAR centres
- Promotion of public-private partnerships in regional agricultural R&D
- Improvement of agricultural technology, generation, dissemination and adoption in the region through collective efforts, training and capacity building.

He emphasized on the additional concern on the rapid disappearance of AnGR resulting to the extinction and endangerment of some species.

He spoke of the need for the livestock improvement programmes to be more organized through the animal breeders associations enabling the registration of their livestock. Through Dr. Podisi speech, the participants were informed of the presence of an Agricultural Media Office that covers issues related to agriculture and is housed within the ministry of Agriculture.

Remarks by EU

The EU representative Dr. E Njiru stressed the commitment of EU to supporting AnGR on the continent. Dr. Njiru advised on the need to sharpen the log frame of the project given that it was developed more than two years ago and also to create synergies with other on-going AU-IBAR projects. It is important to ensure the realization of activities in the MS and RECs under this project. He also reported the new ILRI project on index-based livestock insurance funded by the EU.

Remarks by ILRI

Dr. Moyo highlighted some of the ILRI initiatives in Africa and Asia.

These included the following:

- *Small ruminant value chains for reducing poverty and increasing food security in dryland areas of India and Mozambique (imGoats)*
- *Enhancing the Competitiveness of Smallholder Livestock in Botswana*
- *Innovative Beef Value chain development schemes in Southern Africa: The case of Swaziland*
- *Integrating crops and livestock for improved food security and livelihoods in rural Zimbabwe*

She also pointed out potential areas of collaboration with development and technical partners which included;

- Animal Breeding and Genetics – Contribute to the value chain work based on need (e.g. dairy crossbreds, animal recording, breed performance evaluation, sustainable use)
- Information and knowledge sharing through CCARDESA platforms
- Participation and presentation of thematic papers at the FANRPAN annual policy dialogues
- Project proposal development and implementation with various partners in the Member states under the identified priority areas

AU-IBAR-Presentation of Project:

Drs. Mbole-Kariuki and Bosso presented the project's goal, objectives and expected outcomes as well as the proposed institutional arrangements including roles and responsibilities of partners and stakeholders involved and implementation strategy. The key milestones and expected dates of completion were also highlighted.

Adoption of workshop programme and objectives

Dr. Julie Ojango presented the agenda (see Appendix A) of the workshop and facilitated the introduction of all the participants.

The agenda outlined key activities as follows;

- Breeding and conservation programs
 - Mapping national and regional initiatives
 - Status of implementations (nationally and regionally)
 - Global Plan of Action initiatives
 - Opportunities for enhanced regional collaboration in development of breeding programs with present resources
- Developments and research on breeding programs
- Resource mobilization for research on animal breeding programs
- Developing concept notes—what could be done with present resources? What else would be needed?
- Way forward (outputs and outcomes)
- FAO'S SoW: Introductions and guide to the preparation of the 2nd report

The Agenda was adopted without amendments.

Workshop format and plenary sessions

The workshop agenda was a combination of plenary sessions to provide a common perspective to all the attendees and of breakout sessions for more detailed interactive discussion on different aspects of Animal Genetic Resources in Africa. The sections below describe the plenary sessions and the activities related to the breakout sessions.

Presentation from SLU, Professor Jan Philipsson: Breeding and conservation issues of global importance

Professor Philipsson introduced the topic of Breeding and conservation issues by presenting their global importance for

- Food security and globalization
- Genetic diversity - Productivity
- New technologies – Infrastructure
- Capacity development

He listed some key challenges for Developing Countries in order to meet the increasing demands for food of animal origin on an increasingly competitive market: 1) without having more new land to utilize, 2) without environmental degradation of land and water, 3) considering the needs for future genetic diversity. He stated that we must utilize the potential of the animal genetic resources and increase the productivity per animal and develop relevant simple Animal Breeding Programs.

Professor gave some lessons learnt from the ILRI – SLU project:

- Lack of infrastructure as a serious constraint for developing functional breeding programs
- Increased human capacity able to translate new knowledge into actions for sustainable use of AnGR is urgent in all regions included in the project - more people need to be trained (all levels)
- Linkages between universities, research institutes and ministries need to be strengthened
- Previous course participants and NCs showing leadership should become regional "trainers of trainers"

He then concluded his presentation with ten (10) general AnGR issues for discussion, namely:

1. How to prevent breeds from being at risk?
2. Use of resources for conservation of inferior breeds vs. investment in improvement of still promising breeds?
3. Conservation methods determined by genetic vs. economic or cultural reasons?
4. Conservation of genes or genotypes?
5. Controlled crossbreeding as a tool for conservation of pure breeds?
6. Globalization in use of breeding materials
7. New technologies exciting, but...
8. The safest way of conserving a population is to continuously develop it!
9. Capacity building at all levels needed!
10. Best ways forward in this region?

Presentation from Dr. Julie Ojango ILRI/SLU: Capacity development in animal breeding and genetics – insights and opportunities from a decade of regional “training of the trainer” experiences.

In order to sustainably utilize the AnGR in developing countries there is a great need for capacity building at all levels. Capacity building at universities and NARS in developing countries usually target students at MSc and PhD levels in collaborative programs with universities in developed countries. Yet the potential of utilizing the existing capacities of the many NARS could be enhanced considerably, and the effects of capacity building could be much greater, if university and NARS scientists were given opportunities for continued training and collaborative projects.

ILRI in collaboration with SLU (Swedish University of Agricultural Sciences), launched the project, Capacity Building for Sustainable Use of Animal Genetic Resources in Developing Countries. The main objectives are to strengthen subject knowledge and skills, as well as teaching and communication skills, of university and NARS animal scientists teaching or supervising BSc, MSc and PhD students in developing countries. Other objectives are to stimulate contacts and networking, and to develop computer-based training resources relevant for use

by NARS scientists in teaching and research. The project has had a large impact through the strengthened knowledge and skills of scientists in developing countries and the large number of students reached, and also through enhanced potential for collaborative research between the universities, NARS, ILRI, and other organizations.

The project includes the following components:

- Surveys and visits to universities and research institutes in different developing countries to learn the actual situation in teaching and research hence are able to identify areas where assistance is most needed.
- Planning workshops in different regions with leading university faculty and NARS scientists to introduce them to the project, to propose and discuss the intended course programs, and the teaching resources to be produced or made available.
- Courses on theories and applications, including project work, on the sustainable use of indigenous AnGR, and on communication and teaching methods.
- Production of computer based training resources, including introductory core texts in five different modules
- Networking by establishing more collaboration within countries between universities and research institutes, as well as between scientists in a region by establishing electronic discussion groups through the Internet.
- Follow-up workshops by region to study the impact of previous courses and teaching resources made available in order to further improve the continuing education of the scientists and for strengthening their research capacity.

Concerns raised during the presentations focused on:

- How much money does each of the African countries receive due to the relative small amount for the project?
- What will be the roles and responsibilities of the National coordinators
- The need for training for the national coordinators
- The need to equip the NC with material to perform their task
- The need to clarify the confusion between FAO coordinators and the appointed project coordinators by the ministries
- What was included in the term Champion and what was their roles
- Clarification about the roles of the champions in defining national objectives

Presentation from SLU, Birgitta Malmfors: Experiences of Nordic Collaboration in PhD Education within Animal Breeding and Genetics

She presented the development of the Animal Genetics Training Resource (AGTR) website. She mentioned that an essential component and output of the ILRI—SLU project has been the development of a computer—

based training resource, the Animal Genetics Training Resource AGTR), available online and on CD from ILRI. The AGTR is a unique, 'one stop', user—friendly interactive, multimedia resource, primarily targeted at researchers and scientists teaching and carrying out research in ABG. It is a dynamic training resource designed to help strengthen the capacity of NARS: inform the design and implementation of breeding programmes; and provide information that will empower countries and institutions to undertake their own research and apply available information and knowledge. It covers established and rapidly developing areas, such as genetic based technologies and their application in livestock breeding programmes.

Core to the AGTR are Modules on:

1. Global perspectives on animal genetic resources for sustainable agriculture and food production;
2. Improving our knowledge of tropical indigenous animal genetic resources;
3. Sustainable breeding programmes for tropical farming systems;
4. Quantitative methods to improve the understanding and utilization of animal genetic resources: and
5. Teaching methods and science communication.

The modules are supported by over 40 case studies that summarize real—life experiences and capture indigenous knowledge and lessons learnt from developing countries. The case studies also illustrate principles and/or methodologies commonly applied in animal genetics, from real—life situations and highlight knowledge gaps appropriate for post-graduate theses or further research. Practical examples, exercises, compendia, a library with full—text articles in ABG and links to relevant web resources are included. The AGTR also has links to many other information sources on and related to AnGR.

Workshop Breakout Tracks on Breeding and Conservation programs

The second part of the workshop was organized around two tracks of breakout sessions. Each track was divided into session topics, addressed by different breakout groups. Each topic was led by representatives from Member States and facilitated by a note taker.

The groups formed were:

Group 1: South Africa and Mauritius

Group 2: Malawi and Mozambique

Group 3: Swaziland, Lesotho and Namibia

Group 4: Zimbabwe

Group 5: Botswana and CCARDESA

Questions to be addressed included:

- Mapping national and regional initiatives
- Status of implementations (nationally and regionally)
- Global Plan of Action initiatives
- Opportunities for enhanced regional collaboration in development of breeding programs with present resources

Everyone was called back into plenary and ask to report back from group deliberations into a plenary session on the conclusions they have reached as a result of their discussions, focusing on the practical solutions that were identified. See attached annexes for the reports of the groups' discussions.

In summary below are the respective country presentations in response to the four main questions on AnGR posed above ;

South Africa

- In situ and cryopreservation conservation of cattle, goat, sheep chicken and pigs
- Nguni Cattle have been characterized (not yet to the ecotype level)
- Some pig and chicken breeds have also been characterized
- There are conservation programmes for pig and chicken, however there is need to establish markets for the products for sustainability
- Most of the conservation programmes are carried out at universities and research institutions and by some provincial government

Mauritius

- There is a conservation programme for Creole cattle which has been classified as critically endangered. However, there is need to do genetic characterization, especially phenotypic
- There is need to establish a national breeding policy
- Identify stakeholders willing to collaborate in the sustainable utilization of the breed

Zambia:

- There is indiscriminant crossbreeding of indigenous with exotic animals mainly because of the desire to increase body size and/or milk production and Zambef the main meat processor, prefers large animals
- Recording programs are generally quite poor and there is need to develop them (collection of baseline data should be first step)
- Breed population numbers are not well known
- Some characterization of AnGR has occurred, but not sufficiently to determine if all various types are distinct breeds
- Production environments are also not well studied and management of animals is often sub-optimal
- Value of indigenous breeds is not well known or appreciated by farmers
- A Research station is being used as an AnGR conservation site with Baila cattle which is at high risk of extinction and the Angoni breed, which is less threatened but also at risk
- There is an in situ conservation programme for the Tonga cattle breed
- The country is developing a livestock policy including issues of AnGR
- Joint programs for management and conservation of transboundary breeds (Angoni, Tonga and Barotse) can be prepared and implemented with Malawi, Zimbabwe and Botswana, respectively

Mozambique

- The country has a national AI programme
- Import live animals and semen, Jersey for dairy and Brahman and South Devon for beef; Bonsmara and Simmental crossing with Landin and Nguni
- There is a conservation programme for Landin and Angoni at Research Stations
- Angoni has been phenotypically characterized while the Nguni has also been registered with the Nguni Breed Association in South Africa
- The country introduced the Kalahari Red and Boer goats for cross breeding with the local goat to improve performance
- There has been domestication of guinea fowls

Malawi

- There is a national AI Centre for semen production
- Importation of performance tested bulls; Friesian and Jersey for dairy, Brahman for beef and Boer goats for meat, Saanen, Alpine for dairy
- There is a conservation programme for indigenous Malawi Zebu, Local Malawi goats and local sheep at Research Stations
- The Malawi Zebu Cattle has been phenotypically characterized as well as indigenous chickens
- There has been some molecular characterization of indigenous Malawi Zebu Cattle
- Crossbreeding of indigenous chickens with Black Australops breed to improve productivity is being practised
- Malawi developed an issue paper on *Managing animal biodiversity and associated ecosystems in Malawi (2011)*
- A Pilot Animal Recording System for dairy cattle in Malawi and Mozambique (DIMSSA: Beira) has been initiated
- There is some available expertise and infrastructure for molecular characterization and genomic studies

Zimbabwe

- Resuscitation of breed societies especially Mashona cattle and to some extent Nguni cattle
- Capacitating government research institutions through boundary fence construction and establishment and maintenance of nucleus herds for conservation *in-situ* on government farms
- Protection of farms holding stud breeds from compulsory acquisition;
- Promoting use of AI among smallholder dairy farmers;
- Characterization of indigenous goat populations
- Protection of farms holding stud breeds from compulsory acquisition as part of the Land Reform Programme;
- Promoting use of AI among smallholder dairy farmers;

- Characterization of indigenous goat populations
- Some phenotypic characterization of breeds was conducted but there is need to verify this with molecular characterization
- Development of regional breeding programmes for Nguni cattle (Zimbabwe, South Africa, Botswana, Zambia and Malawi); Afrikander cattle (Zimbabwe and South Africa); Tuli (Botswana, Namibia and Zimbabwe); Sabi, Tswana and Damara sheep (Zimbabwe, Botswana and Namibia)
- Development of a regional gene bank for semen processing and distribution, suggestions are to use Botswana's modern AI facilities

Angola

- National technical meetings have been organized to develop NAPs for AnGR including conducting inventories of animal breeds, human resource capacity and institutions
- There is a review of existing policies and legislations on AnGR
- The country is also reviewing the structure of the National Coordination Unit for AnGR
- There is a project on phenotypic characterization of local breeds (ruminants) with support from IAEA
- Another project is providing support to local livestock-keeping communities with basic services such as water and forage
- The country is involved in activities for the VET-GOV project

Madagascar

- Inventory on AnGR has been conducted
- There is a proposal to establish a gene bank for indigenous AnGR with FAO support
- There has been characterization of local cattle breeds such as the Malgache Zebu
- Sensitization and training of breeders/technicians on AnGR has been conducted
- There have been importations of new breeds of duck
- There have been restrictions on the export of live animals to prevent extinction, especially ruminants
- There are restocking programmes for bees and local chickens
- There is a review of existing policies and legislations on AnGR
- The country is also involved in activities for the VET-GOV project

Seychelles

- The country has no indigenous breeds, all are imported
- There is a livestock improvement centre and use of biotechnology
- Seychelles is setting up a poultry parent stock programme
- The country has initiated the write-up of a programme on the conservation of adaptable breeds/crossbreeds
- Review of policies and legislation under the VET-GOV project

Botswana

- The SADC region has a sub-committee on Animal Production, Marketing, Range Management and Animal Genetic Resources (APRM-AnGR) as well as a Livestock Information Management System (LIMS) from which Botswana is benefiting
- Botswana has a National Development Plan an agricultural policy which encompasses conservation of AnGR a Draft National AnGR Plan, gene bank
- The country also has the Livestock Improvement Act, Advisory Board and a National Livestock Recording and Performance Scheme
- Botswana has a functional National Focal Point (DAR), National and Alternate Coordinators
- The country has programmes for characterization (phenotypic and molecular), conservation and selection for improvement of indigenous breeds and conducts research on indigenous breeds
- Awareness activities such fairs, workshops are conducted regularly
- The country would support the establishment of a regional gene bank as well as conduct of breed surveys and characterization of transboundary breeds of cattle, sheep and goats (Nguni, Ngoni)
- There are opportunities for capacity building in open nucleus breeding programmes as well as training of national coordinators
- There is need to revive the SADC Regional AnGR Focal Point and Regional AnGR networks
- There is scope for cooperation in livestock recording and performance evaluation in the SADC region
- The presence of CCARDESA as the regional broker for R&D should be exploited for the benefit of AnGR

Swaziland

- Beef cattle breeding programme based on four breeds – Indigenous Nguni, Brahman , Simmental and Drakensberger, producing performance tested bulls for distribution to farmers through the bull loan scheme
- There are also out and cross-breed evaluation for adaptability in different agro-ecological zones of Swaziland
- For dairy cattle, there is an improvement programme with three breeds, Jersey, Friesian and Nguni) and the crossbreds are also evaluated
- There are selection programmes for the improvement of indigenous goats
- There is promotion of the commercialization of indigenous chickens using farmer groups and currently there are two breeding units
- There is also *in situ* conservation with utilization programmes for Nguni cattle, goats and indigenous chickens
- The private sector is practicing ecotourism with wildlife and AnGR conservation

Lesotho

- The country has five mare camps for the Basotho pony owned by farmers including a conservation programme for the Basotho pony

- The country provides AI services for dairy cattle; Jersey, Holstein-Friesian, Dairy Swiss
- Merino sheep studs are run by the government and there are woolled Merino sheep breeders and Angora goats breeders associations
- There is a programme for distribution of dual purpose chickens

Namibia

- The government has 10 livestock breeding stations where Nguni, Afrikaner, Simmental are maintained for conservation as they are now threatened. These breeds are also used for cross breeding. The Bonsmara has been introduced for breeding.
- Damara and Swakara (Karakul) sheep flocks are also maintained at these stations.
- There are well-organized and functional private stud breeders associations.
- Namibia indigenous goats are kept for conservation
- The Boer goat (white boar goat and the black ones) is used for cross-breeding mainly for meat.
- Some indigenous pig breeds are kept by the government.
- Farmers are assisted to collect data for performance testing.

FAO session

Introductions and guide to the submission of the country reports

This session was facilitated by Dr. Paul Boettcher, the project Officer FAO.

The primary objective of the session was to present the key roles of FAO and brief participants on the SoW-AnGR 2nd process in order to coordinate the reporting in their respective countries. Presentations were given including a Questions and Answer session and discussion. An overview of the State of the World's Animal Genetic Resources process was presented as well as the progress in the implementation of the Global Plan of Action (GPA). Each National Coordinator gave a statement on his/her involvement in the first SoW-AnGR process and the implementation of the GPA, the experiences and lessons learned were as well shared with other participants. There was a demonstration on how to use the fillable form for the country reports questionnaire as well as the Domestic Animal Diversity Information System and national reporting form on AnGR. Groups were formed to work on the preparation of the national report, namely on how and whom to involve, problems and issues. The reporting back by working groups and discussion was done in plenary. The presentations can be found in the annexes.

Take home messages from FAO

The take away messages were based on answers to some key questions:

1. Where can I get information and assistance?
2. Where can I publish a paper?

3. Where can I request publications?
4. Where can exchange experiences?
5. Deadlines for national reporting
6. How could you represent your country!
 - 8th Session of the Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture in Rome, Italy - 26-28 November 2014
 - Discuss draft version of *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture*
 - Advise on updating the Global Plan of Action
 - 15th Session of the Commission on Genetic Resources for Food and Agriculture Rome, Italy - 19-23 January 2015
 - Endorse *The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture*
 - Decision on updating the Global Plan of Action

Issues arising and general recommendations from the workshop

- There was a general consensus that Animal genetic resources are important but the lack of funds is an evident limiting factor
- National Co-ordinators were ready to lead the process for the submission of the country reports and sought assistance from the relevant organizations
- There is an urgent need to follow-up on the state of reporting at country level. AU-IBAR should take a proactive role to insure that countries meet the deadline for submission of country reports.
- The sub-regional focal point for Southern Africa should be identified and re-established - CCARDESA
- Discussions should be initiated with the sub-regional research and development organizations to identify their roles in the implementation of the project.
- Identification of a potential sub-regional genebank and conservation centre.
- Establish a functional and informative AnGR database populated by the region to instill sense of ownership.
- There is need to train more animal breeders and encourage collaboration between universities in AnGR for MSc and PhD training programmes
- There should be fair exchange of genetic materials and information among the Member States in the region
- Regional collaboration in molecular characterization of AnGR should be promoted
- More utilization of the already in operation livestock recoding systems introduced through SADC funding

List of annexes

Annex 1: Agenda

Annex 2: Country presentations on Mapping national and regional initiatives; status of implementations (nationally and regionally); Global Plan of Action initiatives; Opportunities for enhanced regional collaboration in development of breeding programs with present resources

Annex 3: Introductions and guide to the submission of the country reports

Annex 4: List of the participants

Annex 1: The Agenda

Regional workshops on Animal Genetic Resources in Sub-Saharan Africa: ILRI–SLU Capacity building Project in collaboration with FAO and AU/IBAR: November 2013

Day 3: Thursday			
<i>Breeding and Conservation programs, continued</i>			
8:30-10:30	Group work 4	Breeding and Conservation programs <ul style="list-style-type: none"> • Mapping national and regional initiatives • status of implementations (nationally and regionally) Global Plan of Action initiatives • Opportunities for enhanced regional collaboration in development of breeding programs with present resources 	
10:30-11:00	Coffee Break		
11:00-11:30	Plenary	Feedback from group work 4	
<i>Developments and research on breeding programs</i>			
11:30-12:15	Group work 5	Prioritized issues for developments in AnGR	
12:15-12:45	Plenary	Feedback from group work 5	
12:45– 14:00	Lunch		
	<i>Resource mobilization for research on animal breeding programs</i> <i>Developing concept notes—what could be done with present resources? What else would be needed?</i>		<i>AU-IBAR/ FAO- NC's SoW</i>
14:00-15:00	Groups/ Plenary	Discussions/Conclusions	<i>Update of the implementation of the GPA : report of the ITWG, financing the GPA etc</i> introduction & discussions
15:00–15:30	Coffee Break		
15:30–17:00	<i>Joint session – Ways forward in conclusion</i> <i>Outputs & Outcomes</i>		
19:00-	<i>Joint Dinner</i>		
Day 4: Friday FAO / AU-IBAR			
8:30-13:00	Plenary	SoW: Introductions and guide to the preparation of the 2 nd report	FAO- NC's Reports etc.
13:00-14:00	Lunch		
14:00-16:00	Plenary: Guide to the update of the inventories		
16:00-16:30	Coffee Break		
16:30-17:30	<i>Ways forward in conclusion</i> <i>Outputs & Outcomes</i>		

Annex 2: Group Works

Country Group Work

- Mapping national and regional initiatives on Breeding and Conservation programs
- Status of National and Regional implementation (UN/FAO) Global Plan of Action initiatives
- Opportunities for enhanced regional collaboration in development of breeding programs with present resources



South Africa

Mauritius

Mapping national and regional initiatives

South Africa

- In situ conservation of cattle, goat, sheep chicken and pigs
- Nguni Cattle has been grossly characterised (not yet to the ecotype level)
- Pig and chicken have been characterised
- Conservation programme for pig and chicken already established need market the products for sustainability
- Most of the conservation programmes are carried out at universities and research institutions and some provincial government
- Recording scheme for small scale farmer established

Mapping national and regional initiatives

Mauritius

- Conservation of creole cattle which has been classified as being critically endangered. Need to do genetic characterisation
- Establish a national breeding policy
- Identify stakeholders willing to collaborate in the sustainable utilisation of the breed

Global Plan of Action initiatives

- Characterisation
- **Mauritius**
- Initiatives taken for phenotypic characterisation of creole cattle and local goat
- **South Africa**
- Phenotypic and genotypic characterisation of almost all species

Sustainable Use

- **Mauritius**
- **Not well utilised**

Global Plan of Action initiatives

- **Sustainable Use**
- **South African**
- **All cattle that were in the conservation programme are all commercialised**
- **breed societies have been set up and well organised**
- **Pig not well utilised**
- **Chicken for eggs and meat are being utilised**

Opportunities for enhanced regional collaboration in development of breeding programs with present resources

- Assist in the setting up of a breeding policy and plan
- Setting up of a data recording system
- Assist in genotypic characterisation
- Training and capacity building programme in University and Research Institution in SA

Creole breed “ Endangered breed”



AFRIKANER

The work of the AFRIKAAN Society of South Africa was to develop a breed of cattle that would be suitable for the conditions of the South African veld. The history of the Afrikaner breed is a story of selection and adaptation to the conditions of the South African veld. The Afrikaner breed is a result of the selection of the best animals from the various breeds of the South African veld. The Afrikaner breed is a result of the selection of the best animals from the various breeds of the South African veld. The Afrikaner breed is a result of the selection of the best animals from the various breeds of the South African veld.

FROM SOUTH AFRICAN BREEDING SOCIETY
 101 Main Street, Durbanville, 7800
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BONSMARA

The Bonsmara cattle breed, in common with most of the established breeds of today, was developed by a process of crossbreeding. The Bonsmara is the only breed based on the mixed cross with the aid of specific recorded performance data. The Bonsmara was bred as one of the most important breeds in the world under the guidance of the late Prof. B. M. van der Merwe. The first objective was to develop a breed that would be suitable for the conditions of the South African veld. The first objective was to develop a breed that would be suitable for the conditions of the South African veld. The first objective was to develop a breed that would be suitable for the conditions of the South African veld.

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DRAKENSBERGER

The Drakensberger breed is a result of the selection of the best animals from the various breeds of the South African veld. The Drakensberger breed is a result of the selection of the best animals from the various breeds of the South African veld. The Drakensberger breed is a result of the selection of the best animals from the various breeds of the South African veld. The Drakensberger breed is a result of the selection of the best animals from the various breeds of the South African veld.

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NGUNI

The Nguni breed is a result of the selection of the best animals from the various breeds of the South African veld. The Nguni breed is a result of the selection of the best animals from the various breeds of the South African veld. The Nguni breed is a result of the selection of the best animals from the various breeds of the South African veld. The Nguni breed is a result of the selection of the best animals from the various breeds of the South African veld.

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Commercialised indigenous chicken



Zimbabwe

National initiatives

- Resuscitation of breed societies;
 - Mashona cattle;
 - Nguni cattle (limited);
- Capacitating government research institutions
 - boundary fences for research institutions;
 - nucleus herd conservation *in-situ* on government farms;

National initiatives

- Protection of farms holding stud breeds from compulsory acquisition;
- Promoting use of AI among smallholder dairy farmers;
- Characterization of indigenous goat populations

Global Plan of Action initiatives

- Phenotypic characterisation was carried out but there is need to verify this with molecular characterisation;
- Questionnaire has been distributed but responses are taking long to come back;
 - questionnaire is too long

Opportunities for enhanced regional collaboration in development of breeding programs with present resources

- Development of regional breeding programmes for :-
 - Nguni cattle - Zimbabwe, South Africa, Botswana, Zambia and Malawi;
 - Afrikander cattle – Zimbabwe and South Africa;
 - Tuli - Botswana, Namibia and Zimbabwe;
 - Sabi/Tswana/Damara sheep – Zimbabwe, Botswana and Namibia

Opportunities for enhanced regional collaboration in development of breeding programs with present resources

- Development of a regional gene bank for semen processing and distribution: -
 - e.g. Use of Botswana’s modern AI facility;
- Strengthening of CCARDESA to enable efficient coordination of the initiative

6

MALAWI AND MOZAMBIQUE

MALAMBIQUE

Mapping National Initiatives

Mozambique

- National AI programme
- Import live animals and semen
 - Jersey for dairy and Brahman & South Devon for beef
 - Bons mara and Simmental crossing with Landin/Nguni

Mapping National Initiatives

Mozambique

- Conservation of Landin (2) and Angoni (1) at Research Stations
- Angoni is phenotypically characterised
- Nguni is characterised and registered at Nguni Breed Association in South Africa

Mapping National Initiatives

Mozambique

- Introduced Kalahari red and Boer goats
 - Cross breeding with the local goat to improve performance
- Domestication of Guinea fowls

Mapping National Initiatives

Malawi

- National AI Centre for semen production
 - Friesian/Holstein for dairy
- Importation of performance tested bulls
 - Friesian and Jersey for dairy, Brahman for beef
 - Boer goats for meat, Saanen, Alpine for dairy

Mapping National Initiatives

Malawi

- Conservation of indigenous Malawi Zebu, Local Malawi goats and local sheep at Research Stations (2)
- Phenotypic characterization of Malawi Zebu Cattle
- Characterization, conservation and multiplication of indigenous chickens
- Crossbreeding of indigenous chickens with Black Australops breed to improve productivity

Mapping Regional Initiatives

- Management of Farm Animal Genetic Resources Project 1998-2002 (UNDP/FAO/SADC Project)
 - Set up of NFPs
 - Breed surveys
 - Phenotypic characterization
 - Networking,
 - Policy framework and guidelines for management of sustainable animal genetic resources developed

Mapping Regional Initiatives

- Since the last Regional programme 1998-2002 there has been no active AnGR programme at regional level
- There is need to review the current regional status

STATUS OF NATIONAL AND REGIONAL IMPLEMENTATION GPA

Global Plan of Action Initiatives

- National action plans are available for both Mozambique and Malawi but no active initiatives
 - Change in composition of implementation team (NCs and Alternate Coordinators)
 - Inadequate resources

STATUS OF NATIONAL AND REGIONAL IMPLEMENTATION GPA

Global Plan of Action

- Malawi developed the issues paper on *Managing animal biodiversity and associated ecosystems in Malawi (2011)*
- A Pilot Animal Recording System for dairy cattle in Malawi and Mozambique (DIMSSA: Beira)– for expansion
- Initial molecular characterization of indigenous Malawi Zebu Cattle

OPPORTUNITIES FOR ENHANCED REGIONAL COLLABORATION

- Since the last Regional programme 1998-2002 there has been no active AnGR programme
- There is need to review the current regional status
- Need to strengthen networking and information sharing (eg. E-discussion....)
- Available technical expertise (Champions) to roll out capacity building in AnGR programmes (TOTs)

OPPORTUNITIES FOR ENHANCED REGIONAL COLLABORATION

- Since the last Regional programme 1998-2002 there has been no active AnGR programme
- There is need to review the current regional status
- Need to strengthen networking and information sharing (eg. E-discussion....)
- Available technical expertise (Champions) to roll out capacity building in AnGR programmes (TOTs)

OPPORTUNITIES FOR ENHANCED REGIONAL COLLABORATION

- Available centres of Excellency for research within the region eg. ARC RSA
 - Lobby for expansion (to Malawi and Mozambique) of the SADC funds for collaboration within SADC eg. Small holder Dairy Programme

OPPORTUNITIES FOR ENHANCED REGIONAL COLLABORATION

- Available expertise and infrastructure for molecular characterization and genomics
 - Need for specific national molecular characterization implementation programmes

**Swaziland
Lesotho
Namibia**

Mapping national and regional initiatives

☐ Swaziland

☐ National Initiatives

- Beef cattle breeding programme based on 4 breeds – Indigenous Nguni, Brahman , Simmental and Drakenberger.
- The programme produces performance tested bulls for distribution to farmers through the bull loan scheme.
- It also carries out breed cross-breed evaluation the adaptability in the different ecological zones of Swaziland.
- Dairy
- Dairy cattle improvement programme where 3 breeds are kept (jersey,fresian and nguni).Crosses are evaluated.

Conservation

- Improvement of indigenous goat through selection.
- Commercialising indigenous chicken production through group farmers. Two breeding units are set up by farmers where cocks and hens are shared.
- Nguni cattle, goats and indigenous chickens conservation programme where they are in situ through utilisation.
- In the cattle of nguni they are carried out by both the government and the private sector. In the private sector is carried out as ecotourism

Lesotho

National initiatives

- Establishment of 5 mare camps for Basotho pony owned farmers
- Provision of AI services for dairy cattle (jersey, Holstein-friesian, dairy swiss).
- Establishment of sheep woolled ram merino sheep breeders associations.
- Merino sheep studs are run by the government.

- Introduction of AI in sheep using fresh semen and is done by farmers.
- Hatching and distribution of dual purpose chickens.
- Angora goats breeder associations and owned by farmers.

Conservation

- Conservation of the Basotho pony.

Namibia

National initiatives and conservation

- Ten livestock breeding stations and all are owned by the government. Breeds kept are nguni, Afrikaner, simmentalas and they for conservation and are cross bred so are now threatened. The bonsmara was introduced for breeding.
- Small ruminants are kept in the same stations. Breeds are the Damara sheep, Swakara (Karakul). The gellpper cross breed sheep are kept for meat.

- Namibia indeginous goats are kept for conservation. The boer goatse (white boar goat and the black ones) are kept for breeding for meat.
- Indigenous pigs are kept by the government.
- Farmers are helped to collect data for performance testing.

Global of Action

Strategic pillars	Swaziland	Lesotho	Namibia
Characterization	Yes. Production and phenotypically traits on cattle.	Yes. In horses and indigenous chickens phenotypically.	Yes. Production and phenotypically traits on cattle, goats, sheep and indigenous chickens.
Conservation	Yes	Yes	Yes
Sustainable use and development	Yes	Yes	Yes
Capacity building and policy	No	No	No

Opportunities for enhanced regional collaboration in development of breeding programs with present resources

- Setting up of sub regional gene banks .
- Training of animal breeders
- Exchange of genetic material
- Molecular characterisation
- Collaboration between universities in AnGR for MSc and PhD training programmes.
- Information exchange among the member states in the region.

Challenges

- The indigenous breeds are not favoured by commercial farmers.
- Lack funding for development and conservation of AnGR.
- Lack of appropriate policies for management of AnGR.

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BOTSWANA & CCARDESA



Mapping national and regional initiatives

REGIONAL

- DAR Declaration, SADC RISDP, Regional Agricultural Policy (RAP), CCARDESA
- SADC Livestock Technical Committee (LTC)
- Sub committee on Anim. Prod, Marketing, Range Management and Animal Genetic Resources (APRM-AnGR)
- L/stock Info Management Sys - (LIMS)
- SADC Regional Plant Genetic Resources Centre
- SADC Smallholder Dairy RSA funded project

Mapping national and regional initiatives

NATIONAL

- National Development Plan
- AGRIC Policy – Conservation of agric resources
- L/stock improvement Act, Advisory Board, Registrar
- National L/stock Recording & Performance Scheme
- Agro-biodiversity in SoW-Environment
- Bio-safety Framework approved



Global Plan of Action initiatives

- National AnGR Initiatives
 - Functional National Focal Point (DAR)
 - National Coordinator & Alternate Coordinator appointed
 - Draft National AnGR Plan
 - Gene Bank
 - Conservation herds/ flocks
 - Selection programmes for improvement of indigenous spp.
 - Awareness activities (fairs, workshops etc)
 - Characterization of (indigenous breeds)
 - Physical characterization (sheep, goats, chickens, cattle)
 - Molecular characterization (cattle, sheep, goats & chickens)
 - Research on indigenous breeds
- DAD-IS not updated



Opportunities for enhanced regional collaboration in development of breeding programs with present resources

- Regional Gene-banking
- Breed surveys & Characterization of transboundary breeds (Cattle and sheep & goats): Nguni, Ngoni,
- Training of national coordinators
- Capacity building on open nucleus breeding programs
- Reviving the regional AnGR networks



Opportunities for enhanced regional collaboration in development of breeding programs with present resources

- Explore hosting the livestock recording under the SADC LIMS portal and ARC system
- Reviving the regional AnGR networks
- Reviving the SADC Regional AnGR Focal Point
- Collaboration in University Teaching
 - Student / staff exchange programs
 - Co- supervision and examination of students
- Cooperation in l/tock recording & performance evaluation
- CCARDESA role as the regional broker for R& D
- Joint resource mobilisation (joint roposals)

Annex 3: FAO – GUIDELINES FOR THE PREPARATION OF COUNTRY REPORTS

Preparation of the country report

contributing to
The Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture





Contents

- Who should prepare the country report?
- What is the content and structure of the country report?
- How does the fillable pdf form work?
- The country report – an official government document

Country report – Who?

National Coordinator for the Management of Animal Genetic Resources:
the government-nominated person who coordinates national implementation of the Global Plan of Action for Animal Genetic Resources and leads the development and operation of a national network on AnGR

National Focal Point for the Management of Animal Genetic Resources:
the NC and his or her support staff within the institution responsible for coordinating activities concerning the management of AnGR



Country report – Who?

Key areas of activities of National Coordinators and their support staff:

- Policy development
- Management of AnGR
- Communication
- Cooperation
- Education and public awareness
- Global reporting
- Specific tasks related to intergovernmental processes

Country report – Who?

National advisory committee
(SoW-AnGR:1: National Consultative Committee)

Representatives of stakeholders:

- the Ministry of Agriculture or similar
- breeders', farmers', herders' and pastoral peoples' associations;
- livestock-sector organizations
- National Agricultural Research Systems and other research and scientific institutions
- extension services

Country report – Who?

National advisory committee
(SoW-AnGR:1: National Consultative Committees)

Representatives of stakeholders - continued:

- artificial insemination organizations
- interest organizations, both professional organizations and civil-society organizations
- marketing boards and consumer organizations
- commercial and private companies
- development and technical-cooperation organizations

Country report - content

- I. Executive summary
- II. Data for updating the parts and sections of *The State of the World's Animal Genetic Resources for Food and Agriculture*
- III. Data contributing to the preparation of *The State of the World's Biodiversity for Food and Agriculture*
- IV. Progress report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2007 to 2013

⇒ Open pdf form to explain structure and content

Country report – fillable pdf form - mechanics

1. Adobe Reader required
2. Save form on your hard disk – rename the file!
3. Form can be forwarded, printed and saved in any stage of completion
4. Prepare textual responses (including any formatting such as bullet points) in a separate document and then to copy and paste them into the form
5. Text boxes are expandable!
6. When you have finished completing the questionnaire, click the "Submit by E-mail" button (automatic check of compulsory fields!)

⇒ Open fillable pdf form to explain mechanics

Country report – an official government report

- SoW-AnGR:1 – country reports were sent to FAO through official channels
- National Coordinators have been nominated by their governments
- Governments agree "terms of reference" of National Coordinators (included in: Developing the institutional framework for the management of animal genetic resources)
- FAO accepts country reports from National Coordinators

...but

recognition is important for future work and development of national strategies and action plans

Discussion time



Preparation of Country Report

- **National advisory committee**
 - Has it been established?
 - Please describe its current or required membership and operation.
 - What will you do when you return home to ensure an operational and adequate national advisory committee?

- **Preparation of country report**
 - How will you ensure stakeholder involvement and buy in?
 - How are you collecting the required information and data?
 - Who will draft the country report?
 - Who will comment and finalize the country report?
 - How will you ensure government endorsement?
 - How will you ensure that the country report is taken into consideration when preparing the national strategy/action plan?

- **National inventory in DAD-IS**
 - Are national data available or can they be collected easily?
 - Who will enter the data?

Annex 4: AU/IBAR FAO Regional workshops on Animal Genetic Resources in Africa

26 – 29 November 2013, Gaborone, Botswana

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