

Capacity building for sustainable use of animal genetic resources in developing countries

J.M.K. Ojango^{1,3#}, B. Malmfors², A.M. Okeyo¹ and J. Philipsson²

¹ ILRI, Box 30709, Nairobi, Kenya; ² SLU, Box 7023, Uppsala, Sweden, ³ Egerton Univ. Box 536 Njoro, Kenya

Abstract

Animal Genetic Resources for Food and Agriculture (AnGR) have great potential to contribute to increased food security and improved livelihood of poor people in developing countries. However, indigenous livestock which are well adapted to local conditions are often underutilized, and with few exceptions systematic breeding programmes are lacking. This is due to lack of a “critical mass” of people trained and informed in issues relating to AnGR, in addition to insufficient policy support and institutional frameworks. To address these shortages the International Livestock Research Institute (ILRI) in collaboration with the Swedish University of Agricultural Sciences, and supported by Sida (Sweden), launched a project “training the trainers”, for university lecturers and NARS in developing countries. So far, more than 100 scientists from 25 countries in sub-Saharan Africa and 15 countries in South and South East Asia have been trained in refresher courses and workshops. An Animal Genetics Training Resource (Web & CD) has also been developed, containing case studies from the tropics, generic information on livestock genetic improvement, breeding programme design, research, science communication and teaching methods. In general, very positive outcomes of the training courses and resources developed have been reported by participants on their teaching, research and on supportive activities for better use of AnGR. Despite these effects there is a huge demand for expanded activities in this area.

Keywords: Capacity building, animal genetic resource, developing countries

Corresponding author. E-mail: j.ojango@cgiar.org

Introduction

At the dawn of the 21st century more than 1.2 billion people live in extreme poverty, while 850 million are chronically hungry and the number is rising. Most of these people are found in sub-Saharan Africa, and South and East Asia. To arrest this trend, the Millennium Development Goals (MDG) of the United Nations (2007) set an overall objective to reduce the proportion of people who are extremely poor and hungry by 50% by the year 2015. Development and sustainable use of the diversity in the world’s livestock breeds and populations (otherwise referred to as ‘Animal Genetic Resources for Food and Agriculture’ or AnGR), especially if targeted to the poor, provides a pathway to achieving the goals. Critical to ensuring sustainable management of AnGR, strategic development of a strong knowledge and skills base among national agricultural research scientists and researchers (NARS) through planned and concerted capacity building initiatives is required. Capacity building within a nation plays a catalytic role in economic growth and development through availing a critical mass of individuals able to address rapidly changing technological, policy and cultural environments. To be effective, capacity building in scientific fields and related soft skills needs to be targeted innovatively and strategically; building on partnerships and collaboration between institutions.

Training the Trainers for sustainable use of AnGR in developing countries

To promote a sustainable and improved use of AnGR in developing countries, and as an integrated component of the International Livestock Research Institute (ILRI) research support activities on AnGR, ILRI in collaboration with the Swedish University of Agricultural Sciences (SLU), and supported by SIDA (Sweden), launched a project “*training the trainers*”, for university lecturers and NARS scientists in developing countries (Malmfors *et al.*, 2002; Mwai *et al.*, 2005). The main objectives of the project were to strengthen subject knowledge, teaching and communication skills of scientists involved in teaching and supervising graduate students in animal breeding and genetics. Thereby enabling better use of AnGR, and

thus, contributing to food security, poverty alleviation and improved environmental management. The project primarily targeted university lecturers and researchers in developing countries actively involved in teaching and supervision of research in animal breeding and genetics at BSc, MSc or PhD level. The expectation is that each lecturer/researcher given refresher training would, with the improved knowledge, awareness and skills, reach out to a large number of students and colleagues at their respective home institutions. The effect would thereby be multiplied through students who would use and further spread the knowledge during their professional careers. Details on implementation of the project were presented by Mwai *et al.* (2005). The main activities carried out by this project are presented in Figure 1.

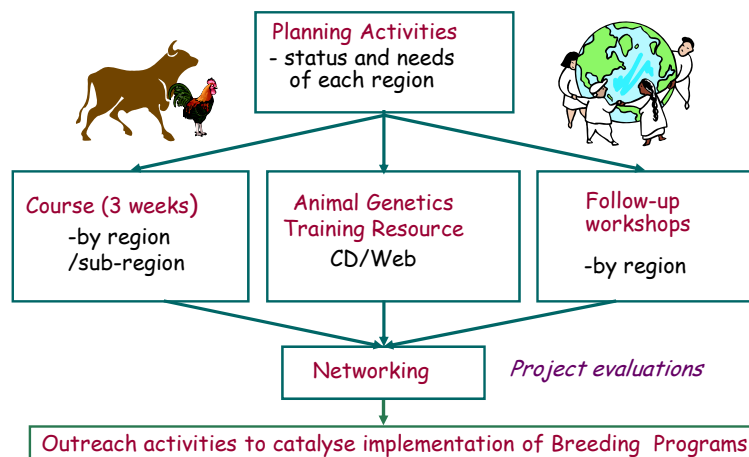


Figure 1 Main Activities of the ILRI-SLU Project.

The project target areas were countries in sub-Saharan Africa, (split into East-South and West-Central sub-regions), South-East Asia and South Asia. Through country visits and hands-on participatory learning, members of the project team interact personally with university trainers and researchers in the target countries and thus build trust and confidence, which are critical to forming collaborations and making them successful.

Resources developed

In response to the need for training material on AnGR improvement that is relevant to developing countries, the project developed an Animal Genetics Training Resource (AGTR) which was launched initially as a CD in 2003, and later updated in 2006 and is available both as a CD (Ojango *et al.*, 2006) and on the internet at <http://agtr.ilri.cgiar.org/>. The AGTR is a unique, 'one-stop', user-friendly, interactive, multimedia resource, consisting of core modules, case studies from developing countries, exercises, tools, and a library.

The five modules that comprise the core of the AGTR together provide a holistic overview of key issues regarding livestock genetics in developing countries. Lessons are also given on teaching and communicating this topic. These lessons cover both the preparation of research proposals and the presentation of results. The five modules cover the following areas: i) Global perspectives on animal genetic resources for sustainable agriculture and food production; ii) Improving knowledge of tropical indigenous animal genetic resources; iii) Sustainable breeding programmes for tropical farming systems; iv) Quantitative methods to improve the understanding and utilization of animal genetic resources; v) Teaching methods and science communication.

The modules are supported by over 40 case studies (CS) that summarize real-life experiences and capture indigenous knowledge and lessons learned. The studies also illustrate principles and/or methodologies commonly applied in animal genetics and breeding and highlight knowledge gaps appropriate for tackling in theses or further research. New CS are continuously developed, thus ensuring aptness and

increased relevance. A linked breed information tool incorporates all the breeds highlighted in the modules/case studies. Examples, exercises, web resources and links to full-text articles are included.

Outcomes

Research organizations and universities in several developing countries across Africa and Asia are now utilizing new knowledge and skills from the training programme and information in the animal genetics training resource (AGTR) to re-design their training courses, influence their national livestock policies and develop breeding programmes for livestock improvement in their respective countries. Since the year 2000, 74 university lecturers and NARS scientists from 25 countries in sub-Saharan Africa, 20 from six countries in South Asia, and 18 from nine countries in South East Asia have been trained by the project team. Experiences shared by participants during follow-up workshops three years after the training course indicate various impacts of the programme through:

- Improved teaching of animal genetics and breeding in universities: Improved lectures, better structure and use of visuals, time for questions and discussion; introduction, and/or increased use of group discussions, group work and project work; the introduction or improved use of the internet searches and computer laboratories (where available); the use of case studies, and also provision of course notes or handouts to students
- Increased interest in animal breeding and genetics by students, scientists and policy makers, as evidenced by increased focus on the global efforts aimed at conserving domestic AnGR. Increased interest in the practical applications of the subject AnGR
- Expanded research interest on AnGR in developing countries:
 - Research areas now given higher priority include: (i) Characterization of indigenous breeds (e.g. chicken, pigs and small ruminants) and some wild animals; (ii) Animal genetic conservation, including genetic improvement; (iii) Evaluation of production systems in crossbreeding; and (iv) Smallholder livestock farming, including indigenous knowledge;
 - Improved research proposal writing—more competitive research proposals;
 - Improved research methodologies (i.e. design, data collection, data arrangement and statistical analysis). Enhanced access to, and use of literature - leading to more rigorous literature review and experimentation and reporting of results, through use of databases and software presented at training courses.
- Communication skills improved among the participants, i.e. scientific writing, oral presentation and poster presentation of research results. More papers submitted and more papers accepted for publication; Supervision of students' research performed more efficiently and given more emphasis.
- Individual initiatives taken by participants to stimulate research, e.g.: (i) Exchange of ideas between colleagues concerning research priorities, project planning and publication; (ii) Collaborative research projects; and (iii) National database on indigenous animal genetic resources initiated.
- Establishment of e-mail discussion groups in the area of AnGR within the different regions: Afrib Breeders, in sub-Saharan Africa (maiser@idpi1.agric.za); IAGRA (Indonesian Animal Genetic Resources & Breeder Association) in South East Asia [a_anang@yahoo.com]; South Asia Genetics Discussion group (sa-genetics@googlegroups.com)

Exposure to the project's capacity building methodology has influenced how NARS and regional organizations organize their own capacity building initiatives. So for example, the Forum for Agricultural Research in Africa (FARA) adopted the ILRI-SLU approach as a model for a FARA initiative known as 'Building African Scientific and Institutional Capacity (BASIC). Also, the training programme was adapted and an extra course was provided on a request from the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) and Animal Agriculture Research Network (A-AARNET) as part of their capacity building activities to implement an EC funded programme on management of livestock genetic resources in Eastern Africa.

Through the application of the new knowledge, skills and information, several countries have been influenced at different levels. So for example:

1. Participants from all countries contributed to their country reports for the State of the World's (SoW) Animal Genetic Resources, and several contributed to negotiations on the resulting Global Plan of Action (FAO, 2007);

2. Tanzania and Kenya are drafting new livestock and breeding policies, while Uganda is revising the existing breeding policy. These efforts all aim at coming up with new policies on livestock that embraces management and conservation of native livestock resources;
3. The Malaysia Agricultural Research and Development Institute sought ILRI's assistance in developing a beef cattle improvement programme;
4. Ethiopia is putting the training into practice through the Ethiopian Agricultural Research Institute's Dairy research programme;
5. Some universities, such as the University of Nairobi in Kenya, and the University of Bhutan revised their curricula on animal genetics,

Challenges and Opportunities for Capacity building in AnGR

Building the required capacity to implement changes in livestock production and AnGR utilization however, takes time before its impacts are evident at the livestock or farmer level. Although more than 100 influential scientists from 40 countries have been trained, there is still a need for new generations of scientists to be part of this kind of capacity building.

Thus far, many of those trained, with their improved experiences have been promoted to senior positions in institutions, taking up roles in decision making and administration. This has created an opportunity for use of new knowledge and skills in dialogue with development partners (e.g., donor governments, international development agencies and multi-national corporations) and stakeholders to mobilize funding to enable "ownership" of improved education and implementation of livestock improvement strategies. A challenge however is for each developing country to have a "critical mass" of people trained and informed in issues relating to AnGR, in order to implement the breeding programmes proposed.

The SoW reports to the FAO (2007) helped different countries identify their needs and priorities for AnGR improvement. A few passionate "champions" from the training programme can positively affect the success of AnGR improvement through collaboration between NARS, university lecturers, ILRI and the SLU. These individuals, with a little extra facilitation, can play a key role in recruiting the necessary resources and expertise to launch and sustain projects.

In order to increase creativity in moving knowledge into practice through university and research institution collaboration, institutional learning and transition for more effective capacity utilization needs to be factored into university programmes in developing countries. Concepts such as joint appointments and shared time need exploration. Through scientific mentoring from partners in countries with more developed livestock industries and advanced training programmes, institutions from different countries within a region could join forces in graduate training and avail facilities for research. This would reduce the "brain-drain" often hindering progress in developing countries.

References

- FAO, 2007. The state of the World's Animal Genetic Resources for Food and Agriculture, Rome.
- Malmfors, B., Smalley, M., Philipsson, J., Ibrahim, H., Andersson-Eklund, L., Mwai, O., Mpofu, N. & Rege, J.E.O., 2002. Capacity building for sustainable use of animal genetic resources in developing countries-- A new approach. In: Proc. 7th World Congress on Genetics Applied to Livestock Production, pp. Communication No 29-04, Montpellier, France.
- Mwai, A.O., Malmfors, B., Andersson-Eklund, L., Philipsson, J., Rege, J.E.O., Hanotte, O. & Fulss, R., 2005. Capacity building for sustainable use of animal genetic resources in developing countries, ILRI-SLU Project progress report for the period 1999-2003. SLU (Swedish University of Agricultural Sciences), Uppsala, Sweden and ILRI (International Livestock Research Institute), Nairobi, Kenya.
- Ojango, J.M., Malmfors, B. & Okeyo, A.M., 2006. Animal Genetics Training Resource, version 2, Vol. www.Agtr.ilri.cgiar.org. International Livestock Research Institute, Nairobi, Kenya, and Swedish University of Agricultural Sciences, Uppsala, Sweden.
- United Nations, 2007. The Millennium Development Goals Report 2007. Vol. <http://www.un.org/millenniumgoals/pdf/mdg2007.pdf> (Accessed: July 2008).