
**FORGING PARTNERSHIPS TO
ENHANCE THE RELEVANCE OF
ETHIOPIAN GRADUATE SCHOOLS
RESEARCH IN AGRICULTURE**

**REPORT ON STAKEHOLDER
WORKSHOP**

**23-24 OCTOBER, 2008, HAWASSA
UNIVERSITY, ETHIOPIA**

WORKSHOP SUMMARY

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BACKGROUND AND RATIONAL

Tertiary level agricultural education, research, and extension constitute the core components of agricultural knowledge triangle in Ethiopia. The first has a profound influence on the latter two in at least two ways. First, agricultural education imparts knowledge, develops skills, and shapes attitudes of professionals and managers in research and extension. Second, agricultural education can be a key research actor in its own right. Research conducted by postgraduate students is an integral part of the research activities of tertiary educational institutes and probably represents the larger share of time-bound research undertakings of the institutions.

Ethiopia has over half a century of experience in tertiary agricultural education. Graduate programs in agricultural sciences began at MSc level in 1979 at the then Alemaya College of Agriculture (now Haramaya University) and has been expanding ever since. Today, the number of universities in Ethiopia has expanded significantly and most have commenced graduate programs. One of the strongest aspects of these graduate programs is exposure of students to research undertakings and associated theses of their major findings.

Research and development organizations these days are under immense pressure to improve their relevance, accountability, and impact. They are facing new and increasingly complex challenges to support; the fight against poverty; food and nutritional insecurity, and the process of agricultural commercialization. Properly planned and implemented graduate-level research can make positive contribution to this endeavour. However; although graduate programs in agriculture have been successful in producing high calibre professionals, the relevance of graduate theses research in addressing the real needs of Ethiopian farmers and supporting policy and development practice has been questionable. One of the reasons for the mismatch between research activities of graduate students and the other two major components of the agricultural knowledge triangle has been the absence of proper coordination of efforts among the Ministry of Agriculture and Rural Development (MoARD), National Agricultural Research System (NARS) and Higher Learning Institutions (HLIs). This lack of coordination encompasses all aspects of research issues; starting from research problem identification and implementation to synthesising, packaging and popularization of relevant research results. This has led to difficulty in securing and leveraging funds for graduate research projects, created artificial shortage of skilled human resources to undertake research and opened the door for duplication of research activities.

The current global trend in agricultural research reveals a major shift away from the conventional linear and often isolated process to the pursuit of impact as a driving force for research new way of doing science that focuses on impact-driven engagement or a research-for-development approach is emerging. Given our stage of development, we therefore need to gainfully position ourselves in these changing circumstances and ensure that our resources and efforts are leveraged in a meaningful, intelligent and synergistic manner.

Given the particular focus of the Government of Ethiopia in the agriculture sector; the urgency of the need to enhance agricultural productivity and market-orientation; and the encouraging trend in expansion of higher learning institutions; it is an opportune time to harmonize efforts to create synergy among the major actors and stakeholders in the agriculture sector. As a result, the *Improving Productivity and Market Success of Ethiopian Farmers* project (IPMS), in collaboration with Hawassa University organized a two-day workshop from October 23 to 24, 2008 to:

1. Examine the current situation of graduate research in various national universities,
2. Develop recommendations and sustainable remedies to identified opportunities and challenges, and therefore

3. Enhance the relevance of graduate research to science and agricultural development in the country.

More specifically the workshop had the following objectives and expected outputs:

OBJECTIVES:

1. To deliberate and *form a common understanding on improving the relevance of graduate research in agriculture* in informing the country's agricultural policies and strategies options
2. To re-position graduate research undertakings to *focus more on demand-driven engagement* in research-for-development and impact
3. To develop mechanisms for *enhanced partnerships* among key actors and stakeholders in problem identification, research implementation and application of research results
4. To develop a *common understanding on resource mobilization and the coordination* of funding for sustainable support of graduate research
5. To develop appropriate *recommendations for proper documentation* and dissemination of research results
6. To *agree on specific modalities and mechanisms* for coordination of efforts to enhance the relevance of graduate research

EXPECTED OUTPUTS:

1. Clear appreciation and understanding of the potential *contribution of graduate research in addressing the country's agricultural problems*
2. Agreement on the need *to re-position graduate research to be more demand-driven* and impact-oriented
3. Development of agreed *mechanisms for enhanced partnerships* in engagement in graduate research undertakings and application of research results
4. Appreciation and agreement on the *importance, need, and mechanisms of coordination of funding and resource mobilization* to ensure sustainable support for graduate research
5. Development of *recommendations for proper documentation and dissemination* of research results
6. Development of *modalities and mechanisms for coordination of efforts* to enhance the relevance of graduate research

PARTICIPANTS:

The workshop brought together all the relevant stakeholders (Annex-1) from:

- the Federal Ministry of Agriculture and Rural Development
- the Rural Capacity Building Project, MoARD

- the Federal Ministry of Education
- the Ethiopian Institute of Agricultural Research (EIAR)
- Regional Agricultural Research Institutes (RARIs)
- the Addis Ababa, Haramaya, Hawassa and Mekele universities
- the International Food Policy Research Institute (IFPRI)
- the International Livestock Research Institute (ILRI)
- the Improving Productivity and Market Success (IPMS) Ethiopian Farmers Project, ILRI

ACTIVITIES AND PROCESSES:

The workshop comprised plenary sessions (presentations and discussion) and breakout sessions (small group tasks followed by plenary presentations on group findings and discussion). Stakeholders deliberated on four themes relating to graduate research in agriculture and related disciplines:

1. The relevance of graduate research,
2. Finance and staff for supporting graduate research,
3. Documentation of outputs of graduate research and
4. Effective communication to potential users, and the need for partnership to enhance the relevance and impact of graduate research.

The workshop began with a welcome speech by Dr. Sheleme Beyene, the Vice President of the hosting university. His Excellency Dr. Adhane Haile, State Minister, Ministry of Education, made a keynote address outlining the GoE strategies and directions for advancing graduate programs in agriculture.

PLENARY SESSIONS

All of the first day and part of the second day were used for plenary presentations and discussions (Annex-2). Five invited papers on issues relevant to the theme of the workshop were presented to set the scene: The papers presented were:

1. Emerging issues and challenges in Agricultural Research for Development (AR4D) and their implications for agricultural higher education (Drs P. Anandajayaskarem & Berhanu G/Medhin, ILRI)
2. Agricultural higher education linkages with the core components of agricultural knowledge triangle in Ethiopia (Dr. Tena Alamirew in lieu of Professor Belay Kassa, Haramaya University)
3. The need for harmonizing EIAR research with research in agricultural higher education (Dr. Admasu Shibru in lieu of Dr. Solomon Assefa, EIAR),

4. Linking graduate research to market-oriented agricultural development in Ethiopia: IPMS experience, and
5. Examples of success stories in strengthening the contribution of agricultural education to research and development in sub-Saharan Africa (Dr. David Spielman, IFPRI).

Following the invited papers presentation session, each of the deans of schools of graduate studies (specifically, AAU- Faculty of Veterinary Medicine, Haramaya University, Hawassa University and Mekele University) presented papers on graduate research experiences of their respective institutions. The overall guiding title for these papers was '*Critical analysis of graduate research in agriculture: types of research, quality, relevance, partnerships, coordination and resource mobilization*'. During this session IPMS presented a paper on its experience in supporting graduate research in agriculture.

The papers presented during the final plenary session primarily dealt with strategies and opportunities for capacity building to strengthen graduate research in agriculture.

1. ILRI strategies and opportunities for capacity building through graduate research (Dr. P. Anandajayaskarem)
2. IPMS experience with capacity development through graduate studies (Dr. Azage et al)
3. Rural Capacity Building Project – support for graduate research (Dr. Mandefro Negusie)
4. Addis Ababa University: higher education staff capacity building (Dr. Brook Lemma)

What followed was a breakout session in which the participants were divided into four groups and critically reflected on key issues relating to enhancing the relevance, quality and practical usefulness of graduate research in agriculture. Each group addressed specific issues in graduate research such as relevance, quality, accountability, partnership, research funding, staff, documentation, and communication of research outputs. A group representative then presented observations of his/her group in a plenary presentation and general discussion was conducted on the findings of the groups.

WRAP-UP SESSION

Finally, Mr. Dirk Hoekstra, IPMS project manager, presented the summary of key issues and deliberations of the workshop and closed his remarks with words of thanks to the organizers and participants of the workshop.

WORKSHOP KEY FINDINGS AND RECOMMENDATIONS ON THE WAY FORWARD

The following section highlights in a bulleted form the current status of graduate research and key concerns of the workshop participants about it.

I. Research Relevance

- The quality of most current graduate research is often of questionable standard
- Graduate research topic selection is generally driven by individual interest
- The research by graduate students is often haphazard, isolated, supply driven, and technology-focused
- There is a mismatch in the typical duration of available student time and the research duration demand of a graduate-level research, and
- There is a lack of a coordinated national agricultural research plan

II. Funding and staff

- Near exclusive reliance on limited government funding
- Disparity in allocation of funds – uncoordinated
- Inadequate staff for teaching and guiding graduate research
- Difficulties in the retention of qualified and experienced staff
- Flexibility of staff to adapt and respond to changing stakeholders demands and expectations

III. Documentation and dissemination of research

- Poor documentation of graduate research outputs
- The dissemination of research outputs is mostly limited to the peer community
- Inadequate use of ICT for proper documentation and communication
- Poor writing and communication skills of students, which seriously influences the quality of graduate research output

IV. Partnership

- Weak linkage/collaboration
- Intra-institutions

- Inter-institutions
- Research – extension – education
- Other relevant actors (private sector, farmers, civil societies, etc)

Options and entry points identified during the workshop to enhance relevance and impact-orientation in graduate research in agriculture are summarized here.

I. Enhancing the relevance of graduate research

- National research & development plan – how do we develop it
- Assist in transformation of subsistence agriculture to market-oriented agriculture
- Value chain – innovation system perspective
- Impact oriented
- Thematic approach - most universities do not yet follow the thematic approach, but there are emerging cases. How can we learn from each other? Are plans the same as deeds.
- Aligning organizational and individual interest – creativity

II. Improving funding and staff situations

- Industry/commercial clients
- Donors/projects/NGOs as sources of funding
- Postgraduate grant scheme
- Short-term in-service training on new concepts
- Staff and student incentive schemes
- Linkages with foreign universities
- Creative staffing arrangements (joint appointments, university/research/industry collaborations)

III. Improving documentation and dissemination of research outputs

- A web-accessible theses database will make add value to theses, increase their potential application, and also discourage plagiarism since it will be easier to check for such deeds.
- Ethiopian Agricultural Portal can be used as a means for disseminating research outputs.
- Fora for stakeholders
- Repackaging research outputs
- Development training materials

- Involvement of students in applying research outputs

IV. Partnership for enhanced relevance of graduate research

- Some encouraging beginnings along partnerships with foreign universities
- Theme based partnerships
- National graduate council
- REAC – who is involved? Is it enough?
- Organizational structure research and higher learning institutions – separate/integrated

NEXT STEPS:

The importance of having a research coordinating body and platforms was considered critical to translate intentions to concrete actions. Thus, it was decided to establish a *“Forum for Graduate Research in Agriculture”*. The forum will include deans of schools of graduate studies of interested higher institutes and EIAR representation. Actors such as Improving Productivity and Market Success (IPMS) of Ethiopian farmers’ project and the Rural Capacity Building Project (RCBP) of MoARD were identified as collaborators with important facilitation roles.

It was agreed that Hawassa University would convene the next FGRA meeting and play the coordination role during the transitional period. The university was recommended to take this transitory role because it had previously considered to launch similar initiative and was taking steps to secure financial support from Canadian International Development Agency.

The FGRA will be expected to:

- Develop a partnership and communication strategy, modalities, and suggest coordination mechanisms; and
- Organize the next platform for deliberation of the proposal and developing action plan to move forward.

SETTING THE SCENE

The workshop started with a series of presentations intended to set the scene for what is to come in the next two days. Specifically the following five targeted presentations were delivered:

1. Emerging issues and challenges in Agricultural Research for Development (AR4D) and their implications for agricultural higher education (Drs P. Anandajayaskarem & Berhanu G/Medhin, ILRI)
2. Agricultural higher education linkages with the core components of agricultural knowledge triangle in Ethiopia (Dr. Tena Alamirew in lieu of Professor Belay Kassa, Haramaya University)
3. The need for harmonizing EIAR research with research in agricultural higher education (Dr. Admasu Shibru in lieu of Dr. Solomon Assefa, EIAR),
4. Linking graduate research to market-oriented agricultural development in Ethiopia: IPMS experience, and
5. Strengthening the contribution of agricultural education to research & development Examples of success stories in strengthening the contribution of agricultural education to research and development in sub-Saharan Africa (Dr. David Spielman, IFPRI).

The presentations were followed by questions & answer session and discussions.

These were followed by presentation of graduate research experiences of workshop participating universities. Following are summaries of these papers.

THE EXPERIENCE OF ADDIS ABABA UNIVERSITY - FACULTY OF VETERINARY MEDICINE (AAU-FVM)

Historical background

In 1979, AAU - FVM was established to offer a six-year Doctor of Veterinary Medicine (DVM) program. In 1996, the Faculty opened a joint masters program in Tropical Veterinary Epidemiology (TVE) with Free university of Berlin. The joint program lasted for six years. In 2002, The Faculty opened a new masters program in Tropical Veterinary Medicine and took over the responsibility of running the joint masters program in TVE.

In 2004, FVM-AAU diversified the masters programs into the following eight fields:

1. Animal Physiology
2. Tropical Animal Health and Production
3. Tropical Veterinary Epidemiology
4. Tropical Veterinary Microbiology
5. Tropical Veterinary Public Health
6. Tropical Veterinary Parasitology
7. Tropical Veterinary Pathology
8. Veterinary Obstetrics and Gynecology

Currently (in 2008), the faculty preparing to launch an international masters program in Transboundary Animal Disease Management in collaboration with five universities:

1. Free University of Berlin
2. University of Khartoum
3. Makerere University
4. Sudan University of Science and Technology
5. Nairobi University

The faculty has so far trained 766 veterinarians with DVM degrees and 202 specialists with masters' degrees, of which 32 were in the joint program. The current annual intake is 150 undergraduate and 120 masters' students.

Currently, the faculty is finalizing preparation of the curricula of following four PhD programs:

1. Veterinary Obstetrics and Gynecology
2. Tropical Veterinary Parasitology

3. Veterinary Public Health
4. Animal Production

The programs will be joint programs with **SLU** and other foreign universities

The following table depicts the university's current human resources composition.

Human Resource – Academic Credentials				
Department	DVM	MSc	PhD	Total
APS	1	3	3	7
BMS	3	4	1	8
CLIS	2	6	4	12
MVPH		1	5	6
PAPA	2	5	4	11
TOTAL	8	19	17	44

Addis Ababa University current human resources composition – by Academic Credentials

Human Resource – University Posts					
Department	Lecturer	Assistant Professor	Associate Professor	Professor	Total
APS	1	2	3	1	7
BMS	4	4	-	-	8
CLIS	2	6	3	1	12
MVPH	-	1	2	3	6
PAPA	2	8	1	-	11
TOTAL	9	21	9	5	44

Addis Ababa University current human resources composition – by University Posts

In addition, the Faculty has 17 technical assistants all with diploma and 6 expatriate staff (13.6%) from which 4 are professors (80% of the total number of professors)

In terms of physical infrastructure, there are 11 lecture halls and 2 conference halls, eight specific task laboratories and one multipurpose lab, two veterinary clinics with one dedicated equines clinic with surgical and imaging facilities. There are also two libraries with more than 7500 entries and two computer labs, one of which has Internet access facilities.

New buildings which are under construction to support the faculty expansion will add the following to existing facilities:

- Offices (about 62)
- Classrooms (8)
- Laboratories (11)
- Library (300 seats)
- Conference Hall (800 seats)
- Dormitories (1000 students)
- Veterinary Teaching Hospital
- Modern Abattoir
- Postmortem Hall
- Student cafeteria (560 seats)
- Student clinic
- Staff lounge
- PC Room (1)

In 2006/07, AAU drafted a 5-year strategic plan with the Faculty of Veterinary Medicine. It has set a vision to be a regional center of excellence in teaching, research and services in the area of animal health and production. The specific vision statements are:

- Provision of high standard problem solving training in animal health and production at different levels
- Conduct basic and applied research in animal health and production
- Provision of high standard and exemplary animal health services supported by latest diagnostic facilities
- Foster partnerships and working relationships with all stakeholders
- Making research derived knowledge and technology available to end users
- Creation of networking with national as well as international teaching, research and development institutions to facilitate skills development and knowledge transfer

- Nurture and promote animal welfare concepts and practices

Graduate Research in FVM-AAU

From 1996 to 2002, a joint masters program in TVE (North-South partnership) between AAU and FUB admitted students, mainly from South-Eastern African countries (Ethiopia, Kenya, Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Malawi, Lesotho, Cameroon)

Emphasis was given to applied research in the following areas:

- Peri-urban and urban dairy health and production
- Tsetse and non-tsetse transmitted trypanosomosis
- Food safety, veterinary public health and consumer protection
- Animal health delivery and epizootics control strategies
- Poultry health and production

Research topics were determined based on national needs of countries involved and interests of FVM-AAU and FVM-FUB. Significant efforts were made to ensure the quality of research through various measures including:

- Involvement of highly qualified experts in thesis advising;
- Requirement to defend research outputs in front of an external assessors;
- Partnerships with national and international institutions

Partnering institutions include

- OAU/IBAR/EU& PARC Ethiopia, Kenya, Uganda and Sudan;
- Relevant Ministries, Veterinary Services, National Veterinary Laboratories
- International Institutions like ILRI, UNICEF, FAO, OXFAM, ACCOMPLISH; etc.

During this period, research problems identified for graduate research were in line with the mandates and objectives of partner institutions and funded mainly by German Government through BMZ, GTZ and the Senate of Berlin

After 2002, the main focus of graduate research in FVM-AAU has been applied research in the areas of animal health and production. After the diversification of the masters program, specific and in depth studies have been carried out through the eight masters programs, as shown in following tables:

Summary of graduate research by field of study	
Field of study	Proportion (n=169)
Trypanosomosis	10.90%
Zoonosis and food safety	29.60%

Other infectious diseases	19.80%
Reproduction	9.20%
Endoparasites	8.60%
Ectoparasites	5.60%
Dairy and poultry production	9.80%
Others	6.50%

Summary of graduate research by field of study

Summary of graduate research by location	
Location	Proportion (n=169)
Mixed crop-livestock system	41.70%
Urban and peri-urban systems	13.60%
Pastoral systems	10.70%
Export abattoirs, municipal abattoirs and supermarkets	21.90%
Experimental and/or on-station	8.60%
Not system specific	3.60%

Summary of graduate research by location

Summary of graduate research by species	
Species	Proportion (n=169)
Bovine (cattle)	53.80%
Caprine (goat)	11.20%
Ovine (sheep)	10.10%
Poultry (domestic chicken)	8.30%
Equine (donkeys, horses, mules)	3%
Camel	3%
Swine	0.60%

Fish	0.60%
Not species specific	9.50%

Summary of graduate research by species

The quality of graduate research has been ensured through

- Assessment and evaluation of thesis research proposals at the end of the first year of study;
- Assignment of qualified and experienced experts in thesis research advising;
- Attachment of graduate students with research projects;
- Creating partnerships with international and national research and academic institutions and
- Evaluation of the research outputs and thesis of students by internal and external assessors

Coordination and partnerships

There is no formal mechanism to coordinate graduate researches at national or regional level. The Faculty participates in research review meetings organized by national and regional research institutions and tries to publicize graduate research outputs by preparing a bulletin containing abstracts of graduate researches every year to make other institutions aware of the graduate research activities in the faculty. Many public and private institutions partner with the university in these research endeavors. These include:

- Federal Ministry of Agriculture and Rural Development
- National Veterinary Institute
- Regional Veterinary Laboratories
- National Animal Health Diagnostic and Investigation Center
- Regional, Zonal and District Offices of Agriculture
- Amhara Regional Agricultural Research Institute
- Oromia Regional Agricultural Research Institute
- Tigray Regional Agricultural Research Institute
- Federal Agricultural Research Institutes (Holetta, Debre Zeit, Adami-Tulu)
- International Livestock Research Institute
- Ethiopian Health and Nutrition Institute
- Faculty of Medicine, AAU
- NGO's

While Office of Vice President for Graduate Studies and Research has been providing limited budget for field research of graduate studies, the faculty believes that graduate students get crucial help from our partner institutions in the form of finance, human resource and material resource

Promising progress has been made in many areas of graduate research endeavors in the faculty. However, it is not without some significant constraints. To name just a few:

- Limited of research fund
- Mismatch between staff profile and graduate expansion specially for supervision of graduate research
- Absence of national agricultural research strategy
 - Redundant research activities
 - Prevalence of graduate research topics not related to national development
- Absence of networking between institutions in the NARS
 - Uncoordinated research activities
 - Missed opportunities for co-funding and co-supervising of graduate research
- Inadequate laboratory facilities for graduate research
- Lack of qualified personnel for available lab facilities

THE EXPERIENCE OF HARAMAYA UNIVERSITY

Presented by Professor Chemedda Fininsa, Dean of School of Graduate Studies, and
Dr. Tena Alamirew, Academic & Research Vice President

Haramaya University is a pioneer institution in offering graduate programs in Agricultural Sciences, which dates back to 1979. The School of Graduate Studies at Haramaya University began its graduate programs at MSc level with five areas of specializations. Today the agricultural fields of study offered have reached to 23 at MSc level and nine at Phd level. Enrollment has increased from 30 in 1979 to 930 in 2008.

The curricula for the graduate programs were developed on national human resource development need basis at a higher level. During the 2007/2008 academic year, a total of 963 students were enrolled in the graduate programs, of which 16% were female candidates. The curriculum for each field of study has been designed to include advanced principles of knowledge, methods and tools. It focuses on developing practical, analytical and communication skills that are relevant to each respective specialization and to the Ethiopian agricultural context.

Haramaya University has been making a deliberate and continuous effort to ensuring the relevance and quality of the curricula and graduate research in agriculture and allied disciplines. The University uses integral graduate education and research ensuring mechanisms. In 1985, the university established the School of Graduate Studies (SGS) with main purposes of launching, coordinating, managing, and administering graduate studies. The curricula have been periodically reviewed and evaluated for relevance, content, required employability skills, and mode of delivery with active participation of stakeholders. Courses are offered by qualified and experienced professionals in the respective fields of study and practical and field visits are encouraged. The teaching-learning environment at Haramaya, including library and computer services; has improved significantly. The SGS made a successful effort of soliciting funds to overcome the constraint of finance for graduate research and to increase the participation of women in the graduate programs in agriculture. More importantly, the SGS has granted MSc degree scholarships on a competitive basis to 73 female candidates. This has helped to increase the proportion of female graduate students from 2% in 2002 to 16% in 2007.

With regard to research, the SGS manages graduate related projects and links the university graduate program with sponsors. The School has sponsored a number of graduate research projects in agriculture. Proposals for theses research are critically reviewed; field experimentation and execution are visited by supervisors; and theses are again critically reviewed, examined and corrected by examiners. Moreover, Haramaya University has been receiving continuous feedback from key employers and domestic and international institutions about its graduates competency and knowledge.

It is fair to say that graduate research at HU has resulted in products and technology packages that are relevant, cost effective and productive. However, there are four important limitations that need to be tackled for graduate research to be more effective, productive and usable. These are:

1. Lack of continuity to develop products and usable technology packages
2. Tendency by graduate students to pick up any researchable problem in their field of study

3. Limited funding for most senior faculty members (professors) to align graduate research on thematic areas of research leading to the development of finished products or technology packages
4. Less integration of graduate research into regular research in the faculty of agriculture, and
5. Lack of procedure for field-based graduate research results review, other than defense examination, to develop usable technology package

In-country graduate training is advantageous in that it is cheaper and effective to develop capacity towards attaining critical mass of human resource with knowledge and skills relevant to the needs of the country and it facilitates graduate research in relevant problem areas. Nonetheless, the limited grants for graduate studies and lack of enthusiasm on the part of potential candidates to be trained at home – particularly for PhD programs, in light of the aforementioned lack of financial incentives, are the major issues that need to be considered. Equally important is a shortage of qualified and experienced academic staff to offer courses and provide sound thesis research supervision, particularly in some highly demanded fields of studies. Lastly, the proper documentation of outputs of graduate research and its effective communication to potential users remains a challenge deserving due attention.

Recommendations to address the identified constraints:

1. Establish graduate research grant system where university professors apply for the fund and align graduate students to conduct successive and continual research – based on the time needed to do complete research work to develop product and technology packages
2. Integrate graduate research with university research in such way that research is aligned in thematic areas conducted by functioning research groups
3. Make conditions and financial incentives attractive to encourage potential candidates to join in-country graduate study programs, and
4. Establish functioning partnerships with various organizations to solve the problem of shortage of qualified supervisors in demanded fields of studies.

THE EXPERIENCE OF HAWASSA UNIVERSITY

Presented by Dr. Tesfaye Abebe – Dean of School of Graduate Studies

Hawassa University launched graduate programs in agriculture and forestry in 2003/4 academic year. The School of Graduate Studies currently runs graduate programs in Plant Sciences (7), Animal & Range Sciences (5), Applied Human Nutrition (1), Forestry and Natural Resources (10) and Natural Science (5).

Research projects conducted by graduate students are generally aimed at understanding the prevailing production systems and identifying existing opportunities and constraints as bases for improving management/productivity and ensuring sustainability in natural resource management. Specific graduate research projects have addressed a broad range of issues such as technical issues in crop production, livestock production and forestry and natural resource management. The other important issues such as biodiversity, gender, processing and marketing have received attention in some graduate programs such as Agro-Forestry, Animal Production, Dairy Science and Applied Human Nutrition.

Research in the graduate programs has produced some outputs which, if applied, have the potential to improve productivity and the sustainability of natural resource management practices. However, the relevance of most of the research projects being carried out by graduate students to specific contexts has been constrained by the lack of spatial and social targeting and other limitations relating to the identification and prioritization of researchable problems. Moreover, limited scholarship opportunities for potential candidates, inability of private applicants to pay tuition fee, limited funding for graduate research, inadequate research facilities and shortage of staff in certain specialized areas are the main constraints to effectively run the graduate programs at Hawassa University.

Hawassa University has established strong national and international knowledge networks and resource linkages which can help the University to enhance the quality of research in its graduate programs and to ameliorate problem of finance for graduate research. For example, the university's partnerships with the CIDA/UPCD Project and Operational Research Project, financed by the Irish Aid can be mentioned as successful research partnerships. These projects have helped to strengthen the existing linkage with public extension and thereby enhance the relevance and effectiveness of agricultural research in solving practical problems. The documentation of outputs of graduate research and its effective communication to potential users remains a challenge deserving due attention.

THE EXPERIENCE OF MEKELLE UNIVERSITY

Mekelle University (MU) was established in 2000 as a merger of Mekelle University College and Mekelle Business College. The University is striving to be a research university in the very near future. MU has seven faculties. These are:

1. Faculty of Dryland Agriculture and Natural Resources (FDANR)
2. Faculty of Science and Technology (FST)
3. Faculty of Veterinary Medicine (FVM)
4. Faculty of Law (FoL)
5. Faculty of Business and Economics (FBE)
6. Faculty of Education (FED)
7. Faculty of Language, Journalism and Art (FLJA)

MU also hosts the College of Health Sciences (CHS) in addition to the above faculties.

The university believes that it is contributing to agricultural development through various means including:

- Production of research outputs to the scientific community as articles, proceedings, manuals, and bulletins.
- Experience sharing workshops, seminars...etc, that are organized in order to share knowledge, and
- Close collaboration with farmers and members of rural communities to introduce improved technologies and disseminate improved agricultural practices

The graduate program in the Faculty of Dryland Agriculture and Natural Resources currently has 209 students. One hundred thirty three students have graduated from the program. The student composition is mainly government employees. There are also self-sponsored students and students sponsored by NGOs.

Types of graduate research conducted at MU

The framework for research prioritization of MU is indicated in the "Research, publication and consultancy at Mekelle University: Policy guidelines and regulation" (Dec. 2004). While research topics are often identified by students themselves, they are encouraged to select development-oriented research topics. Partners may also identify research topics. Students are often linked to existing research projects. The relevance and scientific quality of the research topic is evaluated and approved by the academic advisor. Proposals are defended at postgraduate council. The academic advisor does Field supervision. After a research is completed, internal and external examiners evaluate its standard. The research is also publicly defended.

Partners in the Graduate Program

Following is a summary of the active and planned partners of Mekelle University graduate programs.

Currently active partners

1. Federal Level
 - a. Ministry of Agriculture and Rural Development
 - b. Federal Cooperative Agency (FCA)
 - c. Agricultural Technical and Vocational Education and Training (ATVET).
2. Regional level
 - Tigray Agricultural Research Institution (TARI)
 - South-Eastern Administrative Zone of Tigray Region
 - Tigray Bureau of Trade, Industry and Transport
 - Relief Society of Tigray (REST)
 - International
3. Cork University of Ireland
4. Norwegian University of Life Sciences
5. Inter University Collaboration between MU and Flemish University in Belgium (IUC)
6. ILRI (Improving Productivity and Market Success Project).
7. Norads Program for Masters Study (NOMA): Collaboration with Universities in Norway, Uganda, Tanzania AND Srilanka

Planned partnerships that are in the process of formation:

1. Colombia University (Distance Graduate program)
2. University of South Africa (UNISA): (Distance Graduate program)
3. Swedish University of Agriculture
4. Coordination and Resource Mobilization

Program coordination

The graduate program of Mekelle University is coordinated by the following bodies:

- At Senate level: Senate standing committee for research & graduate program
- At University level: School of Graduate Studies
- At Faculty level: Faculty Research and Graduate Committee
- At Department level: Department Research and Graduate Committee

- Resource Mobilization

Research fund for graduate program is obtained from various sources, such as:

- Projects in Mekelle University such as NORAD II project, Development Innovative Fund (DIF), Interuniversity collaboration (IUC) ...etc
- Horn of Africa-regional Environmental Centre/Network
- Students Fee
- The government

Challenges

Following are some outstanding challenges facing the university:

- Although there is collaboration and MoU between MU and stakeholders, there is no defined system or mechanism to allow direct participation of stakeholders in the selection of the research topics
- Motivation of stakeholders to get involved in the research process is less than desired
- Lack of strong international partnership and networking to support the graduate program. This collaborations and networking may include
 - Joint supervision of students
 - Exchanging of students
 - Joint research projects
 - Joint preparation of curriculum and teaching materials, etc
- Shortage of qualified staff to run the graduate program
- Lack of adequate funding for research projects
- Inadequate facilities (ICT, laboratories, library, transport)
- Gender imbalance and
- Limited intake capacity

Conclusion

The expansion of agricultural graduate program by the Ethiopian government has significant contribution to enhance agricultural development of the country. Besides, fulfilling the gap in shortage of agricultural professionals in the nation, such programs also contribute positively in addressing agricultural problems of the country. However, graduate programs are challenged by inadequate resource (from high calibre instructors to infrastructure), poor linkage of the research with the actual development problems and poor partnership and networking.

Therefore, the way forward for the agricultural graduate program should focus on the aforementioned issues.

RESEARCH CAPACITY STRENGTHENING

ILRI Strategies and opportunities for capacity building through graduate research

IPMS capacity building

Rural Capacity Building Project – graduate research

Addis Ababa University: higher education staff capacity building

Discussion: questions and responses

2. Breakout Sessions

During the breakout session, the participants were divided into four groups and critically reflected on key issues relating to enhancing the relevance, quality and practical usefulness of graduate research in agriculture. Different groups addressed specific issues in graduate research such as relevance, quality and accountability, partnership, research finding and staff, and documentation and communication of research outputs. The breakout session was followed by a plenary presentation by each group representative and general discussion.

REPORTS ON GROUP FINDINGS

RELEVANCE, QUALITY AND ACCOUNTABILITY

In order to develop a common understanding of overall picture of the topic at hand group members began their discussion by exchanging views on what is really meant by 'relevance and quality' within the context of graduate research in agriculture and allied disciplines. Then the members proceeded with a discussion that revolves around assessing the prevailing status, limitations and possible causes and the way forward to enhance relevance, quality and accountability in graduate research.

A relevant graduate research:

- problem solving and development oriented
- addressing knowledge gap through basic research
- responsive to clients interests e.g. funding agencies
- innovative, addresses new areas or view problems from a new angle
- contributing to national priorities
- ethical

The existing situation regarding the relevance of graduate research is judged as low. The factors identified as causes of low relevance in graduate research can be summarized as follows:

1. Most graduate research by students last a short period – usually about 6 months. There is often no continuity of graduate research, i.e., the next batch of graduate students usually don't take up what has been started by their previous peers and build it up with further research
2. Inadequacy of funding often dictates the selection of research topic rather than actual relevance of the research topic
3. Candidates often exclusively focus on getting their degree rather than maximizing the learning opportunities provided by graduate research
4. There are often no thematic priority research programs at national and university levels
5. Excessive workload on staff leads to reduced quality of supervision
6. Lack of research leaders is also seen as a factor for the low relevance of graduate research

Following are recommendations put forward to address low relevance of research:

1. Develop research priorities at national and university levels and strive to get students to contribute to clearly defined programmatic agenda

2. Make use of REFLAC (Research, Extension and Farmers Learning and Advisory Committee) in establishing relevant thematic areas for graduate research
3. Sponsors should play active roles in identifying research topics relevant to their context but should also transfer funds for graduate research to universities so that such funds can be administered by the universities for optimal overall results
4. Establish graduate research fund and integrate graduate research into normal research programs of universities
5. Clarify the existing confusion with regard to universities' research mandate, i.e., the appropriate balance between basic vs. applied research
6. Increase frequency of communication between universities and research

It was observed that the quality of research being carried out by graduate students was highly variable, with a few very good ones. Factors identified for low quality of graduate research include:

1. Weak computer and biometrics support by schools of graduate studies
2. Weaknesses of graduate programs in offering specialization courses and research methods course which is partially responsible for graduate students' poor research design capacity
3. Weak analytical and writing skills
4. Limited access to appropriate and current (latest) references by students
5. Attitude of students towards thesis research – focusing more on earning degree
6. Low credit given to research work
7. Inadequacy of time allotted to guide students by university advisors, and
8. Low remuneration rate for external examiners, given the time required to critically evaluate the theses and suggesting appropriate corrections.

Following are recommendations put forward to address low quality of research:

1. Strengthen laboratory facilities
2. Strengthen computer training and support
3. Strengthen research methods course (faculty, students)
4. Provide scientific writing skills training
5. Advisors composition should be relevant to topic
6. Introduce editorial services
7. Develop directory of professional for external examination

With respect to accountability, the candidates, supervisors, sponsors and university have responsibility to varying degrees in different stages and areas in the graduate research process comprising planning and

implementing relevant research, defense, documentation, dissemination and application of research outputs. Transparency, clear guidelines and expectations and upholding the right of candidates were underlined as key in fostering accountability in graduate research.

PARTNERSHIP FOR ENHANCING RELEVANCE AND IMPACT

The second group in its deliberation addressed issues related to partnerships among stakeholders in Ethiopian Graduate School Research in Agriculture, including purposes and forms of partnerships, modalities for functional partnership, and the coordination of efforts by key actors.

The issue of partnership was considered critical for many reasons including:

- Concerted development of mechanisms to enhance the relevance and impact of graduate research
- Ensuring access to and efficient utilization of resources
- Exchange of knowledge and information
- Building capacity to build capacity
- Mobilization of resources, financial or otherwise, and
- Enhancement of multidisciplinary research

Partnership modalities may include:

- Within university – across departments and faculties
- Among universities: collaborative research, staff exchange, transfer of students, etc
- Among universities, regional bureaus of agriculture and district offices of agriculture, and
- Among universities and external players such as relevant sub-regional research institutions, donors, NGOs, the private sector, and civil society.

The partnership can take different forms:

1. Partnership between a research institution and a university:
 - a. Collaborative research and training
 - b. Joint team on thematic research area, database and networking
 - c. Experience sharing and scaling out/up
2. Sharing research facilities:
 - a. Sharing available facilities and services for graduate research at cost,
 - b. Joint acquisitions of facilities and consumables and highly skilled lab technicians
 - c. Exchange of germplasm

3. Mobilizing finance for graduate research
 - a. Joint proposal
 - b. Research contract
 - c. Graduate research fund
 - d. Staff incentive development
 - e. Consultancy

The importance of having some kind of coordinating structure and platform was considered critical to translate the intentions to concrete actions. Thus, it was decided to establish Forum for Graduate Research in Agriculture (FGRA). The forum will be comprised of deans of schools of graduate studies of relevant higher institutes and EIAR representative. Other active collaborators in the agricultural research arena such as “Improving Productivity & Market Success (IPMS) of Ethiopian Farmers” project and the “Rural Capacity Building Project” (RCBP) of MoARD were identified as collaborators with important facilitation roles.

It was agreed that Hawassa University will convene the next FRGA meeting and play a coordination role during the transitional period. The University was recommended to take this role because since it had previously considered to launch a similar initiative and was making efforts to secure financial support for such purposes from the Canadian International Development Agency (CIDA).

The FGRA is expected to:

1. Workout partnership and communication strategy, partnership modalities, and suggest coordination mechanisms; and
2. Organize the next platform for deliberation on the proposal and action plan to move forward

RESEARCH FUNDING & STAFFING

One of the four key areas explored during the breakout sessions was the issue of research funding and staffing. Members of this breakout session deliberated on the following key points regarding funding and staffing issues?

Three main funding sources were identified. These are:

1. Core university budget - through SGS but following different modalities (where the need for mechanisms of control was raised).
2. Projects within the university where the finance is administered by the university
3. Organizations sponsoring individual students in which case the finance is administered by the sponsoring organization.

In addition to funding, sponsoring organizations may have specific and clear research agenda or they may sponsor a student without having their own clear research agenda to be explored by the student research. Even when sponsors have clear research agenda, the research being conducted

might not fit the agenda of the sponsoring organizations and there is a need for effective communication and agreements between the universities and the sponsoring organization in order to have mutually beneficial relationships and to get the best return on investment.

When sponsors do not require students to work on a specific research agenda, it will be the mandate of the universities to have a research strategy and prioritized research agenda so that the researches of such candidates fit into it. When it comes to funding, the most important issues are that all funding should be transparent to avoid abuse of funds. Sponsors with agenda should also have qualified co-supervisors to oversee not only the content of the research but the proper utilizations of funds. On the other hand graduate schools should be strengthened to attract more project-specific and general funding to their research programs. Funds used to solve identified problems instead of just support research as an academic exercise will have better longer-term impact.

On the important issue of staffing, points deemed critical include; limiting the number of advisees in order to provide due supervision to students; use of external supervisors to supplement regular university staff supervisor and including the provision of attractive fee structures for external supervisors to encourage such trend. Furthermore, introduction of uniform incentive systems for supervisors across universities and exchange of information among universities regarding incentive mechanisms and availability of research fund is recommended. Provision of staff in-service training in critical areas such as research methodologies, statistical packages, pedagogy, ICT, advanced laboratory techniques, marketing, and innovations was also recommended.

DOCUMENTATION & DISSEMINATION OF RESEARCH RESULTS

It is obvious that research proposals and research outputs should be accessible to all who can potentially benefit from these documents. However, this is not always so. The documentation process should start when proposals are approved for further research and continue along the natural progression to completed research theses. While students and their supervisors are primarily responsible for the acquisition/submission of research proposals, clear processes should be established to ensure submission of approved proposals and completed theses in each respective graduate studies unit. Graduate studies units should be responsible for making sure approved proposals and/or completed theses are available in the appropriate university library. A database of approved proposals and completed theses searchable by categories such as proposed researcher, research supervisor, research status (on-going, completed, and terminated) should be developed. Such processes and systems will show whether proposed researches and completed theses are in line with established national research agenda and highlight any redundancies and/or plagiarism in research proposals. They also make it easier to utilize theses for further research input or to be applied to solve practical issues. We can also evaluate progress being made in meeting the national research priorities and university research priority areas

When it comes to dissemination of research output, a database of abstracts should be available in some form – whether it is centralized and/or decentralized. Availability of financial resources, staff, and organizational commitment will be critical success factors. When planning research output dissemination, we need to determine our target audience and present the research outputs (theses) in the appropriate format. The university and research systems can often utilize the output as is, without any need for further repackaging. On the other hand research outputs may need to be repackaged to fit the needs of the government extension system, the private sector, NGOs, policy makers, and international organizations.

Commitment by graduate studies faculties is critical. This will entail commitment of funds, human resources, and developing clear processes. International organizations may be approached to support such efforts as part of a capacity building initiative. Broader challenges in this area include organizational & societal culture and mindsets such as resistance to change and a culture of holding to what one knows (unwillingness to share). Infrastructure issues such as availability of the Internet and adequate ICT support at all levels are important. Proficiency of information consumers on using modern ICT tools and "customer" orientation by those involved in the task of dissemination should also be developed further to significantly enhance service provision. Once we have a critical mass of qualified technical staff, retention of such staff becomes important. Factors important in this regard include; a thorough review of the remuneration system, due recognition of achievements, and developing a promising career path for technical staff.

EMERGING ISSUES & CHALLENGES IN AGRICULTURAL DEVELOPMENT AND THE RELEVANCE OF GRADUATE RESEARCH

P. Anandajayasekeram & Berhanu Gebremedhin¹

Introduction

Human capacity is still a critical constraint for development. Knowledge quadrangle (research, extension, training and indigenous technical knowledge) contributes to capacity strengthening in the agricultural sector. However, changing contexts and emerging challenges demand new skills and agricultural education and training (AET) system should respond to emerging needs. AET capacity strengthening is crucial.

Capacity strengthening

“Capacity strengthening” is the process by which individuals, groups, organizations, and societies increase their abilities to: perform core functions, solve problems, define and achieve objectives; and understand and deal with their developments in a broad context and in a sustainable manner.” (UNDP, 2000). Capacity strengthening refers to: enhancing people’s ability to understand a situation, and take action to improve it; building of confidence, development of knowledge, skills, and creativity; formation of positive attitudes and strengthening of relationships. It is more than training, which can be passive and removed from life – rather it is more like empowerment.

Building capacity for agricultural innovation can be broken down into several parts:

- Existence of human capital at professional and managerial level
- “Research” infrastructure
- Ability at the national level to train own scientists on local problems
- Indigenous knowledge and skills base of smallholder farmers
- Research & development (R&D) organizations ability to educate farmers so as to build on this base

Current Agricultural Education and Training (AET) Capacity in sub-Saharan Africa (SSA) is Characterized by: erosion of staff (brain drain, HIV/AIDS); skewed age distribution; weak linkages between tertiary education and R&D institutes; poor organization and management of existing capacity; and lack of systematic reinforcement. Constraints to building AET Capacity in SSA include distorted and declining enrolment pattern, isolated and fragmented AET institutes, obsolete and curricula, often disassociated from the economy, crisis in staffing and inadequate teaching facilities and outdated teaching methods.

¹ International Livestock Research Institute, Addis Ababa Ethiopia

Changing role and challenges of AET

Changing role of AET encompasses:

- i) Moving away from traditional role (as a source of ideas, basic scientific knowledge, teaching resources) to making contribution to development – development orientation; and
- ii) Transforming from “knowledge container” to “entrepreneurial universities”. The challenges to AET to perform their new roles are:
 - a. Transforming learning institutes- ddeveloping the necessary skills and changing the curricula
 - b. Mobilizing resources to establish a credible program; ii) establishing the necessary linkages
 - c. Harnessing the benefits of enhanced capacity-providing opportunities
 - d. Training and retaining capable staff; and
 - e. Effective communication of research results and keeping the program dynamic.

Contributions of Graduate Research

Graduate research has potential to make several contributions such as complementing the efforts of the formal R&D system, generation technologies, knowledge, new tools, techniques and methods. Appropriate graduate research adds to the pool of researchers, makes the learning institutes’ development & innovation oriented and enriches the curricula of the learning institute.

Graduate programs in general and graduate research in particular, should be dynamic to respond to changing context such as on-going transformation, emerging new issues and changing paradigms

On-going reform agenda in the R&D System

- Redefinition of the role of government
- Decentralization and privatization of agricultural R&D
- Pluralism in service provision
- Changing institutional landscape (national, regional and global)
- Increased importance of third parties
- Orientation of R&D to be more outward looking, client oriented and impact driven.
- Changing structure of the farming sector

New Issues

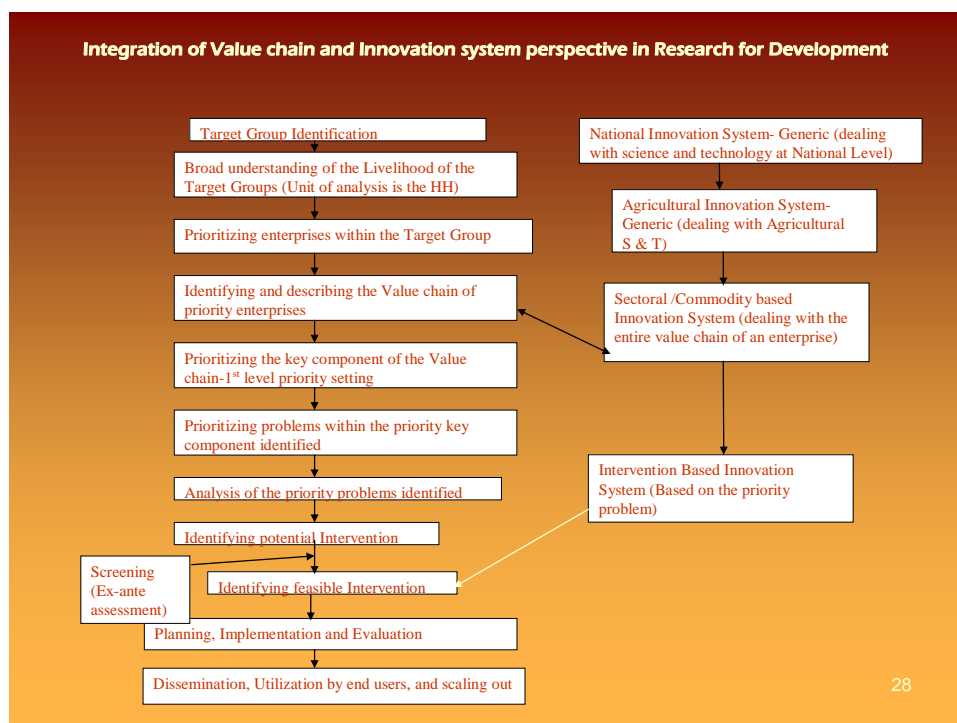
- Emerging food and energy crisis

- Technological advances in biotechnology and ICT
- Climate change
- Trade, market, and emerging agrifood systems
- Emerging diseases
- Growing need for inter-sectoral linkages
- Changing expectations of science and technology and innovation
- Globalization of private agricultural research and innovation
- Meeting the various commitments and MDG targets
- Greater concern for environment
- Under investment in agriculture and agricultural research

Changing Paradigms

- Agricultural value chains framework
- Innovation systems perspective
- Integrated agricultural research for development (IAR4D)
- Impact orientation

Integration of Value chain and Innovation system perspective in Research for Development



ILRI STRATEGIES AND OPPORTUNITIES FOR CAPACITY BUILDING THROUGH GRADUATE RESEARCH

P. Anandajayasekeram²

The mission of ILRI

Livestock mediated poverty alleviation, food and nutritional security, and environmental sustainability achieved through good science – research, research based capacity strengthening and outreach – through strategic partnership.

Broader target groups

- Farmers, community based organizations, farmers organization
- Extension personnel/service delivery agents
- Policy makers
- Capacity builders, i.e. universities, colleges, FTCs
- Scientists, researchers, and managers
- Private sectors

The mission of Capacity Strengthening Unit (CaSt)

Through strengthening the capacity of R&D community, CaSt contributes to ILRI's mission of achieving livestock-mediated poverty alleviation.

Purpose

The purpose of CaSt is strengthening the capacity of ILRI's partners to enable them to successfully apply their skills and resources to accomplish their goals, satisfy their stakeholders and improve their performance and impact. CaSt focuses on enhancing capacity at individual, team/group, organizational and system levels.

Strategic objectives

CaSt has five strategic objectives:

1. Effective integration of CaSt activities into project planning, implementation and evaluation;
2. Building sustainable capacity of institutes' to build capacity;
 - Creation of sustainable sub-regional "hubs" or mechanisms.

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- Facilitate the integration of research-based learning outputs (tools, methods, approaches, and results) into the curricula of learning institutions
 - Training of trainers
 - Participating in on-going/planned external CS activities. ILRI will contribute to the livestock component of carefully selected initiatives
3. Testing, adapting, and implementing innovative training approaches and delivery mechanisms using ICT as well as development and dissemination of training materials;
 4. Build skills of individuals and groups; and
 5. Developing a functional need-based monitoring and evaluation system to communicate with partners and to assess the performance and impact of CaSt.

Types of training

CaSt conducts two types of training:

- I) Individual training which takes different forms such as attachment associate, student associate, technical associate, research fellows and graduate fellows; and
- II) Group training encompassing core courses, program/project courses as well as network courses.

Opportunities for graduate research

1. Opportunities – through existing themes

- Targeting research and development opportunities
- Improving market opportunities
- Using biotechnologies to secure livestock assets
- People, livestock and environment
- System-wide Livestock Program of the CGIAR

2. Opportunities- research priorities

- Climate change, impacts and adaptation
- Livestock, environment and sustainability
- Emerging diseases, impact and human health
- Market access, value chain analysis and SPS
- Risk, vulnerability and sustainability of pastoral systems
- Animal genetic resources and breeding
- Small holder livestock intensification and implications

3. Opportunities- for fellowships

- Program/Project based Fellowships
- Competitive Fellowships – secured through ILRI
- Competitive Fellowships - Open
- Network based Fellowships
- Special Arrangements – MOARD, UNE, CGIAR

Strategy

Both collaborative and sandwich mode are pursued to combine the best of both worlds.

Issues/challenges

- Effective mechanism to utilize opportunities
- Lack of supervisory capacity
- Quality of Research
- Recognition of the role of CGIAR supervisor (s)
- Adherence to time frame
- Effective communication of findings
- Sharing benefits

IPMS PROJECT EXPERIENCE - LINKING GRADUATE RESEARCH TO MARKET-ORIENTED AGRICULTURAL DEVELOPMENT

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Abstract

Action research, which usually links university graduate students with community groups in applied research projects, is gaining recognition as an effective mechanism for demand driven and impact oriented development. The IPMS project; a research for development project, was designed to contribute to market oriented agricultural development in Ethiopia. In order to address this issue, the project developed four major objectives in its project design. These were a) knowledge management, b) capacity development for public and private sector, c) commodity development, and d) research and promotion. Under the capacity development component, the project sponsored a number of students from the MoARD and the Ethiopian agricultural research system for graduate studies at the Addis Ababa, Haramaya, Hawassa, Mekelle, Jima and Gondar Universities from 2005 to 2008. In addition, in areas where there were no candidates, a separate set of graduate students were charged and supported to address specific research issues. The IPMS project undertakes action research through various approaches. It uses its own staff where there is competence, collaborates with scientists from CGIAR centers, contracts out to private researchers, and collaborates with researchers from the EARS. In addition, the project considers graduate students as one of the means in tackling some of the practical problems that farming communities face in their attempt to move from subsistence to more market-oriented agricultural development. Most students were candidates from the Ministry of Agriculture and Rural development and Ethiopian agricultural research institutions. This paper describes the experiences of the IPMS project, highlights the strength, weakness and short-falls in the process and forwards some recommendations for future consideration. The nature of the outcomes also depends on the intensity, duration and quality of the partnership.

1. Introduction

More often than not, action research involves the collaboration of community members (represented by grassroots activists, community-based organizations, workers etc.) and experts (represented by university researchers, professional scientists, etc). Action research aims not merely to advance understanding, but also to ensure that knowledge contributes to making a concrete and constructive difference in the real world' (Loka Institute, 2002). Action research is often carried out by a partnership of university faculty and students with community groups, non-governmental organizations, or other agencies in civic society.

Action research has been gaining recognition and credibility over the past two decades. There is a growing literature, examining, documenting research successes and discussing the history and philosophical underpinnings of this more publicly engaged form of investigation (Greenwood and Levin, 1998). Community-based research has been encouraged by funding programs that reward partnerships, for example, the Community University Research Alliance and the Initiative for New Economy Research Alliance programs of the Social Sciences and Humanities Research Council in Canada, which funds research undertaken by university–community collaborative. In the US, the Kellogg Foundation, the Carnegie Corporation and the Andrew W. Mellon Foundation have provided funding for community-based action research.

As this methodology has matured and gained adherents, several networks have been established to connect community-based researchers within continents. The Campus Compact organization in the US includes 650 academic institutions which have each made a commitment to linking their curriculum and programs with community needs (Campus Compact, 2000). The latter two networks are primarily composed of academics and university administrators, while the former includes many community groups carrying out independent research.

Community-based action research represents a range of activities, variously identified in the literature as Participatory Action Research (Reardon, 2000), Action Research (Garvin, 1995), Service Learning (Campus Compact, 2000), and Science Shops (Lursen, 2001). This paper examines the question: what benefits and institutional characteristics define community-based action research projects, and how does this affect partnership relationships?

Legeambo project???– community soil and water conservation project – student participation, stipend payment for students, opportunities for various small but relevant research undertaking by undergraduate students, etc. Linking the university with the community, better understanding of technical and non-technical constraints that farmers and rural communities face,

The paper is prepared in order to share the experiences of the IPMS project in capacity building of public staff through graduate studies at various national universities. The project focused on action research and learning.

2. Project Background

The IPMS project is implemented by ILRI on behalf of the Ethiopian MoARD, and in partnership with IARCs, NARES and others. The project is funded by CIDA and has a life span of five years. It is designed in response to the GoE Rural Development Strategy to enhance market-oriented agricultural development in the country. The project operates in four Regional States, Tigray, Amhara, Oromia and SNNPRS. The project attempts to demonstrate market-oriented agricultural development using priority commodities in 10 Pilot Learning Woredas (PLWs) as shown in Figure 1.

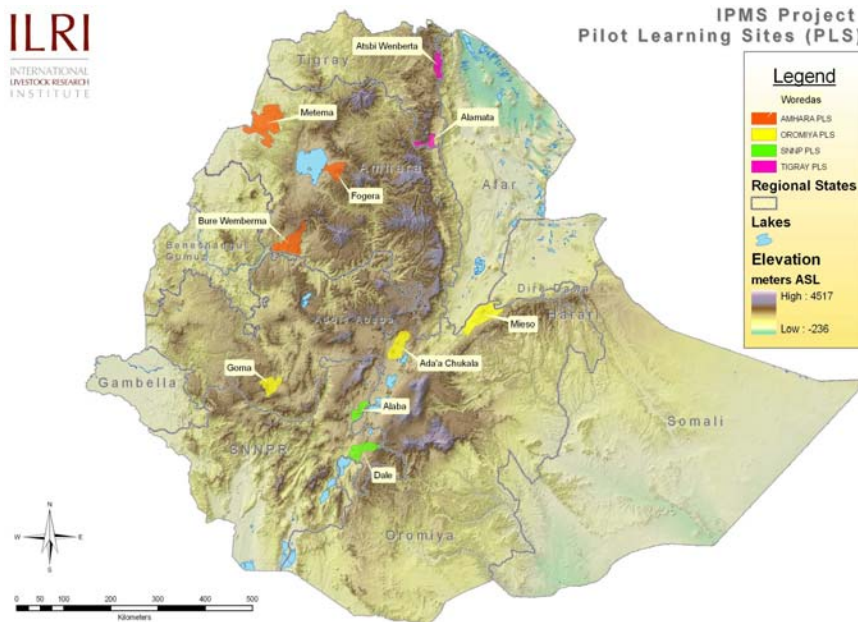


Figure 1. IPMS project Pilot Learning Woredas

The long term goal of the IPMS project is to contribute to improved agricultural productivity and production through market-oriented agricultural development, as a means for achieving improved and sustainable livelihoods for the rural population.

The medium term purpose is to strengthen the effectiveness of the government's efforts to transform agricultural productivity, production, and rural development in Ethiopia to a more market-oriented agricultural development. To achieve this purpose four key components are targeted: a) Knowledge management, b) Innovation capacity development of partners, c) Participatory marketable commodity development and d) Development and promotion of recommendations for scaling out. Gender, HIV/AIDS and environmental considerations are mainstreamed in each of these components.

2.1 IPMS Support to Graduate Students

This assessment is based on observations on 66 MSc graduate students who were enrolled at the Addis Ababa, Haramaya, Hawassa, Mekelle and Arba Minch Universities (Table 1). The fields of studies of these students are also shown in Table 2.

Table 1. Universities and number of students sponsored by IPMS

University	No. Students	Remark
Addis Ababa	9	
Haramaya	40	
Hawassa	7	
Mekelle	8	
Arba Minch	2	
Total	66	

3. IPMS Experiences

2.1 Problem identification process and intervention plan development

The problem identification process involved use of secondary data, GIS, expert consultation, group discussions, key informants, PRA. Using these tools, a documents on the diagnostic survey and work plan development was produced. Subsequently, a stakeholder workshop was organized involving extension experts, Woreda administration, research institutions, farmers, private traders, input suppliers, exporters and women and men farmers to agree on priority commodities, problems, possible solutions, and responsible organizations. Problems that have ready solutions were deal with the experts and the research institutions.

Researchable issues were identified in areas where there is knowledge gap. A document on diagnostic survey and program of work was developed for each PLW.

2.2 IPMS Research Strategies

The IPMS strategy in undertaking action research is a multi-pronged approach. The project encourages multi-disciplinary approach and multi-institutional arrangements and ensures that capacity building activities are embedded in all its research undertakings, and often focus on methods, approaches and processes. Research is implemented using various modalities and partnerships. The included were:

- Own research where there is in-house expertise and competence
- Partnering with CGIAR – ICRISAT, ICRAF, IWMI, CIAT, WorldFish Centre,
- Partnering with National Research Institutions – EIAR, TARI, ARARI, OARI, SARI
- Partnering with Private researchers – Sap-Tek
- Partnering with Farmer-to-farmers, USA
- Partnering with NGOs – LEVIA, and
- Use of graduate students – through full scholarship and research sponsorship.

This paper focuses on sharing the experiences of the IPMS project in sponsoring and supervising graduate research in various national universities. Some of the observations are outlined as follows.

2.3 Graduate Research

University level

Entrance requirements and exams

Quality of exams, assessment methods, etc are of lower standards, eventually creating problem on students being unable to cope with the competition and lowering the standards.

Intra-Communication:

Communication between sponsoring organizations and universities are less than desirable. University websites are not effectively and efficiently used for communications purposes such as enrollment requirements, enrollment dates, academic calendar, programs, changes or cancellation of in programs, grade reporting, entrance exam and enrollment,

Inter-Communication between Dean's office and other offices

Communication between registrar's office, finance office, housing and catering regarding students is poor. With clear statement to communicate the sponsoring organization, direct dealing with students on their requirements is unacceptable.

Changes/cancellation of programs

There is no clear communication after changes or cancellation of graduate programs. Students and sponsors only realize this after students have arrived at the university. Students are forced to change fields

of study other than that they are intending for. This has created problems in the capacity building strategies of various organizations.

Accommodation and Food

Different universities have different arrangements for accommodation and food for graduate students. However, these are not clearly stated in the requirements.

Library services

Capacities of universities to provide library services, text books, computers, internet access etc vary.

Course offerings

Scheduled courses are sometimes dropped, post-poned due to various reasons. Some courses take more than one year to complete and students are often called back from their field research undertakings to their respective universities to complete coursework requirements.

Grade reports and performance of student

This information is not shared with the sponsoring institutions. Some students may not pass the entrance exam or may be required to undertake undergraduate courses. Grade reports and performance of students is not communicated to the sponsoring organization, making it difficult for planning and financial arrangements. This could be computerized.

Although this may be a concern to some access to private areas, arrangements could be made between the university, the candidate and sponsoring organizations for access to this type of confidential information for management reasons.

Balance between theory and practical (field and lab) techniques

Most students lack basic skills in practical work under field conditions – soft skills, working with communities,

Research methods and Statistics

Most students are ill prepared in research methods and statistics. The IPMS project had to organize an additional supplementary course for its students on experimental design and statistical analysis at ILRI.

English language and writing skills

English is the official language in the universities. However, the level of English language, and writing skills of students has been eroded over the years. This creates a lot of workload on supervisors - dealing with editorial issues rather than the scientific contents of the theses.

Presentation skills

Enrollments of candidates

Work load of supervisors

Too much workload, supervision of too many students, lack of time to visit students in the field,

- Why accepts students with no research fund?? ask them to look for their own funding and advisors
- Too many students to supervise
- Other responsibilities of supervisors – teaching, administrative, committee work, consultancy, etc

Financial requirements for graduate studies

Variations in expenses for accommodation, food, library services, internet, supervision fee, supervisors' expenses, thesis binding cost, etc are not clear. And make it difficult for sponsoring institutions.

Bank transfer and arrangements

Proper tracking of transferred funds has created some difficulties in some universities. Names of students are not included in the transfer sheet making it difficult for the financial system to function efficiently. Way and means including transfer details – and indication of 'go' accounts with Commercial Bank of Ethiopia is not adequate.

Concept note and proposal development stage

The research proposal development stage is a very critical moment when the student, the supervisor and the sponsors decide on the problems to be tackled. However, often this is not the case. Students are requested to develop their own research proposals, sometimes with some tips of general areas of research from the potential supervisor. Project proposals are often ill conceived, unrealistic, miss-guided and with little practical relevance to the agricultural problems of Ethiopia. Critical and objective review of the literature, to define what is known and what is unknown is poorly defined. Students may have little access to literature on Ethiopian agriculture, and they tend to depend on references from outside the country. The justification for the project and the relevance of the study are often weak. Copied topics – redundancy poor literature review and identification of gaps and Irrelevant topics, redundancy, Cut and paste – copying

As Donald Ramsefeld (US Secretary of Defense, 2003) once said...'.....there are known knowns - these are things we know we know. We also know there are known unknowns, that is to say we know that there are some things we don't know. But, there are also unknown unknowns – the ones we don't know we don't know'.

The reason why we do research is to generate information, knowledge and to solve problems. For the issue to be researched, there should be a knowledge gap. The knowledge gap is identified from the literature. If the answer to the problem exists somewhere, there is no need in doing it again, unless there is discrepancy or the issue is disputable or documented results are contradicting. Knowledge gap – background, justification, relevance and knowledge gaps are not critically analyzed to justify the objectives of the study. The relevance of the study, which is a key issue in addressing a particular problem is not given due attention. There is a tendency to copy full proposals and also plagiarism.

During the proposal development, students do not get adequate support from statisticians to develop the materials and methods part and most often one encounters ill-designed experiments. Although one realizes the limited number of statisticians that are available for consultation, time constraints cannot justify the wastage involved in time, effort and financial resources in undertaking poorly designed experiments. Statisticians are often considered as service providers and support students on good will basis. Involving them as co-advisors may be an incentive to stimulate more engagement in the research and sharing of the outputs.

Defending the proposal

This is a stage when the faculty should spend adequate time to critically read the proposal, make comments and suggestions for improvement during the defense and enhance the quality of the potential work. Irrelevant and ill-conceived proposals should be rejected at this stage. The process should be rigorous and objective and issues of relevance, workability, contribution to science, possible publications, logical flow, and justification, financial and logistic feasibility should be considered during the review. Most often, only a small group of individuals and sometimes only the supervisors and few year one graduate students are present during the proposal presentation and this exposes the students to limited inputs from the audience to improve the proposal.

Do not know how much time the departmental graduate committee spends debating proposals – some may not even have a chance or enough time to read and digest the proposal in the approval process.

Another critical problem with graduate research is that issues are addressed in an isolated manner and lack of continuity of research – based on isolated topics and no strategic guidance of projects/programs.

Engaging the sponsoring organization during the proposal development stage is very crucial and enhances the partnership between the universities, the student and the sponsoring organizations. This synergy is essential in enhancing the relevance and quality of the proposal. This could be easily done through electronic media.

Implementation stage:

Students: Students lack adequate practical skills in both field and laboratory based activities. Methodologies and approaches to problem solving are non-existence. They also have very limited experience working with communities and addressing their problems in a professional manner. In some instances, one observes lack of concern and reluctance of students to engage in community development activities. Students also lack the communication skills needed when dealing with communities.

University Supervisors: One of the most critical issues with university supervisors is again poor communication with the student and co-advisors. At times, delays in response occur. Poor feedback to students is another problem. University supervisors are also tied up with work load and do not allocate time to supervise students under field conditions.

Write-up stage

Students consider this as a discrete stage. Writing up the thesis is a continuous process starting from the day the proposal is approved. Collection of relevant literature, collation, analysis, synthesis of the literature requires a lot of work. Thinking about the possible chapters that could go into the results section ahead of time also helps the student to organize the data, develop arguments pro and against findings and consider the discussion of the results. Most students lack adequate critical thinking of their results, they do not discuss even preliminary results with colleagues and experts to enhance their findings,

There is very little critical review of the literature and in most cases simple facts and figures from the literature are reported. Most often old and out dated reference materials are used and knowledge gaps are not properly identified. Asking the right question will help to develop analytical skills, and in most cases, students don't even know why they are doing the research and what questions they are going to answer.

The other critical problem is in the use of the English language and writing style. Most of the time, we observe that students are weak not only in scientific writing, but the basic of English writing. This in most

cases becomes obvious in the results and discussion part of the thesis. As a result, the thesis becomes very long, with lots of repetition and redundant arguments. Most of the students also have difficulty in drawing conclusions and recommendations.

This creates a lot of burden on the supervisor. Some students realizing the workload on supervisors do not even care to make the corrections suggested by their supervisors. There is also poor response and lack of good communication between the university supervisor and co-advisors. Basic contents of the thesis such as standardization of format (font type and size, margins, pagination, spelling, line spacing, sequence of chapters, reference citation and listing, annexes, tables, figures, etc) should be the responsibility of the university supervisor. This are considered as an image of a university and should be adhered to and students should be required to be careful and disciplined to handle such simple guidelines.

Defense

Preparation for defense should take place ahead of time. Selection of examiners is also a critical factor as they should be knowledgeable in the subject matter and should be critical and objective in their evaluation of the thesis on scientific merit only. The assessment and evaluation process should be clearly defined and explained to examiners.

Identification and assignment of external examiners should be done very carefully. Invitation letters along with copies of theses should be dispatched to external examiners ahead of time to give them time to read. Guidelines and procedures on evaluation of the thesis and the terms and conditions for services as examiners should also accompany the invitation letter.

Students should be advised and guided on the thesis defense processes. They should practice ahead of time and should as much as possible stick to the instructions. The most critical one is that everything should not be presented on the defense. In most universities, the time allocated for the thesis defense ranges between 30 and 45 minutes. In practice, some defense presentations take more than one hour and there is not restriction by the chairmen of the examining board.

Post-defense

Comments provided by the examining Board should be taken into consideration seriously. Members of the Examining Board invest a lot of time in correcting and making comments and suggestions for improvement of the thesis. This is often done in good faith to improve the quality of science and enhance the image of the University concerned. Most often, the burden of ensuring the suggestions and modifications recommended by the Examining Board is left to the university supervisor and the internal examiner. However, the time gap between defense and graduation is so short, there won't be enough time to do justice to the thesis. As a result, some theses go into binding and final documentation without making the proper and recommended corrections, leaving a bad permanent scar on the image of the University concerned.

Documentation and Dissemination of Results

Documentation of scientific works in a form of theses is a common practice among universities worldwide. Some universities go beyond thesis binding and have mechanisms to ensure wider dissemination of the research results to interested users. These include extracts, leaflets, brochures, WebPages, scientific and popular seminars, working papers, etc. In some national universities, we have also noticed an encouraging and increasing trend of publishing major findings from theses in scientific journals. In few cases, we have also noticed that some of our universities publish abstracts based on theses. However, these materials only reach limited number of professionals and are written in a scientific manner, excluding their value to the wider non-scientific community – who are often the end users.

Some experiences from the IPMS project

Although universities have their minimum requirements for application to join graduate programs, admission is often based on entrance examinations. The types and contents of these exams are difficult to judge. However, based on the performance of some students during thesis research undertakings and write-up of the thesis, they do not appear to qualify for graduate studies. Entrance exams should be carefully crafted to help universities assess the potential of candidates to undertake and withstand the rigors of graduate studies.

Utmost care has to be taken in the concept note and proposal development stage. Potential university supervisors should be able to guide students at this critical stage of the study.

In recent years, we have noticed that some students are admitted to undertake graduate studies without securing funding for their thesis research. It is surprising to note that such students are advised to look for funding organizations after they have completed their course work. This should be improved and more coordinated by the concerned graduate programs.

Defense of the proposal should not be limited at the university level. Other stakeholders should also have an opportunity to provide inputs in order to improve the scientific quality and relevance of the research proposal. Although we realize the financial and logistic implications, requiring students to deliver seminars to stakeholders is an effective way of getting inputs. The IPMS requires students to give seminars at PLW level before they start their research activity to enrich the content.

As IPMS promotes action research, community participation is an important component. This will involve training of farmers, development agents, Woreda experts, private sector in various aspects of extension methods, market extension, commodity development, quality, post-harvest handling and processing, market linkages. This requires skills in community dialogues, platform handling and management, etc. However, most of the students either lack the experience or the attitude to involve in community based action research. Most often they are interested in their data only – which unfortunately is collected from the community itself.

Once students collect their data, they make sure that they disconnect with the community, no matter what the level and stage of the development intervention. Although we realize that graduate students have time pressure and time bound activities with deadlines, ensuring the continuation of activities through staff of the Office of agriculture and Rural Development is crucial.

The data analysis and write-up stage is the period when most students need support from their supervisors. However,

- Defense
- Documentation and popularization of results – Seminars (PLW, ILRI), working papers,
- Lessons
- Quality of students – proposal, data collection, community participation
- Dialogue with University supervisors
- Disconnect –University, problem, supervision (time, location)

Supervision

Conclusion

In conclusion, the experiences of the IPMS project in supporting and co-advising graduate students from various national universities could be summarized as follows:

For action research and relevance to community

- Linkage between research-extension and universities
- Mindset of university supervisors
- Lack of practical field and lab experience
- Poor community connection between students – no action interests in data only
- Linking practical training with communities around universities
- Linking incentives for students to undertake community based activities during their stay at universities – credited courses
- Coordination of researchable issues
- Funding – research, MoARD, projects, communities – unions, cooperatives, private sector
- Continuity of research – program based than topic based with a purpose
- English – entrance exams, writing skills, presentation skills
- Statistics
- Incentives for advisors – number of students per year, remuneration,
- Publications – requirement?

Questions

- Proposal marketing strategy – NARF for students competitive grants, gender and affirmative action
- Marketing research results – What mechanisms should be in place? How do we distill results that have immediate application in agriculture, industry/practical value
- What mechanisms should be in place to minimizing copying, sharing, emailing plagiarism of proposals and theses?

Why Changes is essential and inevitable

The IPMS project follows and innovations systems perspective and a value chain approach to commodity development. An innovation systems perspective provides a broad analytical framework with which to examine technological change in agriculture as a complex process of actions and interactions among diverse actors engaged in generating, exchanging, and using knowledge, and the social and economic institutions that condition their actions and interactions. Higher learning institutions are conventionally viewed as key to the development of human and scientific capital, but also have a vital role to play in building the capacity of organizations and individuals to transmit and adapt new applications of existing

information, new products and processes, and new organizational cultures and behaviors. The importance of improving higher learning institutions by strengthening the innovative capabilities of organizations and professionals; changing organizational cultures, behaviors, and incentives; and building innovation networks and linkages cannot be over-emphasized.

Final word – Some quotations on change –

"In an egalitarian environment the influx of mediocrities relentlessly lowers the general standards at colleges to levels the weak ones can meet... Ultimately it is the yearning to believe that anyone can be brought up to college level that has brought colleges down to everyone's level" ~ anon

'Oh, would that my mind could let fall its dead ideas, as the tree does its withered leaves!' ~Andre Gide

*'Continuity gives us roots; change gives us branches, letting us stretch and grow and reach new heights'.
~Pauline R. Kezer*

'Every beginning is a consequence - every beginning ends something'. ~Paul Valery

'God grant me the serenity to accept the people I cannot change, the courage to change the ones I can, and the wisdom to know it's me'. ~Author Unknown

'Our only security is our ability to change'. ~John Lilly

'A scholar who loves comfort is not fit to be called a scholar'. ~Confucius, Analects

'When you jump for joy, beware that no one moves the ground from beneath your feet'. ~Stanislaw Lec

'The only man I know who behaves sensibly is my tailor; he takes my measurements anew each time he sees me. The rest go on with their old measurements and expect me to fit them'. ~George Bernard Shaw

Table x. Innovation as a linear versus complex process: A comparison of key elements

	Linear science perspectives	Innovation system perspectives
Objectives	<p>Emphasis on</p> <ul style="list-style-type: none"> • advanced technology and radical innovations • technological “shocks” that change production modalities 	<p>Emphasis on</p> <ul style="list-style-type: none"> • learning within firms and organizations to innovate • strengthening individual and collective capabilities to innovate • long-term efforts to build holistic innovation systems
Strategy	<ul style="list-style-type: none"> • supply-driven science and technology • focus on conventional research continuum: basic, strategic, applied, adaptive research • Hierarchical knowledge dissemination: from education to research to extension to user • typically embedded knowledge dissemination: in capital goods, production inputs, and technology packages • R&D undertaken by large firms (in industrialized countries) and public institutes (in developing countries) • typically centralized management of innovation processes 	<ul style="list-style-type: none"> • demand and supply-driven science and technology • Focus on the roles and interactions of diverse agents in society and economy • focus on complex and dynamic interactions among innovative agents • network-based knowledge dissemination • both embedded and dis-embedded knowledge dissemination: in both tacit and codified forms • typically decentralized management of innovation processes

Instruments	<ul style="list-style-type: none"> • direct public financing • indirect public financing: subsidy programs, incentive schemes • private investment 	<ul style="list-style-type: none"> • scientific exchanges • advisory and consultancy services • stakeholder forums • participatory research projects • public–private–civil society partnerships • competitive grant programs • advanced market commitments • changes to individual and organizational practices, behaviors, and cultures to promote labor mobility of educators, researchers, and technicians; and _ integrate educators, researchers, and technicians into networks with other innovation gents

Source: Hall (2006); Vázquez-Barquero (2002); Spielman et al. (2008).

Annex 1. Graduate theses research sponsored by the IPMS project in various national universities (2005-2008)

	Student	University	Thesis title	Field of study
1	Ephrem Assefa	Addis Ababa	Impact Assessment Of Rainwater Harvesting Technologies: The case of Atsbi PLS, Tigray	Natural Resources and Environmental Economics
2	Belete Teffera	Hawassa	Studies on cattle milk and meat production in Fogera Woreda: production system, constraints and opportunities for development	Dairy Sciences
3	Rebeka Amaha	Addis Ababa	Impact of rainwater harvesting Ponds: A case study in Alaba Woreda	Natural Resources and Environmental Economics
4	Rehima Mussema	Haramaya	Analysis of Red Pepper Marketing Chains: The case of Alaba and Siltie, Ethiopia	Agricultural Marketing
5	Kindie Aysheshum	Haramaya	Sesame Market Chain Analysis: The Case of Metema Woreda	Agricultural marketing
6	Wakena Totoba	Arba Minch	Operational analysis of the cascaded Wadecha – Belbela Reservoir system in Ada Woreda	Hydrology and water resource management
7	Demeke Tilahun	Haramaya	Performance of Coffee Farmer's Marketing Cooperatives and Member's Satisfaction in Dale Woreda, South Ethiopia	Agricultural marketing
8	Kedija Huseen	Haramaya	Characterization of milk production system and opportunity to market orientation: case study of Mieso Woreda	Animal Production
9	Ousman Surur	Haramaya	Effectiveness of Agricultural Development Training Program: The cases of Teff and Livestock Farmers of Alaba Woreda, Southern Ethiopia	Agricultural Extension & Rural Development
10	Endeshaw Asefa	Hawassa	Assessment of production systems and marketing of meat goats in Dale Woreda	Animal Production

11	Tsedeke Kocho	Hawassa	Production, marketing system and performance potential of sheep in Alaba Woreda, Southern Ethiopia	Animal Production
12	Sintayehu Yigrem Mersha	Hawassa	Dairy production systems, marketing channels, challenges and opportunities: The case of Shashemene-Dilla area, Southern Ethiopia	Dairy Science
13	Addis Alemayehu	Haramaya	Dairy Extension and Adoption of Dairy Package in Fogera Woreda of South Gondar Zone, Amhara Region	Agricultural Extension
14	Abay Aklalu	Haramaya	Market chain analysis of vegetables production in Fogera	Agricultural Economics
15	Workneh Abebe	Haramaya	Determinants of adoption of improved box hive in Atsbi district of eastern zone, Tigray Region	Agricultural Extension,
16	Zelalem Tamirat	Haramaya	Adoption of small ruminants fattening packages by agro-pastoralists in Mieso Woreda, East Oromia Zone	Agricultural Extension
17	Deribe Kaske	Haramaya	Agricultural Information Networks of Farm Women and Role Agricultural Extension: The case of Dale Woreda	Rural Development and Agri. Extension
18	Rahmeto Negash	Haramaya	Determinants of the adoption of improved haricot bean package in Alaba special Woreda	Agricultural Extension
19	Bosena Tegegne Delele	Haramaya	Market chain analysis of cotton production in Metema	Agricultural Economics
20	Hailay Berhane	Haramaya	Water use efficiency for horticultural crops production in Atsbi	Natural Resources Management
21	Daniel Tewodros	Haramaya	Beef cattle production system and opportunities for market orientation in Borena Zone, South Ethiopia	Animal Production
22	Alema Woldemariam	Mekelle	Analysis of the role of cooperatives in agricultural input and output marketing, South Tigray Zone	Agricultural Marketing

23	Jemal Mahamud	Mekelle	Analysis of the role of cooperatives in agricultural input & output marketing, East Tigray Zone	Agricultural Marketing
24	Rahel Deribe	Addis Ababa	Institutions for irrigation water management	Natural Resources and Environmental Economics
25	Almaz W/Tensaye	Addis Ababa	Women and land use rights in Oromia Regional State Eastern Shewa Zone	Gender
26	Mehari Gebremedhin	Mekelle	The Role of Beekeeping in Household Income and Food Security	Rural Development
27	Endaweke Assegid	Addis Ababa	Scenario analysis of the proposed upland rice production through GIS and RS techniques in Fogera Woreda	Environment
28	Bogale Kibret	Haramaya	A study on poultry production system, performance of local chicken ecotypes and market linkages in Fogera Woreda, Amhara Region	Animal Breeding
29	Almaz Mesfin	Mekelle	Comparative Analysis of the performance of dairy cooperatives input and output marketing in Atsbi, Alamata and Enderta Woreda	Dry land Agriculture and Natural Resources
30	Amsalu Bedasso	Haramaya	Determinants of Farmers Innovativeness in Alaba special Woreda	Rural Development and Agri. Extension
31	Mekonnen G/Egziabher	Hawassa	A study on poultry production and marketing in Dale Woreda, Southern Region	Animal Production

32	Eshetu Tefera	Haramaya	The Role of Dairy Cooperatives in Stimulating Innovation and Market Oriented Smallholders Development: The case of Ada'a Dairy Coops	Rural Development and Agricultural Extension
33	Gezahegne Waleligne	Haramaya	Determinants and role of farmers seed and seedling multiplication Dale, in the SNNP Regional Seed system	Agricultural Economics
34	Yeshitila Admassu	Haramaya	Efficiency of Livestock Feed Resources Utilization and Forage Development in Alaba Woreda, Southern Ethiopia	Animal Science
35	Woldemichael Someno	Haramaya	Market chain analysis of dairy production in Shashemene-Dilla milkshed	Agricultural Economics
36	Tesfaye Desalew	Haramaya	Characterization of Rangeland Resources, Utilization Practices, Condition, and Quality and Opportunities for Developing Livestock Feed Resources in Metema District of North Gonder Zone, Ethiopia	Animal Science/Range Ecology and Management
37	Daniel Tadesse	Haramaya	Access and Utilization of Agricultural Knowledge and Information by Resettler Farming Households: case of Metema Woreda, North Gondar, Ethiopia	Agricultural Extension
38	Tsefaye Mengiste	Hawassa	Characterization of cattle production systems, processing and marketing of dairy and meat products in Metema Woreda, Amhara Region	Dairy Science
39	Habte Gebre Wolde	Haramaya	Market chain analysis of small ruminants production in Alaba and Dale	Agricultural Marketing
40	Jamal Kuru Mama	Haramaya	Knowledge flows and constraints of extension in reaching out to women	Agricultural Extension
41	Muzeyin Hawas	Addis Ababa	Household food security & women's pivotal role in the context of	Gender

			market oriented agricultural development: the case of Dale Woreda	
42	Sileshi Bekele	Arbaminch	Optimal Water Allocation for Irrigation in Upper River Basin in ten days base on Modjo River	Irrigation Engineering
43	Anteneh Girma	Haramaya	Dairy services delivery in Debre Zeit milk shed of Ada'a district central Ethiopia: Analyzing options to develop pluralistic service delivery in the Dairy sector.	Dairy
44	Desalegn Gebremedhin	Addis Ababa	Assessment of problem associated with Artificial Insemination service in Ethiopia	Animal Science
45	Jemal Kuru	Haramaya	Access and Utilization of Agricultural Knowledge and Information by Women Dairy Farmers: The case of Adaa	Rural Development and Agri. Extension
46	Mikinay Hailemariam	Haramaya	Gender Based Social Network Analysis in Agricultural Innovation Dissemination: The case of Hot Pepper Crop Technology Package in Alamata	Rural Development and Agri. Extension
47	Mulugeta Arega	Haramaya	Determinant Factors and Intensity of Adoption of Old Coffee Stumping Technology on Coffee Farmers in Dale Woreda	Rural Development and Agri. Extension
48	Shitahun Mulu	Mekelle	Assessment of the Major Feed Resources Availability, Performance Evaluation of Cattle Fattening Practice and Marketing System in Bure Woreda	Dry Land Agriculture and Natural Resources
49	Ashagre Abate	Haramaya	Effect of nitrogen Fertilizer and Harvesting Stage on Yield and Quality of Natural Pasture in Fogera District	Range Ecology and Management
50	Tesfaye Tsegaye	Haramaya	Characterization of Goat Production System and on Farm Evaluation of the Growth Performance of Grazing Goat Supplemented with Isonitrogenous Protein Sources in Metema Woreda	Animal Science

51	Tadesse Tewoldeberhan	Mekelle	Introduction of Community based Garlic (<i>Allium sativum</i> L.) Seed Production: Varietal Test and Farmers perception in Atsbi Wonberta Woreda	Dry Land Crop and Horticultural Sciences
52	Tirhas Mebratu	Mekelle	The role of community forest in conserving the biodiversity and understanding the community forest management institutions	Dry Land Agriculture and Natural Res. Department and Environment Protection
53	Tigeneh Shiferaw	Haramaya	Pastoralists' Perceptions about Range Res. Utilization and their traditional Range Management Techniques in Miesso District	Animal Science
54	Tadesse Adgo	Haramaya	Farmers Evaluation and Adoption of Improved Onion Production package: The case of Fogera District South Gondar	Rural Development and Agric. Extension
55	Yenesew Abebe	Haramaya	Characterization of Small Ruminant Production System and On-farm Evaluation of Urea Treated Teff Straw and Concentrate Feeding in Sheep Body Weight Change in Bure Woreda	Animal Science
56	Berhe Arkebe	Addis Ababa	Assessment of hides & skins marketing in Tigray	Agricultural Marketing
57	Dessalegn Molla	Haramaya	Social networks in Diffusion of agricultural innovations	Agricultural Innovations
58	Sisay Yehuala	Haramaya	Determinants of small holder farmers access to formal Credit	Small holder Farmers
59	Fisseha Moges	Hawassa	Production and Marketing System of Local Chicken Ecotypes in Bure Woreda	Animal Production
60	Jemal Abass	Addis Ababa	Spatial Analysis of Farming Systems: the case of Bure Woreda	Earth Science
61	Assefa Abebe	Haramaya	Market chain analysis of honey production in Atsbi	Agricultural Economics
62	Adugna Gesesse Tekka	Haramaya	Market chain analysis of vegetables and fruit production in Alamata	Agricultural Economics
63	Tewodros Gebremedhin	Haramaya	Market chain analysis of small ruminants production in Atsbi and	Agricultural Economics

			Alamata	
64	Mohammed Urgessa	Haramaya	Market chain analysis of teff and wheat production in Alaba	Agricultural Economics
65	Zelege Agid	Haramaya	Market chain analysis of haricot bean production	Agricultural Economics (Federal MoARD)
66	Hailu Kendie	Mekelle	Effects of vermicomposting of Rice Husk, Cow dung and fresh Biosolid with different Carbon to Nitrogen ratio on onion production in Fogera Woreda, South Gonder, Ethiopia.	Dryland Agriculture and Natural Resources

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3	Rahel Deribe	Addis Ababa	Institutions for irrigation water management	Nat. Res. & Environmental Economics
4	Almaz W/Tensaye	Addis Ababa	Women and land use rights in Oromia Regional State Eastern Shewa Zone	Gender
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38	Ashagre Abate	Haramaya	Effect of nitrogen Fertilizer and Harvesting Stage on Yield and Quality of Natural Pasture in Fogera District	Range Ecology and Management
39	Tesfaye Tsegaye	Haramaya	Characterization of Goat Production System and on Farm Evaluation of the Growth Performance of Grazing Goat Supplemented with Isonitrogenous Protein Sources in Metema Woreda	Animal Science
40	Tigeneh Shiferaw	Haramaya	Pastoralists' Perceptions about Range Res. Utilization and their traditional Range Management Techniques in Mieso District	Animal Science
41	Tadesse Adgo	Haramaya	Farmers Evaluation and Adoption of Improved Onion Production package: The case of Fogera District South Gondar	Rural Development and Agric. Extension
42	Yenesew Abebe	Haramaya	Characterization of Small Ruminant Production System and On-farm Evaluation of Urea Treated Teff Straw and Concentrate Feeding in Sheep Body Weight Change in Bure Woreda	Animal Science
43	Dessalegn Molla	Haramaya	Social networks in Diffusion of agricultural innovations	Agricultural Innovations

44	Sisay Yehuala	Haramaya	Determinants of small holder farmers access to formal Credit	Small holder Farmers
45	Assefa Abebe	Haramaya	Market chain analysis of honey production in Atsbi	Agricultural Economics
46	Adujna Gesesse Tekka	Haramaya	Market chain analysis of vegetables and fruit production in Alamata	Agricultural Economics
47	Tewodros Gebremedhin	Haramaya	Market chain analysis of small ruminants production in Atsbi and Alamata	Agricultural Economics
48	Mohammed Urgessa	Haramaya	Market chain analysis of teff and wheat production in Alaba	Agricultural Economics
49	Zelege Agid	Haramaya	Market chain analysis of haricot bean production	Agricultural Economics
50	Belete Teffera	Hawassa	Studies on cattle milk and meat production in Fogera Woreda: production system, constraints and opportunities for development	Dairy Sciences
51	Endeshaw Asefa	Hawassa	Assessment of production systems and marketing of meat goats in Dale Woreda	Animal Production
52	Tsedeke Kocho	Hawassa	Production, marketing system and performance potential of sheep in Alaba Woreda, Southern Ethiopia	Animal Production
53	Sintayehu Yigrem Mersha	Hawassa	Dairy production systems, marketing channels, challenges and opportunities: The case of Shashemene-Dilla area, Southern Ethiopia	Dairy Science
54	Mekonnen G/Egziabher	Hawassa	A study on poultry production and marketing in Dale Woreda, Southern Region	Animal Production
55	Tsefaye Mengiste	Hawassa	Characterization of cattle production systems, processing and marketing of dairy and meat products in Metema Woreda, Amhara Region	Dairy Science
56	Fisseha Moges	Hawassa	Production and Marketing System of Local Chicken Ecotypes in Bure Woreda	Animal Production

57	Alema Woldemariam	Mekelle	Analysis of the role of cooperatives in agricultural input and output marketing, South Tigray Zone	Agricultural Marketing
58	Jemal Mahamud	Mekelle	Analysis of the role of cooperatives in agricultural input & output marketing, East Tigray Zone	Agricultural Marketing
59	Mehari Gebremedhin	Mekelle	The Role of Beekeeping in Household Income and Food Security	Rural Development
60	Almaz Mesfin	Mekelle	Comparative Analysis of the performance of dairy cooperatives input and output marketing in Atsbi, Alamata and Enderta Woreda	Dry land Agriculture and Natural Resources
61	Shitahun Mulu	Mekelle	Assessment of the Major Feed Resources Availability, Performance Evaluation of Cattle Fattening Practice and Marketing System in Bure Woreda	Dry Land Agriculture and Natural Resources
62	Tadesse Tewoldeberhan	Mekelle	Introduction of Community based Garlic (<i>Allium sativum</i> L.) Seed Production: Varietal Test and Farmers perception in Atsbi Wonberta Woreda	Dry Land Crop and Horticultural Sciences
63	Tirhas Mebratu	Mekelle	The role of community forest in conserving the biodiversity and understanding the community forest management institutions	Dry Land Agriculture and Natural Res.
64	Hailu Kendie	Mekelle	Effects of vermicomposting of Rice Husk, Cow dung and fresh Biosolid with different Carbon to Nitrogen ratio on onion production in Fogera Woreda, South Gonder, Ethiopia.	Dryland Agriculture and Natural Resources
65	Wakena Totoba	Arba Minch	Operational analysis of the cascaded Wadecha – Belbela Reservoir system in Ada Woreda	Hydrology and water resource management
66	Sileshi Bekele	Arbaminch	Optimal Water Allocation for Irrigation in Upper River Basin in ten days base on Modjo River	Irrigation Engineering

Field of study	No students
Economics/marketing	19
Extension and Rural Development	16
Animal sciences	16
Dryland agriculture/ Crop sciences	5
Hydrology and Irrigation	2
Gender	2
Environmental sciences/Earth Science	2
NRM	1
Total	66

AN INNOVATION SYSTEMS PERSPECTIVE ON STRENGTHENING AGRICULTURAL EDUCATION AND TRAINING IN SUB-SAHARAN AFRICA

Strengthening the contribution of agricultural education to research and development: Success stories and immediate priorities

David J. Spielman³

Changing Global Realities in Agriculture

Global agriculture and food systems is increasingly driven by consumer preferences, integrated through global trade, guided more by markets than state intervention, influenced by new technologies, subject to heightened regulatory and ethical scrutiny and focus of conflict over scarce resources, e.g., food vs. fuel. Hence, innovative means of addressing changing realities on a large scale are needed. Strengthening the contribution of education to agriculture is imperative. Learning from emerging success stories is one way forward.

Table 1: Demand for and supply of postgraduates

Country	Actual no. of postgraduates (c. 2005)	Postgraduates needed today to match the no. in developed countries in the 1960/70s (farm-based)	
		Farm-based estimates	Area-based estimates

³ International Food Policy Research Institute, Addis Ababa, Ethiopia. This presentation is adapted from Spielman, D.J., J. Ekboir, K. Davis, and C.M.O. Ochieng. 2008. An innovation systems perspective on strengthening agricultural education and training in Sub-Saharan Africa. *Agricultural Systems* 98: 1-9.

Nigeria	459	6,399	1,507
Uganda	89	1,287	264
Burkina Faso	36	669	219
Congo, DR	138	3,381	488
Ethiopia	204	4,598	673
Morocco	101	1,080	650
Tanzania	114	2,922	858
Zambia	30	393	755

Existing and Emerging Success Stories

- Sasakawa Africa Fund for Extension Education (Ghana)
- Young Farmers' Training Program (Ghana)
- Agricultural Polytechnics (Mozambique)
- Food Security and Plant Breeding Programs (South Africa)
- EARTH University (Costa Rica)
- Regional and global agricultural education networks

Sasakawa Africa Fund for Extension Education

Est. 1991: University of Cape Coast, Ghana

- Goals
 - Introduce participatory and locally-relevant skills in mid-career extension staff develop
 - Promote more relevant and responsive agricultural extension curricula for the region
 - Facilitate partnerships between and among public, private, and civil society extension providers
- Hallmarks
 - New approaches: Experiential learning, real-life problem solving, off-campus practical projects, and close interactions with farmers
 - Replication in Ethiopia, Uganda, Tanzania

Young Farmers' Training Program

Est. 1990: University of Ghana

- Goals
 - Train farmers and potential farmers, especially the youth, and encourage farming as a commercial venture
 - Forge lasting links between farmers and the agricultural education and research community
- Hallmarks
 - Competency development in modern production techniques, post-harvest storage, and commercial farm management
 - Includes a 10-month residential training at the University of Ghana

Agricultural Polytechnics

Expanded c. 2004: Government of Mozambique

- Goals
 - Two new agricultural polytechnic schools to train students for employment or self-employment in Mozambique's expanding agricultural sector
- Hallmarks
 - Competence-oriented curriculum that focuses on practical skills development
 - Priority on building independent entrepreneurial skills
 - Focus on meeting the demands for skilled labor from private agribusinesses

Food Security and Plant Breeding

Est. c. 2007: University of KwaZulu-Natal, South Africa

- Goals
 - Postgraduate Food Security Program: train those involved (or seeking careers) in policymaking, research, extension, teaching, or project management that relate to food security in Africa
 - Doctoral Plant Breeding Program: Course of study focused on improving local food crops, particularly "orphan" crops such as sorghum, millet, cassava, and cowpea
- Hallmarks
 - Food Security Program: an intensive multidisciplinary approach
 - Plant Breeding Program: Regionally (Africa) focused

EARTH University

Est. c. 2004: Costa Rica

"Escuela de Agricultura de la Región Tropical Húmeda"

- Goals
 - Practical education in agriculture and development
 - BA/BS and MA/MSc level courses
- Hallmarks
 - combining classroom instruction with learning-by-doing activities conducted with farmers, agribusinesses, and other actors
 - Highly practical curriculum, hands-on instruction
 - A possible alternative to conventional agricultural education

Regional and Global Programs

- Building African Scientific and Institutional Capacity (BASIC) program
- Regional Universities Forum for Capacity Building in Agriculture (RUFORUM)
- Partnership for Higher Education in Africa (PHEA)
- Collaborative Master of Science Program in Agriculture and Applied Economics in Eastern and Southern Africa (CMAAE)
- Agricultural Open Curriculum and Learning Initiative (AGROCURI)

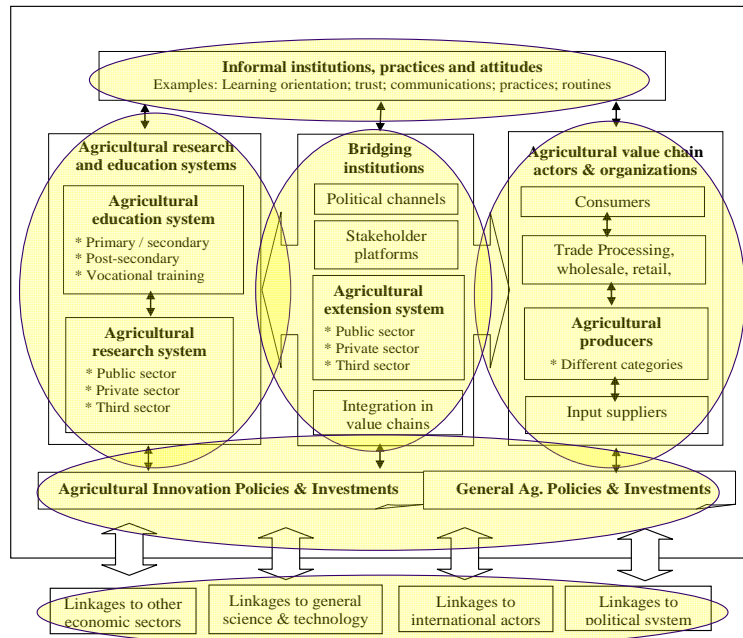
Reform Agenda

- Link agricultural education systems to wider national dialogues on development (Figure 1)
 - Involve the full range of innovation system actors
 - Mobilize political willingness to support reform

- Create incentives to engage all actors in the reform process
- Align mandates and with national and local priorities, not necessarily with foreign best practices
- Link agricultural education systems to other actors in the productive sector
 - Develop curricula that address the practical challenges facing farmers
 - Prioritize more participatory and responsive technology development and deployment programs
 - Encourage educational institutions to become “resource centers” for rural communities through both in-reach and out-reach

Figure 1: Agricultural education in the wider system

A Need to View Education in the Wider System



- Explore new ways of resourcing agricultural education systems (Figure 2)
 - Diversify away from centralized, budget-oriented educational financing (i.e., public financing through annual budgets) to
 - Program-oriented financing (based on a performance formula where the state pays, e.g., for the number of credits accumulated by the students)
 - Supply-driven financing (where the state awards contracts for the supply of a number of graduates through a competitive tendering system)

- Student-centered financing (where institutions' core funds are supplied through students who are funded through a voucher or bursary system)
- Explore new modalities of learning
 - Short-term applied courses, short-term professional training
 - Long-term multidisciplinary degree programs
 - In-service and on-the-job programs
 - Distance education
 - Apprenticeships
 - International sandwich programs
 - Abridged residential programs
 - E-learning
- A shift from "teaching" to "learning"
- Induce change in organizational cultures, behaviors, and practices
 - Improve incentives to conduct research in partnership with other system actors
 - Improve incentives for raising funds from new sources e.g., industry associations, businesses, contract research funds, etc.
 - Change professional evaluation systems to encourage a range of activities and outputs from educators/researchers

Figure 2: Alternative Financing Arrangements

