



## Progress report on the implementation of the *Global Plan of Action for Animal Genetic Resources* - 2007 to 2011

### Regional Focal Point for Latin America and the Caribbean

#### Strategic Priority Area 1: Characterization, Inventory and Monitoring of Trends and Associated Risks

Most relevant strategic priorities and actions:

Strategic Priority 1, Action 6: *“Strengthen global and regional information systems ...”*

Strategic Priority 1, Action 7: *“Establish or strengthen existing breed endangerment early-warning and response systems, through the further development of national, regional and global risk monitoring mechanisms...”*

#### General information

The twelve countries that submitted their Progress Reports on the Implementation of the Global Plan of Action for Animal Genetic Resources can be classified into three different groups in relation to their advances in terms of animal genetic resources. The first group is formed by countries that started the conservation and characterization of their locally adapted livestock breeds long before the adoption of the Global Plan of Action. The second is formed by countries that have started some work for a limited number of species. And the last and largest group is formed by countries that recognize the need to start this work, but lack not only funding but also capacity building of their human resources to do the job.

Even though there are many cases of similar locally adapted breeds in neighbouring countries, they have different names in each country. Phenotypically, the Casanare cattle from Colombia are very similar to the Pantaneiro cattle from Brazil; Criollo cattle from Argentina have many similarities to the Criollo Lageano from Brazil. Even with these similarities there are not many cases of exchange of locally adapted breeds. One of these cases is the Romosinuano, originally from Colombia, which can be also found in Venezuela. This is not the case for commercial breeds. Zebu cattle from Brazil, mainly Nellore and Gyr can be found in the majority of Latin American countries, and even in the United States.

#### Inventories

A complaint common to almost all countries where there are agricultural censuses is that in the questionnaires there is no breakdown by breed within a given species. With so much money invested in the agricultural census of each country, it is necessary to increase the awareness of governments about the importance of classifying the species by breed. It is known, however, that the high number of crossbred animals is always a complicating factor that has to be faced.

#### Phenotypic characterization

The majority of the countries replied that some phenotypic characterization has been done. Mostly on cattle breeds, followed by sheep, pigs and horses. Unfortunately, only some countries reported this phenotypic characterization for locally adapted breeds, with the majority reporting this work for commercial or recently imported breeds, and the characterization being done by breeders' associations. As expected, in the Andean countries, emphasis has been on camelids and guinea pigs.

#### Molecular characterization

Only two countries of the region reported progress in molecular characterization of their animal genetic resources covering all

livestock species of economic importance. Another five countries mentioned genetic characterization for some species, while the other five replied that there is no work on genetic characterization whatsoever.

#### Criteria for assessing risk status

Eight of the twelve countries said that they are using FAO's criteria for assessing the risk status of their animal genetic resources. No other criteria are being used in the other four countries. They just are not using the FAO criteria due to the scarce information they have about their livestock breeds.

#### Emergency response

One of the biggest problems in the region is the complete inexistence of emergency response systems that could provide for immediate action to safeguard breeds at risk in all important livestock species within the countries. Only Mexico mentioned that this safeguarding is being done by the Environment and Natural Resources Ministry. Perhaps the way to address the lack of this mechanism in most countries would be to organize a training course in the region, in order to trigger this type of action in each country. This could be an action of FAO, using as instructors National Coordinators of European countries where such a mechanism is already in place. The outcome of such training would be to allow the development of national risk monitoring mechanisms, which could lead to the development of a regional risk monitoring mechanism.

#### Barriers

Many barriers and obstacles to enhancing inventory, characterization and monitoring programs have been listed by the countries. The number one barrier is the lack of governmental funds for these activities. The second barrier is the need for capacity building that would allow a larger number of people to get involved in these activities. Another important barrier mentioned by several countries is the need to increase the awareness of the population about the importance of animal genetic resources for food security. Again, it was pointed out that the agricultural censuses done in the majority of the countries do not breakdown population figures by breeds within species.

#### Development of a regional information system

In a joint effort, the United States, Brazil and Canada are developing an information system for their animal genetic resources. These three countries established a framework for cooperation and coordination for the joint development and operation of a robust information system/database used to store information on in situ and ex situ conservation efforts in the three countries. Such a database will support the execution of conservation activities and facilitate, where desirable, the exchange of information about genetic resources and their use. In addition, the resulting database will be a valuable tool for breeders as they address food security issues involving animal genetic resources. In the future, when this information system is fully developed, it will be offered to other countries of the region. Mexico has already showed interest in starting to use it as soon as possible.

## **Strategic Priority Area 2: Sustainable Use and Development**

#### Adequate national policies in place to promote the sustainable use of animal genetic resources

Six out of the twelve countries that presented their Progress Reports on the Implementation of the GPA declared that they already had adequate national policies in place to promote the sustainable use of AnGR.

Among them, Argentina reported that the policies in this area are first implemented through INTA (National Institute of Agricultural Technology) and later endorsed by the Ministry of Agriculture. The latter has a National Commission on Genetic Resources, CONARGEN, which acts in an advisory capacity.

Brazil has a long story of utilization and conservation of its animal genetic resources. The country created its Animal Genetic Resources Conservation Program in 1983. The first decade was devoted to the identification of the locally adapted breeds, as well as to quantifying their population size and determining their geographic locations. A good example of one such breed is the Caracu cattle, which was threatened when the conservation program started, but today, due to the efforts of different research institutions and to a very strong breeders' association, is being used in a sustainable way, and numbers have increased to a total that surpasses 65,000 head.

Colombia reported that in 1994 the government established a policy of conservation of endangered breeds and species by creating a national system of conservation of genetic resources, which includes only locally adapted breeds. A second effort started in 2005, when the Ministry of Agriculture, together with related institutions developed a strategy of development and multiplication of these local breeds, in conjunction with producers, which aims to promote the sustainable use of genetic resources.

In Ecuador, the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP), is implementing the National Livestock Development, which among its components includes a system of animal identification and traceability, genetic improvement,

animal health and silvo-pastoral management, which will provide the rescue, conservation and sustainable use of animal genetic resources, maintaining continuous monitoring, and thus optimizing resources and achieving efficient production of livestock.

In Mexico, the Federal Government has a national policy that considers the care of livestock genetic resources, and has implemented actions through livestock development programs, which were mentioned in their Country Report on the Situation of Animal Genetic Resources, prepared in 2002.

In Uruguay, policies are set up by different institutions, depending on the species. For commercial breeds and locally adapted breeds (Criollo horses and Merilin sheep), the policies are set by breeders' associations. For the Pampa Rocha pig, policies are set up by the CERPAMPA (Faculty of Agronomy), while for the Criollo cattle, policies are established jointly by Faculty of Veterinary Medicine and the General Command of the Army, which is responsible for the maintenance of the herd, in an old fortress, located in the border with Brazil.

The other six countries that presented their Progress Reports, either do not have national policies, or are looking for funds to start a discussion on creating their own policies.

#### Integration of agro-ecosystem approaches into the management of animal genetic resources

The majority of the countries reported that they do not integrate agro-ecosystem approaches into the management of animal genetic resources.

Mexico reported that the Federal Government, through its Sustainable Natural Resources Program, has implemented the Concept of Sustainable Production and Management of Livestock and Honeybees (PROGAN) with an agro-ecosystem approach, which aims to increase productivity, through the induction of technology for sustainable production practices, technical assistance, training and livestock insurance funds.

Ecuador reported that is creating an agro-ecosystem approach, reinforcing one of the policies of the Ministry of Agriculture, Livestock, Aquaculture and Fisheries, which is the Sustainable Livestock Production, a national program being executed that aims to promote a friendly productive environment, allowing the participatory and inclusive development.

Uruguay reported two experiences involving the development of the agro-ecosystem approach and meeting some of its principles: the locally adapted breed known as pig Pampa Rocha, integrating CERPAMPA, from Rocha, with the Southern Regional Center FAGRO, located in Canelones; and the Jersey breed linking the University of the Republic (UDELAR) from Montevideo and the Experimental Station of FAGRO, located in Salto.

#### Revision of breed development program for all major species and breeds

Seven out of the twelve countries reported that their breed development programs have been reviewed, but with differences in emphasis among species. Two other countries reported that the action is planned and that they are looking for funds.

In countries where active breeders' associations exist, breed development programs are one of their main roles. Countries such as Argentina, Brazil and Colombia have strong partnerships between their national agricultural research institutions and breeders' associations, with the involvement of researchers in analyses of data and in breed development programs.

#### Barriers and obstacles to enhance the sustainable use and development of animal genetic resources

Four countries declared that they have no barriers or obstacles to enhancing the sustainable use and development of AnGR. Among the barriers and obstacles mentioned by the other eight countries, the following can be listed: (a) lack of a specific policy or national networks devoted to the utilization and conservation of AnGR; (b) lack of financial resources; (c) need to increase awareness of leaders, producers and the general public of the importance of AnGR; (d) lack of adequate capacity building; (e) lack of plans and breeding programs to make rational use of locally adapted breeds; (f) lack of subsidies or incentives through differential payments for the products of locally adapted breeds; (g) lack of political interest; (h) extreme poverty of livestock keepers raising locally adapted breeds; and (i) restrictive national legislation on access to genetic resources.

#### Impacts of the use of exotic breeds on local breeds

As expected, the largest meat exporter countries of the region (Argentina and Brazil) reported that long before the adoption of the GPA, they have assessed the impacts of the use of exotic (more productive ) breeds on locally adapted breeds, which took them to the verge of extinction. In both countries, this situation led to the creation of national conservation programs.

In Colombia, lack of organization allowed the consolidation of a system of improvement and development of AnGR in which the true value of locally adapted breeds is not taken into account. This situation has led to indiscriminate imports of genetic material for crossbreeding, while the productive potential of germplasm adapted to the tropical environment has not been assessed properly.

The majority of the other countries reported that they do recognize this problem, have actions planned and are looking for

funds. But even so, there is no doubt that the exotic breeds, imported at the end of the 19th century and beginning of the 20th century, were responsible for the huge decrease in the effective population size of the locally adapted breeds in all countries of the region, taking the majority of them to the verge of extinction.

Suriname, declared that during the planned phenotypic characterization of their Criollo cattle, information on the impact of exotic breeds in local populations will be gathered.

#### Establishment or strengthening of recording systems and organizational structures for breeding programs

Five out of twelve countries replied that they already had recording systems and/or organizational structures for enhancing programs before the adoption of the GPA, while other two replied that the structure was established after the adoption of the GPA, but had not progressed since then. The last five countries reported that they either had no recording systems or are looking for funds to establish them.

#### Mechanisms to facilitate interactions among stakeholders, scientific disciplines and sectors as part of sustainable use development planning

Only three countries replied that they already had mechanisms to facilitate interactions among stakeholders before the adoption of the GPA, while one country replied that there are mechanisms partially in place, but no progress has been made since the adoption of the GPA. Other six countries declared that they do not have these kinds of mechanisms, but among them, three are looking for funds and one has already identified the necessary funds. The last two countries replied that they implemented such mechanisms after the adoption of the GPA, but one of them said that no progress has been made since then.

Implementation of measures to provide farmers and livestock keepers with information that facilitates their access to AnGR  
Only three countries replied that comprehensive measures already existed before the adoption of the GPA, while one country declared that such measures are partially implemented (and were established or strengthened after the adoption of the GPA) and the other two that replied positively reported that even though the measures are partially implemented, no progress has been made since the adoption of the GPA. Among the six countries that replied saying that they do not have comprehensive measures to provide information to livestock keepers to facilitate their access to AnGR, four are looking for funds to start this action.

#### Development of agreements for equitable sharing of the benefits resulting from access to, and use and development of AnGR and associated traditional knowledge

The majority of the countries replied that they do not have any agreements on ABS (five countries had no agreements at all, and two are looking for funds to start this process). Just one country reported the existence of some agreements before the adoption of the GPA, while three reported that some agreements exist, but that no progress has been made since the adoption of the GPA.

Bolivia reported a bad experience in terms of ABS when the export of South American camelids was authorized. There have been lots of problems in the process of distributing the benefits to local producers. A similar problem happened with Chinchillas, a genetic resource whose recognized center of origin is Bolivia.

Brazil replied that as a first step, the country has started the discussion about Access and Benefit Sharing to Plant Genetic Resources, and that discussion on ABS for AnGR will follow.

Uruguay reported that the country developed a legal framework for regulating access to genetic resources, but that it has not yet been taken into the consideration by the National Parliament. This proposal is expected also to regulate the equitable sharing of benefits arising from the use and development of national genetic resources.

#### Establishment or strengthening of training and technical support programs for breeding activities of livestock-keeping communities

From the nine countries that replied positively, only three declared that sufficient programs already existed before the adoption of the GPA, while four said that sufficient programs exist because of progress made since the adoption of the GPA, and the last two declared that even though some programs exist, no progress has been made. From the three countries that reported that they do not have such programs, just one is looking for funds. This situation could be improved through regional training courses, where people involved in conservation would learn how to address the subject with livestock-keeping communities.

Identification of priorities for future technical training and support programs to enhance the use and development of AnGR  
Six countries recognize the need to identify the priorities for future technical training and support programs to enhance the use and development of AnGR, but they are still looking for funds to do so. Only two countries replied saying that priorities have been identified and updated since the adoption of the GPA, while the other four have identified their priorities but have not updated them since the adoption of the GPA.

Colombia considers that economic, environmental and food safety studies related to AnGR are necessary, and they have been identified as a priority in the National Plan of Action.

Uruguay indicated as a priority the development of products of locally adapted breeds with territorial identification (names, indications and traditional specialties), a common practice in European countries such as France, Portugal and Spain.

#### Efforts to assess and support indigenous or local production systems and associated traditional knowledge and practices related to AnGR

There was a big difference in the replies of the countries to this question, but it can be seen that not many countries are involved in these actions. Six countries declared that they do not have such measures; among those, four have some actions planned (three are still looking for funds and one has already identified these funds). Bolivia was the only country that reported that these measures were in place before the adoption of the GPA. The other five countries that replied positively are in different stages of developing this action.

Efforts to promote products derived from indigenous and local species and breeds, and facilitate access to markets  
For Brazil, it is necessary to explore niche markets for products of locally adapted breeds in order to show to breeders that they can get profits out of these breeds. Locally adapted breeds developed specific adaptations to the habitats where they have been subject to natural selection during the last five centuries, since the discovery of the country. Guatemala also considers it extremely important to develop a marketing plan for (niche market) products from locally adapted breeds.

Colombia considers that it is necessary to create incentives through differentiated payment for the products derived from local AnGR, recognizing not only their safety and quality but the added value coming from local resources of high strategic value. This could be obtained through tax incentives for breeders whose production is based on local AnGR.

#### Priority requirements for enhancing the sustainable use and development of AnGR

Guatemala considers that it is necessary to involve breeders so as to increase awareness about the importance of AnGR in the country.

For Paraguay, priorities include complete characterization work, obtaining funds to rescue endangered breeds, the establishment of a conservation programs, and an increase in the dissemination of information about AnGR.

#### Further comments

Brazil considers the adaptive traits to be the most important "feature" of the locally adapted breeds. It can be seen that after a long period showing no interest at all in locally adapted breeds, there has been a change in the behavior of many breeders that raise commercial breeds, towards the utilization of the locally adapted breeds in a sustainable way. Many breeders are now trying to re-insert locally adapted breeds into their production systems. A recent research study showed the improvement in beef tenderness achieved by crossbreeding Curraleiro cattle (a Brazilian locally adapted breed) with Nellore cattle, the breed that has by far the largest population in Brazil. Another example is the utilization of Caracu bulls in crossbreeding, with either other European or Zebu breeds.

In Colombia, the government currently funds studies of phenotypic characterization and molecular genetics, aiming at the identification of traits of interest, related to adaptation, product quality and production efficiency, which can be used to improve the use and development of locally adapted cattle breeds. Unfortunately, there funding has not been available for locally adapted breeds of other species such as pigs, sheep, goats, horses and poultry.

Ecuador's government through its Ministry of Agriculture, Livestock, Aquaculture and Fisheries, launched the National Program for Sustainable Livestock. Its main objective is to sustainably manage AnGR – including issues such as reproduction, nutrition, health and breeding – through partnerships that bring technology transfer and training, and are designed especially for small producers. The System for Animal Identification and Traceability (SITA) provides a great contribution to the rescue of AnGR, getting real information about the livestock species.

In Mexico, the PROGAN (Concept of Sustainable Livestock Production Support and Management Livestock and Beekeeping) aims at an increase in livestock productivity through technological practices for sustainable production, which includes technical assistance, training and development of a livestock insurance fund. However, it is recognized that there is a need to look for international partnerships allowing the country to move forward in this area.

## Strategic Priority Area 3: Conservation

Most relevant strategic priorities and actions:

Strategic Priority 8, Action 2: *“Encourage the development and implementation of national and **regional in situ conservation programmes** for breeds and populations that are at risk ...”*

Strategic Priority 10: *“Develop and implement **regional and global long-term conservation strategies**”*

Strategic Priority 9, Action 2: *“Establish or strengthen national and **regional facilities for ex situ conservation**, in particular cryogenic storage. Support the efforts of countries within a region that have opted to establish a regional facility.”*

### Regular assessment of factors leading to the erosion of AnGR

Among the twelve countries of the region that sent their Progress Reports, only one responded that it has been assessing regularly the factors leading to the erosion of AnGR since before the adoption of the GPA. Three of the remaining countries are either looking for funds or have already identified the funds to start this action.

### Factors or drivers leading to the erosion of AnGR

In Argentina, the majority of the locally adapted breeds, from the different species have been crossbred with commercial breeds, resulting in insignificant loss of diversity. Even though conservation programs are implemented, in specific populations the loss of genetic diversity continues. The intensification of production systems tends to reduce diversity through the homogenization of AnGR.

In Bolivia, there is a lack of awareness about the importance of AnGR, and the farmers are looking for high productivity and profits, regardless of whether or not commercial breeds are sustainable. Camelids and sheep are being moved towards more inhospitable areas and are being replaced by dairy cattle breeds. The Suri alpacas producing colored fibers are in critical condition due to the homogenization of the animals with white fleece. Introduction of new breeds of cattle, such as Nellore, Gyr, Limousin and Charolais, which are highly demanding, are threatening the locally adapted breeds, in the East, in the Amazon and in the Chaco regions.

In Brazil, the main factor leading the locally adapted breeds to erosion is their crossbreeding with imported exotic breeds. This is a very serious situation, due to the small effective population size of the majority of the locally adapted breeds. As an example, we can mention the decrease in numbers of locally adapted cattle breeds, which occurred in two steps. The first step was when British breeds came to Brazil, in the 1800s. At that time, the breeds found in the southern region of the country (temperate climate) almost disappeared. One century later, zebu breeds were imported from India. Those zebu breeds were brought to the Southeastern and Central-Western states (which have tropical climates), and this led to a huge and quick decrease in the population sizes of the tropical local breeds.

In Colombia, the main factor is the lack of awareness about the need to manage, select and improve the locally adapted breeds. Moreover, the indiscriminate use of foreign breeds, constantly being imported without any control or appraisal, and their uncontrolled crossbreeding with existing breeds, as the case of zebu, breeds for cattle, has led to the erosion of the locally adapted breeds. The main threatened locally adapted breeds belong to the following species: cattle, pigs, sheep, goats and horses.

Like the previously mentioned countries, in Ecuador, lack of awareness about the importance of AnGR is one of the main factors leading to their erosion. The introduction of exotic breeds for commercial purposes is also a very important factor. Other factors are the lack of incentives to farmers to promote domestic markets with by-products of locally adapted breeds, as well as a lack of policies and inadequate breeding practices.

Guatemala reported that there is poor information about AnGR, as well as poor training for animal science students. There is also a wide promotion to stimulate the consumption of products from commercial breeds. Another factor is the lack of adequate space because of overpopulation that affects the areas where the AnGR were kept. The last factor mentioned by Guatemala is the advance of the agricultural frontier that is causing deforestation, desertification, and over-hunting, affecting populations of rabbits, pigs, turkeys and deer.

In Mexico, the National Committee of Equines has implemented measures to quantify the degree of use of donkeys as this is a species without breeding programs and that has been eroded in comparison to other species.

Paraguay reported that these factors have not been identified due to a lack of evaluation.

The temperate climate of Uruguay facilitated the increased use of commercial breeds instead of the locally adapted ones.

Those imported commercial breeds present good adaptation to the environmental conditions of the country and high production levels. The lack of knowledge about the productive potential of locally adapted breeds is affecting all livestock species, while the intensification of production systems is affecting only pigs and poultry breeds.

#### Conservation policies and programs to protect breeds at risk in all important livestock species

As expected, only three countries replied saying that comprehensive policies and programs have been in place since before the adoption of the GPA. The other two countries that responded positively, reported that they have conservation programs only for some species and breeds, but that the coverage expanded since the adoption of the GPA. The last seven countries do not have such programs, and three of them are looking for funds to establish them.

#### Policies and programs in place regularly evaluated or reviewed

Four countries reported that the conservation programs are regularly evaluated or reviewed. Two countries are looking for funds that will allow these revisions, while another has already identified the necessary funds.

#### Measures to conserve breeds at risk of extinction and to prevent breeds from becoming at risk

##### In situ conservation

Six countries reported that they do have in situ conservation programs to avoid the extinction of their locally adapted breeds. Argentina has a Network of Animal Gene Banks financed by INTA that includes six animal species: cattle, goats, camelids, poultry, sheep and honeybees.

Bolivia reported some measures for in situ conservation were implemented before the adoption of the GPA, with the participation of communities and producers, and based on productive traits that these partners consider to be the important ones.

Starting in the 1980s, the Brazilian Network of Animal Genetic Resources established Conservation Nuclei for the majority of locally adapted breeds, in order to prevent their extinction. Thus, the in situ conservation is being done in these nuclei that were created exactly in the habitats where the breeds developed. Besides being used for collecting samples for cryopreservation and for genetic characterization, these Conservation Nuclei serve to increase awareness of society about the importance of conserving each of these locally adapted breeds.

In Colombia, since 1994 the Ministry of Agriculture has promoted and financed national germplasm banks, and currently there are six breeds included in the program. Starting in 2005, programs aiming at the development and multiplication of locally adapted cattle breeds have doubled their population size as well as the number of breeders.

In Mexico, the in situ conservation is coordinated by the Ministry of Environment and Natural Resources (SEMARNAT). In Paraguay, the Multidisciplinary Center for Scientific Research and Technology is identifying where livestock is located geographically and describing their production environments.

Among the last six countries, four are looking for funds to start an in situ conservation program.

#### Measures to conserve breeds at risk of extinction and to prevent breeds from becoming at risk

##### Ex situ in vivo conservation

In Argentina, there is a Network of Animal Gene Banks financed by INTA, which includes six animal species.

In Bolivia, these measures are being used exclusively for camelids, and began after the adoption of the GPA. ([www.bancamel.org.bo](http://www.bancamel.org.bo))

In Colombia, the Ministry of Agriculture began the conservation of Criollo cattle breeds in 1936 in different regions of the country. Later, similar conservation programs were initiated for sheep and pigs, and just recently, some state universities have started the conservation of poultry breeds.

In Guatemala, some populations of locally adapted breeds are being maintained in private farms.

The conservation of the Pampa Rocha pig, in Uruguay, is developed in the CERPAMPA, located in the Southern Regional Center FAGRO, located in Canelones. The conservation of Criollo cattle and Criollo sheep is being done in the National Park of San Miguel, by the General Command of the Uruguayan Army, located in the department of Rocha.

## Measures to conserve breeds at risk of extinction and to prevent breeds from becoming at risk

### Ex situ in vitro conservation

At the beginning of the 1990s, FAO decided to facilitate the creation of regional gene banks. Training courses were organized in all regions, involving two people from each participant country: one geneticist and one veterinarian working in animal reproduction. In the introduction to the training manual of the course held by FAO in China, it was explained why the gene banks should be regional: "From a genetic point of view, breeds found in different neighboring countries under different names may only be varieties of one breed. Characterization of the different populations and estimation of genetic distances between them will permit to limit the programs to really different breeds. New DNA technologies are powerful tools for this screening.

From an economic point of view, preservation activities are costly, without immediate economic repercussions. It is absolutely necessary to share the costs between countries. On the other side, the implementation of Regional Gene Banks raises difficult problems, mostly as regards differences in health status and health regulations between countries: it may be difficult to import samples (semen, oocytes or embryos) from a given originator country to the country hosting the Regional Gene Bank, as well as to export back the samples to the originator country, or to any other willing to re-create the breed." This last sentence proved to be so true that it was impossible to create, at that time, the regional gene banks. The huge differences in health legislations among countries did not allow the creation of the regional banks. To start this discussion again, it would be necessary to discuss health legislation specific for genetic material that would only be stored in a host country for conservation purposes, without permission to utilize it, unless negotiated and only if there were no risk associated.

Even though this regional bank, which was proposed to have duplicates in Argentina and Brazil, was not established, since then many countries have created their own national gene banks. Seven out of the twelve countries that sent their Progress Reports declared that they have cryobanks. Among the other five, only one is looking for funds to establish such a bank. Argentina has a cryobank that stores only semen from threatened or rare cattle breeds. This bank operates in a single location (INTA Balcarce Experimental Station) and has no replies. In the case of honeybees, the country has developed the cryopreservation of semen of drones (which is unresolved worldwide so far).

In Bolivia, cryopreservation is mainly used in cattle, but for commercial purposes, and its utilization is not a common practice for other species. For camelids, there is some research under development.

The Brazilian Animal Germplasm Bank for locally adapted breeds was created in 1983. At the beginning, only semen of cattle was collected and stored. Later, semen of sheep, goats, horses, donkeys and pigs was included. Presently, the Brazilian Animal Gene Bank has semen and embryos of the majority of these species.

The Ministry of Agriculture of Colombia, through affiliated organizations such as the Colombian Agricultural Institute, at the beginning, and the Colombian Agricultural Research Corporation, since 1994, maintains a cryobank, comprising over 46,500 straws of semen from more than 480 sires of ten Colombian Criollo cattle breeds. Almost 500 embryos of some of these breeds are also stored. The bank has also semen of some Criollo sheep breeds, and has just started the cryopreservation of semen of locally adapted pig breeds.

In Ecuador, a partnership program that includes the Ministry of Agriculture, the Central University of Ecuador, and FAO, a Germplasm Bank has been created, where semen of nine cattle populations is being stored. That country has a System for Animal Identification and Traceability, which will provide live status information and the location of AnGR, which should help to preserve endangered breeds and keep them out of risk.

A very modern National Center for Genetic Resources was recently created in Mexico, with the entire infrastructure for the cryopreservation of genetic material of the different livestock species.

Uruguay has ex situ collections of semen, tissues and cells of Criollo cattle and Criollo sheep, managed by the Department of Reproduction of the Veterinary College.

### Establishment of conservation programs as a priority

Among the ten countries that responded this question, nine considered the establishment of a Conservation Program as a priority. It seems that this question was not understood, because many countries that had declared having conservation programs in place, replied positively.

### Identification of major barriers and obstacles to enhancing the conservation of AnGR

Nine countries declared that there are barriers and obstacles to enhancing the conservation of their AnGR. Among the barriers and obstacles mentioned: (a) lack of financial resources (mentioned by five countries); (b) lack of awareness of breeders about the importance of AnGR (three countries); (c) lack of trained people (two countries); (d) lack of a national program or specific policies for the conservation of AnGR (two countries); (e) lack of interest in AnGR (two countries); and (f) little knowledge about the unique traits of locally adapted breeds (two countries).



#### Major gaps in existing ex situ collections of AnGR

Among the seven countries that reported having ex situ collections, six declared that they have gaps in their collections, and among those, three said that they have established priorities for filling these gaps.

#### Arrangements to protect breeds and populations that are at risk from natural or human induced disasters

Only Mexico replied positively to this question. And Ecuador reported that is looking for funds. It seems that the other ten countries did not even think about this problem.

#### Arrangements for extraction and use of conserved genetic material following loss of AnGR

Only Brazil and Mexico reported that arrangements have been in place since before the adoption of the GPA, while Ecuador and Uruguay are looking for funds to start this action.

#### Research to adapt existing, or develop new, methods and technologies for in situ and ex situ conservation

Seven out of the twelve countries responded that research commenced before the adoption of the GPA. Among the other five countries, three are looking for funds.

Conservation of AnGR in Argentina is based on its utilization. There is also cryopreservation, but greater efforts are focused on sustainable use. This work is being done with the breeders that own these resources. In cattle, for example, there is an agreement with the Criollo Cattle Breeders Association. In goats, however, the partnership is directly with the breeders.

In Bolivia, there is some in situ conservation in place, but cryopreservation is being done only experimentally.

In Brazil, the research on in situ and ex situ conservation of AnGR is being done through the Brazilian Network of Animal Genetic Resources. This Network was created as part of the Brazilian Platform of Genetic Resources, and these activities are developed under four of its six large research projects: (a) In situ conservation of large frame livestock species (cattle, buffaloes, horses, donkeys); (b) In situ conservation of small frame livestock species (sheep, goats, pigs, poultry); (c) In situ conservation of wildlife species with economic potential; and (d) Ex situ in vitro conservation. The Brazilian Network of AnGR involves ten Research Centers of Embrapa, twelve Universities, five Breeders Associations and a total of 86 researchers, from different institutions. In a second Research Network that does not work only with locally adapted breeds, Brazil is developing/ adapting animal reproductive biotechnologies that include in vitro fertilization, cloning and transgenic animals. Recently, two clones of one of the rarest locally adapted breeds of cattle (Junqueira) were produced. The researchers are aware that, in general, cloning is not a technique for conservation, because it decreases the genetic variability instead of increasing it.

However, in extreme cases like this one, where the remaining number of live animals is very low, the cloning allows an increase in the number of females, and if they can be bred with semen from unrelated sires, there will be an increase in genetic variability.

Colombia is developing/adapting new reproductive biotechnology techniques to obtain a larger number of embryos, through in vitro fertilization, not only for conservation purposes but also for immediate utilization.

In Mexico, research on technologies for ex situ conservation is a responsibility of the recently created National Center for Genetic Resources.

#### Programs to promote documentation and dissemination of knowledge, technologies and best practices for conservation

Four countries reported that they commenced programs to promote the documentation and dissemination of knowledge, technologies and best practices for conservation. And among the other eight, five are looking for funds.

#### Priority requirements for enhancing conservation measures for AnGR

The replies to this question in a certain manner repeat what was said in response to question 36, about barriers and obstacles. In other words, the priorities are to overcome the barriers listed. For example, the lack of trained people was mentioned as one barrier, and the priority is to have capacity building. The major barrier was the lack of financing for conservation, and the priority is to obtain financial resources to establish or to continue conservation programs.

#### Further comments

Bolivia has taken several measures on the conservation of genetic resources: agreements and decisions that are approved internally by the legislature of the country, but are unclear in their applicability, where the greatest difficulty is to be understood by the population and especially by the breeders. The benefits and the rights that are in these agreements are, in many cases, poorly understood, even by professionals. It is therefore necessary to disseminate such agreements at the level of the breeders so as to achieve a greater efficiency in their applicability.

In Brazil, following the establishment of the in situ program on a nationwide scale, in 1983, it was decided that EMBRAPA should start an ex situ program. This program would avoid the genetic dilution and the loss of irreplaceable genes in the locally adapted breeds. In order to store semen and embryos from these animals, the Animal Genome Bank was established.

Cryopreservation was initiated at the national Research Center for Genetic Resources (Cenargen) and a number of Conservation Nuclei have been established. Each breeding nucleus has been located at a site that has the necessary infrastructure for the collection of semen and embryos. The selected animals are assembled at these sites and after collection, their genetic material is immediately transferred to the Animal Gene Bank, located in Brasilia. When the infrastructure for collection of semen and embryos do not exist, donors are temporarily transferred to Cenargen's Experimental Farm for subsequent collection. Presently, the Animal Genome Bank has about 65,000 doses of semen and 450 embryos of the different species included in the program.

In Ecuador, the national government, through the Ministry of Agriculture and Livestock, Aquaculture and Fisheries (MAGAP) has been working in the National Sustainable Livestock Program, whose main goal is to increase the profitability of livestock production through environmentally friendly management. The National Genetics Center will help in the conservation of AnGR and distributing genetic material; nuclei will be established in each province for in situ and ex situ in vivo conservation.

In Mexico, it is important to point out that the Federal Government has the newly created National Center of Genetic Resources, responsible for the ex situ conservation of genetic resources (plants and animals). However, due to its recent creation, it is necessary to develop partnerships at regional and international levels.

In Paraguay, the Multidisciplinary Center for Scientific and Technological Research (CEMIT) has carried out genetic characterization of cattle, sheep, goats, pigs and donkeys and phenotypic and geographical study in cattle. The associated risk is the continuing lack of funding.

## Strategic Priority Area 4: Policies, Institutions and Capacity-building

Most relevant strategic priorities and actions:

Strategic Priority 13 Action 3: *“Establish or strengthen, in partnership with other countries, as appropriate, relevant research, training and extension institutions, including national and **regional agricultural research systems**, to support efforts to characterize, inventory and monitor trends and associated risks, sustainably use and develop, and conserve animal genetic resources.”*

Strategic Priority 17: *“**Establish Regional Focal Points and strengthen international networks**”*

Strategic Priority 19 Action 1: *“**Support regional and international campaigns to raise awareness of the status of animal genetic resources for food and agriculture**, and seek to develop wide support at the government and institutional levels, as well as among the general public.”*

Strategic Priority 23, Action 1: *“Assist all stakeholders to strengthen capacity-building, including by exchange of experience, by enhancing research and educational activities, and by providing **training opportunities, technology transfer and financial resources**, at national, **regional** and international levels ... ”*

Implementation and financing (paragraph 57): *“The international networks for animal genetic resources should be encouraged and strengthened through implementation of the Global Plan of Action for Animal Genetic Resources, noting the **important role of Regional Focal Points and regional networking to build collaborative partnerships, to coordinate regional management efforts in animal genetic resources, to further develop information sharing, and for technical cooperation, training and research.**”*

### Creation of the Regional Focal Point for Latin America and the Caribbean – RFP-LAC

The creation of the RFP-LAC in the year 2007 was the result of several driving forces. When the Global Focal Point first invited countries to appoint their National Coordinators, many countries of our region commonly sent a different person to each meeting of the Intergovernmental Technical Working Group on AnGR or to the Regular Sessions of the Commission on Genetic Resources for Food and Agriculture. Fortunately, this situation has changed, and the majority of the countries are now sending the National Coordinator to international meetings related to AnGR. This completely changed the situation and increased the integration of the National Coordinators of the region even before the creation of the RFP-LAC.

We could say that the creation of the RFP-LAC was a result of the determination of the National Coordinators of the region, who understood that the region could be stronger and be heard as one voice during the FAO meetings.

Another driving force was the interest in hosting the Regional Focal Point. A total of four institutions, from three different countries, offered their candidacy showing the importance of the RFP-LAC for the region. The help given by the FAO Regional Office for Latin America and the Caribbean in the creation of the interim Steering Committee should not be forgotten. The Steering Committee was responsible for establishing the rules for the election of the first Regional Focal Point for the region, and later, for the election itself. The RFP-LAC is a reality, but there are many steps to be covered. The most important is seeking financial support in order to organize training courses and regional and/or bilateral collaboration among the countries of the region.

#### First Call for Proposals under the Funding Strategy

The countries of Latin America and the Caribbean have been stimulated to submit projects to the First Call for Proposals under the Funding Strategy. Eight projects have been submitted, two of them being Regional and six national. The regional project submitted by Peru and Bolivia deals with South American camelids that are present only in the Andean countries.

#### Regional conferences on animal genetic resources

There are several conferences held in the region, where countries can present what is being done in terms of animal genetic resources. One of them is the Conference of the Ibero American Network for the Conservation and Utilization of Animal Genetic Resources (known as Red Combiand), held every year in a different country of the region. In the last three years, the Conference was held, respectively, in Ecuador, Brazil and Panama. Another regional event, held every two years, is the Latin American and Caribbean Conference for Genetic Resources (SIRGEALC). SIRGEALC contemplates not only animal genetic resources but also plant and microbial genetic resources. The last three Conferences were held in Mexico, Chile and Ecuador. A third conference, held every two years is the Meeting of the Latin American Association of Animal Production (ALPA). Last meetings were held in Peru, Puerto Rico and Uruguay.

In 2008, Brazil created its Brazilian Society of Genetic Resources, with conferences held every two years, alternating with SIRGEALC. Its third Conference will be held this September in Belém do Pará, located in the Amazon Region. The number of participants is increasing with every Conference, showing the importance of this subject in the country.

There is no doubt the all these opportunities are important tools to increase awareness of civil society about the importance of animal genetic resources for Latin America and the Caribbean.

#### Regional workshops for National Coordinators

The main opportunities for integrating National Coordinators have been the Workshops for National Coordinators that have been held in the region. The first one was held in May 2007, in Santiago, Chile, with the purpose of first discussing the election of the Regional Focal Point; it was attended by 10 National Coordinators, two members of the Global Focal Point, and the Temporary Steering Committee. The opening speech was made by Dr. Jose Graziano da Silva, presently FAO's Director General, who was at the time the Director of FAO's Regional Office for Latin America and the Caribbean. Besides approving the rules for the election of the regional Focal Point, National Coordinators discussed all available documents for the 11th Regular Session of the Commission of Genetic Resources for Food and Agriculture. During the discussion, emphasis was given to the Global Plan of Action, and the National Coordinators of Jamaica and Brazil reported the outcomes of the Friends of the Chair Meeting that had been held in Fribourg, Switzerland, in March of that same year. They stressed the importance of having the Global Plan of Action during the Commission Meeting, in order to have it presented for approval during the International Technical Conference on Animal Genetic Resources for Food and Agriculture that would be held that same year in Leipzig, Switzerland.

The second Regional Workshop was held in Brasilia, Brazil, in April 2008. It was the first one held after the election of Embrapa's National Center for Genetic Resources and Biotechnology as the Regional Focal Point for Latin America and the Caribbean. The main issues discussed were the Rules of the Regional Focal Point, and the election of its first Permanent Steering Committee. The Workshop was attended by 12 National Coordinators, one officer of FAO's Regional Office, and two members of the Global Focal Point. The new version of DAD-IS was presented by the Global Focal Point and tested by the National Coordinators.

Other four Regional Workshops occurred in Lima, Peru, in December 2008; in Pucón, Chile, in October 2009; in Puntarenas, Costa Rica, in November 2010; and in Santiago, Chile, in December 2011. At the last meeting, it was decided to extend the mandate of Embrapa Genetic Resources and Biotechnology as the Regional Focal Point for Latin America and the Caribbean for one more year. A new election is scheduled for the second half of 2012, allowing the new RFP to start its work from January 2013.

#### IICAS's Sub Regional Network on Genetic Resources - REGENSUR

At a Sub-Regional level, actions have been initiated within the scope of a new platform created by the PROCISUR of the Inter-American Institute for Cooperation on Agriculture (IICA) of the Organizations of American States (OAS).

The Platform REGENSUR was originally devoted to Plant Genetic Resources, but in 2010 was extended to animal and micro-organism genetic resources. REGENSUR includes the six countries of the Southern Cone of South America: Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay, and it is expected that common activities will be initiated to reinforce the national plan of action for genetic resources of every participating country. The areas in which interaction among countries is envisaged are sustainable use, conservation, and policies and capacity building.

## Implementation and financing of the Global Plan of Action for Animal Genetic Resources

Most relevant paragraph:

Implementation and financing (paragraph 50): “... *implementation of the Global Plan of Action for Animal Genetic Resources will require substantial and additional financial resources and long-term support for national, regional and international animal genetic resources programmes and priority activities, provided such incentives are consistent with relevant international agreements. The process should encourage and support the participation of governments and all relevant stakeholders. **Regional and international collaboration will be crucial.***”

Reading the replies to this section of the questionnaire it can be seen that the majority of countries of the region do not count with financial resources for conservation of their locally adapted breeds.

### International collaboration established

Only three countries of the region reported that they have established or strengthened international collaboration on characterization of their AnGR, while another three reported that they are looking for funds and the last six declared no international collaboration in this field whatsoever.

When the question was in relation to international collaboration on sustainable use and development, only one country replied affirmatively, while three reported that they are looking for funds to do so, and eight replied that there is no international collaboration on this field. A higher number of countries have a positive reply when the question was about international collaboration on the conservation of breeds at risk. Three countries replied positively, two reported that they are looking for funds and the last seven countries reported that they have no international collaboration in this field. It is important to remember that by the end of the 1980s, FAO initiated a concerted effort to establish regional gene banks.

Two countries of the region had been chosen to host duplicates of the regional gene bank: Argentina and Brazil. Training Courses were offered in the different regions of the globe. The one held in Latin America, for Latin America and the Caribbean, involved 15 countries, which were trained on topics related to ex situ conservation. Two participants were invited from each country: one geneticist and one veterinarian working on reproduction. Even though these courses were considered a success, at the end of them all, it was concluded that huge differences in the animal health of the participating countries would create enormous difficulties on the movement of the genetic material among countries. There would be cases in which the samples collected from one specific country could reach the regional gene bank, but could not get back to the original country because of its own restrictive legislation.

### Active NGOs in the countries

This question was again divided into three possibilities: characterization, sustainable use and development, and conservation of breeds at risk. There was uniformity in the replies. For these three options, eleven countries reported that there are no NGOs working on these three areas. Even though Colombia reported that there are active international NGOs working on these topics, it did not report their names. Brazil reported that the only two international NGOs working with AnGR in the country are WWF and IUCN, but that they only contemplate wildlife, and disregard locally adapted breeds of livestock, no matter how endangered they are.

### National funding for AnGR

Brazil, Colombia and Uruguay reported that there has been an increase in the funding of their national programs for AnGR, while the other nine countries that filled out the questionnaire reported no increase. Even though Brazil replied that there has been a budget increase, it stressed out that his increase has no relation to the adoption of the GPA. The creation of the Brazilian Network of AnGR, as part of the Brazilian Platform of Genetic Resources, was the reason for a considerable increase in the financial resources available for the conservation of AnGR.

### External funding for implementation of the GPA

Eleven out of the twelve countries replied that they did not receive any external funding for the implementation of the GPA. The only country that responded affirmatively was Chile, and even so, the funds received were not for the implementation of the

GPA but for FAO Chile for the elaboration of the National Program for Conservation and Sustainable Use of Animal Genetic Resources.

Establishment of international research and education programs to assist developing countries to better manage their AnGR

Only Argentina and Brazil reported that they had established international research and education programs to assist developing countries to better manage their AnGR before the adoption of the GPA and that they have been strengthened since then. Eight countries reported that they do not have such international programs, and the last two are looking for funds to do that.

Brazil informed that recently Embrapa created an international research program directed to Africa, called "Africa Brazil Agricultural Innovation Marketplace" ([www.africa-brazil.org/](http://www.africa-brazil.org/)), which is a partnership between African and Brazilian Organizations to enhance agricultural innovation and development. The Marketplace is opening a new source of expertise for Africa to identify and target pro-poor, smallholder-based projects utilizing Brazilian innovation research. Among its partners the following can be mentioned: Bill & Melinda Gates Foundation; International Fund for Agricultural Development (IFAD), and the World Bank (WB). In April 2012, 11 pre-proposals including AnGR and involving six African countries and Brazil have been approved: four projects sent by Nigeria/Brazil, three by Ethiopia/Brazil and one pre-proposal for each of the following countries with partnership with Brazil: Benin, Cameroon, Kenya and Uganda, with a total of eleven pre-proposals. The maximum budget per project is US\$ 80,000.00 for a period of two years.

Establishment of international support to assist developing countries to obtain training and technologies and to build their information systems

Nine countries replied that they have no such international programs and two countries declared that they are looking for funds. The only positive reply was the one from Brazil that reported that a program has been established since the adoption of the GPA. In a joint effort, the United States, Brazil and Canada are developing an information system for their AnGR. In the future, when this system is fully developed, it will be offered to other countries of the region, allowing the creation of a regional database.

Funding other countries for the implementation of the Global Plan of Action

None of the twelve countries that replied to the final question reported that they act as donors of funds to other countries of the region for the implementation of the GPA.