Higher Education In Animal Breeding In Developing Countries – Challenges And Opportunities

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Introduction

Livestock in developing countries contribute to livelihoods by providing nutrients, socio-cultural needs and food security. Within these countries, a diversity of species is found whose potentials have neither been fully explored nor exploited. In addition, outputs from animals are kept low due to harsh climates, inadequate feed resources, diseases, inappropriate breeding practices, unfavourable policies and poor infrastructure (Seré et al., 2008). The Global Plan of Action (GPA), as internationally agreed upon in the Interlaken Declaration (FAO, 2007), spells out the needs for improved productivity and long term breeding strategies to enable sustainable management of livestock within these countries. A critical step in ensuring this is the strategic development of a strong knowledge and skills base among the farmers, frontline technical support staff, policy implementers, researchers, university lecturers and technology transfer agents through planned and concerted capacity building.

Within developing countries, higher education institutions (HEI) when well supported and linked with other relevant actors through active networks can effectively serve as prime creators and conveyors of knowledge, and can deliver support for national efforts to raise standards of living and alleviate poverty. Indeed the wealth—or poverty of a nation depends on the quality of higher education (World Bank 2000). In HEI, well designed academic programmes run by high quality faculty, committed students and sufficient resources are required. Building a critical pool of well trained individuals in fields related to agricultural production and with relevant soft-skills plays a catalytic role in economic growth and development through availing individuals able to address rapidly changing technological, policy and cultural environments. However, developing countries have inadequate human capacity in animal genetics and breeding (AGB) which is a major impediment to developing and implementing livestock improvement programmes, policies and strategies.

This paper provides an overview of the current training programmes related to AGB in HEI in developing countries of Sub-Saharan Africa, South Asia and South-East Asia, highlights

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key challenges faced within systems, and explores some opportunities that could be exploited to realize positive results and outcomes.

Current situation of AGB training in HEI in developing countries

HEI in many developing countries offer courses related to AGB at BSc level as a small part of other courses related to broad disciplines in agriculture, veterinary and animal sciences. It is common to find a few consolidated courses in AGB (basic population genetics, and introduction to quantitative genetics) being taught by only one or two lecturers within an institution. In Sub-Saharan Africa and to some extent in South and South East Asia one lecturer may provide training for more than one institution due to unavailability of other lecturers in the same field of study. Heavy teaching schedules for lecturers leave them with little time to explore opportunities for research. Indeed within these regions, most research tends to be carried out at separate research institutions with weak linkages to HEI, and it is rare to find a unique department of AGB in HEI.

Generally very few credit hours are allocated to AGB at undergraduate (BSc) level, and not many institutions are able to offer MSc degrees specialising in AGB. Where MSc courses are available, basic course work is taught for one year after which students carry out a research project and present a thesis for examination. However, students tend to take a long time to complete their research projects due to limitations in funding. In some years, enrolment at MSc level is boosted through funding provided as part of donor supported development projects, however projects undertaken in these instances tend to have a very broad scope with only a small part oriented to AGB.

While BSc classes tend to be quite large in several institutions (e.g. up to 100 students enrolled in Animal Husbandry and 350 in Veterinary Medicine in Bangladesh), MSc classes are usually small in all countries (2-10 students), and only 1 PhD student in AGB may be enrolled at any given time. Reasons given for the low rate of enrolment of postgraduate (MSc and PhD) students include a misconception that the subject is too theoretical and therefore difficult. Further reasons are that course content is not regionally specific or relevant to local conditions which differ greatly from more developed countries (Mwai et al., 2005), and students opt for programs considered as more glamorous, high-tech and better paying (such as biotechnology or biomedical science), or seek “better quality” postgraduate education institutions outside of the developing countries.

Challenges in AGB training programmes

In the recent past, many developing countries have experienced a great expansion in HE with large class numbers in more “trendy” fields such as information technology, economics, various types of management and humanities to name just a few. However, class sizes for courses related to agriculture, particularly animal sciences relative to the crop sciences have remained small, and in several institutions notably in Sub-Saharan Africa, are decreasing. One of the reasons given for lack of interest in agriculture is that a large proportion of students entering HEI in developing countries were raised either on farms or in situations where there was a heavy dependence on agriculture and where poverty was rife. They

therefore associate agriculture with poverty, drudgery and a hindrance to improving the quality of their lives rather than the backbone on which development has been hinged. In Asia however, class sizes at undergraduate levels have remained very high and the limited resources available are thinly stretched.

Further challenges in training programmes within Sub Saharan Africa and Asia are outlined below:

- Most countries have very few lecturers / trainers trained to PhD level in AGB. Until recently, lecturers tended to be trained in more developed countries—and due to restricted time scales for studies, carried out projects responding to needs of more developed economies, and hence were ill prepared to face the challenges and limitations in their own countries.
- Training methods employed lean heavily on imparting theoretical knowledge of the subject—with little emphasis on practical application on the ground. These challenges are compounded by inadequate funding by national systems and infrastructure which does not allow for effective use of audio-visual teaching aids. At the same time "Management" of HEI tends to be rigid and not flexible to adjust to and accommodate new ideas and ways of doing things—hence often ends up being an impediment to change.
- Investment costs in training trainers are high, and once trained, motivation for retaining those trained are inadequate as remuneration for the skills sets acquired within national systems is low (not competitive). Role models in AGB for young scientists are few, and due to high work loads are unable to take up refresher training courses to keep abreast with the generation of new knowledge.
- National policies for employment do not encourage investment in the practice of sciences within training institutions, hence the adaptation of scientific concepts to solving problems locally experienced is a challenge. The absence of a research agenda in several HEI isolates elite scholars and scientists, rendering them incapable of keeping up with developments in their own fields.
- Advances in computerization, communications and information technology have greatly revolutionized the ability of researchers to create and share new knowledge. This "knowledge revolution" has seen an exponential increase in knowledge in more developed countries—evident through new patents, databases, journals etc. However, access to information in developing countries remains a challenge due to inadequate infrastructure and several countries are being left behind, both in their ability to create, absorb and use the new knowledge generated, creating a huge gap between industrial and developing countries.

Opportunities for change and improvement in AGB training

The current food crisis, and the realization that without an increase in agricultural outputs few if any developing countries will be able to meet targets set in the millennium development goals (United Nations, 2007) have re-awakened countries and HEI to change the status and practices in agriculture related fields. There is also an increasing and unmet demand for livestock products that are safe for human consumption against a shrinking diversity of animal genetic resources. To meet this, a "livestock revolution" resulting in a

doubling of outputs from livestock in developing countries is required (Delgado et al, 1999). At the international level increased resources are being allocated to facilitate the implementation of the GPA for animal genetic resources. HEI in developing countries need to strategically develop capacity in AGB through utilizing new and existing opportunities some of which are outlined below.

- Concerted efforts in training of trainers need to be made. Trainers in AGB in developing countries, with some refresher training that exposes them to the possibilities could revolutionize sustainable livestock production within their environments.
- Collaborations with universities in more developed countries (North-South collaboration) that allow for short term exchanges of HEI staff to learn alternate methods of training as advocated in the Erasmus Mundus programme in Animal Breeding and Genetics (EMABG) are required. Such efforts would need to be followed up with focussed workshops reconnecting teaching with research through the development of proposals in AGB improvement between groups of institutions within regions. Such projects would help improve knowledge and awareness of the importance of AGB at student and farmer levels.
- Co-operation among HEI within regions (South-South collaboration) in order to provide training for MSc and PhD students using the best lecturers and scientists both within the region and from partners in other regions would make good use of the resources available within individual countries.
- The rapid expansion in computing technology and internet facilities provide a great opportunity for increased networking, partnerships and "scientific mentoring" for HEI trainers in developing countries. However, to fully utilize these, more flexible sharing of information between institutions offering training in AGB in developing countries should be encouraged.
- Networks to brings together scientists and lecturers for refresher training every 4-5 years would greatly help bridge the "knowledge gap".
- Joint projects between researchers and university lecturers would facilitate HEI to run timely graduate programmes with research projects that respond to needs identified within the livestock industry.
- Regional platforms that have been established to facilitate information sharing (ASARECA, SADC, RUFORUM, FARA and SAARC) need to be better utilized by various HEI.
- New courses that enhance the development of "soft skills" in students should be introduced. Within developing countries, there is an increasing demand for individuals able to take up leadership roles in managing AnGR who have a strong background in AGB and are open-minded and versatile. Such individuals should be able to incorporate economic and social skills while implementing breeding programmes.
- Over many years due to low incomes and little incentives to work within developing countries, there has been a "brain-drain" of expertise in various fields. However, there is a new interest by scientists in the "Diaspora" to offer short-term training, or even run some graduate courses at a minimal cost within their home countries when they return on vacation. Few HEI are beginning to take advantage of this expertise, however, if

adopted, this could rapidly catalyze growth in different disciplines and help reduce the "knowledge-gap" between developed and developing countries.

It should be remembered that numbers of trained individuals are built most cost-effectively within countries with the demand, driven by the needs of the existing livestock industry. Policies, institutions and infrastructure need to be developed to help drive and support livestock production in many developing countries. Sustainable solutions to various crises within countries will only come from people within these countries ready to make a difference. Energy and fresh ideas of young scientists needs to be mobilized through guided research projects, sharing of thoughts in scientific conferences and harnessing ideas in fundable concept notes for development.

An example intervention programme to support AGB in developing countries

To promote a sustainable and improved use of animal genetic resources in developing countries, and as an integrated component of the International Livestock Research Institute (ILRI) research support activities on Animal Genetic Resources, ILRI in collaboration with the Swedish University of Agricultural Sciences (SLU), and supported by Sida (Sweden) in 1999 launched a project training the trainers, for national university lecturers and researchers in developing countries (Malmfors et al. 2002; Mwai et al. 2005). The main objectives of the project are to strengthen subject knowledge, teaching and communication skills of scientists involved in teaching and supervising graduate students in animal breeding and genetics, thereby contributing to food security, poverty alleviation and improved environmental management. 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.

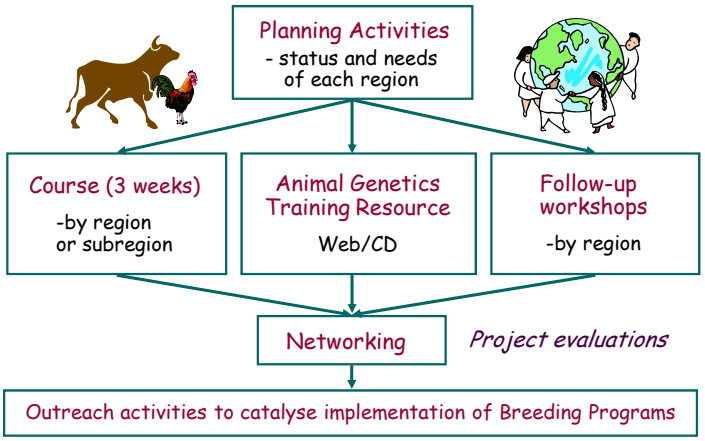

Figure 1: Main Activities of the ILRI-SLU Project

Since 2000, 137 university lecturers and researchers across 12 countries in Central and West Africa, 18 countries in Eastern and Southern Africa, 10 countries in South East Asia and 6 countries in South Asia have been trained by the project team. Feedback from participants in the courses and various institutions within developing countries indicates that several research organizations and HEI across Africa and Asia are now utilizing new knowledge and skills from the programme and the Animal Genetics Training Resource (AGTR; http://agtr.ilri.cgiar.org) developed by the project team to re-design their training courses, influence their national livestock policies and develop breeding programs for livestock improvement in their countries.

Concluding remarks

There is a great need for improvement in HEI training programmes in developing countries. The critical number of trainers and researchers in AGB in HEI needed in developing countries has however not yet been attained. Several challenges would face those striving to implement change, however, beyond the challenges are several opportunities to be exploited. Strong collaborations, partnerships and resource mobilization efforts are required to turn possibilities into realities.

References

Delgado C., Rosegrant M., Steinfeld H. *et al.*, (1999). *Food, Agric. Env. Disc. P. 28. IFPRI 72 pp.*

FAO (2007) *State of the World's Animal Genetic Resources 524 pp*

Malmfors, B., Smalley, M., Philipsson, J. *et al.* (2002) In *Proc, 7th WCGALP Comm No 29-04*,

Mwai, A. O., Malmfors, B., Andersson-Eklund, L. *et al.*, (2005) *ILRI-SLU Project progress report for the period 1999-2003*

Seré, C., Van Der Zijpp, A., Persley, G. *et al.*, (2008) *Anim Genet Res Inf B. 42, 1-27*

United Nations, 2007 http://www.un.org/millenniumgoals/pdf/mdg2007.pdf

World Bank (2000): http://www.tfhe.net