Case studies on RUFORUM Regional Masters degree programs

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List of Acronyms

AGRA	Alliance for a Green Revolution in Africa
AICM	Agricultural Information Communication Management
ARD	Agricultural and Rural Development
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BPS	Board of Postgraduate Studies
CAADP	Comprehensive Africa Agriculture Development Program
CAES	College of Agriculture and Environmental Sciences
CGIARs	Collaborative Group on International Agricultural Research
DRC	Democratic Republic of the Congo
ECSA	Eastern, Central and Southern Africa
GDP	Gross Domestic Product
ICT	Information Communication Technology
IT	Information Technology
JKUAT	Jomo Kenyatta University of Agriculture and Technology
MSc	Masters
NARS	National Agriculture Research Systems
NGOs	Non-governmental Organizations
PhD	Post Doctoral
RDAE	Rural Development and Agricultural Extension
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture

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The author has tried to ensure that all views and perspectives have been fully incorporated.

Summary

Findings of three case studies of RUFORUM Regional Masters degree programs namely, Research Methods at Jomo Kenyatta University of Agriculture and Technology (JKUAT), Plant Breeding and Seed Systems at Makerere University, Agricultural Information Communication and Management (AICM) at the University of Nairobi, Haramaya University and Egerton University are provided in this report. The study focused on what is in place, demands for the training programs, implementation progress and issues, outputs, outcomes and impacts. In addition, the study was to identify what needs to be done to strengthen the existing programs. The study involved deskwork review and in-depth discussions with Program Coordinators and Chairpersons of the host Departments, Deans of Faculties and Schools, Directors of Council of Graduate Studies and Board of Postgraduate Studies. Data were also collected from students and teaching staff using a semi-structured questionnaires. Key findings of the study are as below:

1. **Demand for the programs:** There is demand for the programs and they have collectively trained 237 professionals from 13 countries in Eastern, Central, Southern and West Africa. Further, a significant number of qualified applicants have not been trained due to financial constraints. Also, research activities focused on limited topics, staples and agro-ecological zones and there is need for more research to address constraints facing other agro-ecological areas and crops to cater for the diverse eating habits of the people of Africa. The programs are mainly attracting young professionals between 21 and 39 years of age and most are employees in the civil service.
2. **Factors influencing enrollment and success of the programs:**

a) The programs are relevant and meet the needs of the professionals, namely; to acquire discipline depth and fundamental skills needed for upward career mobility, to expand career opportunities and enhance performance in current positions. In addition, the programs have a wide admission base and are seen as adding value to a range of academic backgrounds.
b) The programs have promoted wide adoption of multiple and modern training tools and a balance in theoretical and practical components. Further, training is done by teams of professionals drawn from multiple institutions and the knowledge pool is contributing to high quality of training.
c) The programs are popular for their short duration to complete studies and regional scope which promote networking for future collaborations.
d) The applied research being conducted by the programs is relevant to the development of the region. Example, the elite plant materials developed, coupled with improved packaging (communicating innovations for impact), access and adoption of research findings will contribute to enhanced food security and livelihoods in the region. Generally, the programs are perceived as having the potential to positively impact rural livelihoods and the regional economy at large.

3. Results of running the programs

a) So far, the programs have collectively graduated 126 high quality professionals who are equipped with discipline depth and soft skills and have gone back to their home countries and are serving the region. Some graduates are teaching in universities and positively influencing research and learning approaches in use, those in research institutes are contributing to improved quality of research while employees in government ministries have a say in shaping policy environment.

b) Further, 126 theses have been produced and some research findings published in peer reviewed journals which is evidence of high quality research and a significant contribution to the body of knowledge.

c) Academic staff and students have realized enhanced networks. By virtue of hosting the programs, universities have benefited from enhanced infrastructure, networks, income accrued from tuition and enhanced profiles by enrolling students from the regions.

d) Running the programs has catalyzed desirable changes in the host universities, including adopted wide use of modern and multiple learning approaches, emphasis on practical components in training and attaching students in relevant institutions where mentoring and practical skills are enhanced. The institutions have also embraced consultative approach to curricula development and review. Further, as a result of running the RUFORUM regional AICM program, Mekelle University in Ethiopia has shown interest in offering the same program while the University of Nairobi has started a PhD in AICM. Similarly, as a result of JKUAT running the Research Methods program and involving professionals from Masinde Murilo University in Kenya, the latter has launched a program on Research Methods. Programs are institutionalized within the host universities.

4. Key Recommendations

a) Review curricula of all the programs and improve infrastructure, particularly computer facilities and internet access in all universities hosting the programs.

b) Re-tool teaching staff handling the Research Methods and Agricultural Communication Management Programs.

c) Increase representation of females enrolled in the programs in general but particularly in AICM hosted at Haramaya University

d) Address the shortage of staff at Haramaya University.

e) All programs to mount aggressive fund raising campaigns to support staff mobility, students' stipend, tuition and research so as to increase enrollment and maintain regional outlook. Offering some courses online could also boost access.

f) For success and sustainability of the regional programs, it is important to have harmonized academic quality assurance measures in place.

1: SCOPE, OBJECTIVES AND APPROACH OF THE CASE STUDIES

The study was conducted between May and June 2014 and it focused on the RUFORUM supported MScs in Research Methods, Plant Breeding and Seed Systems, and Agricultural Information Communication Management (AICM) hosted in the five institutions detailed in table 1. The study focused on what is in place, demands for the training programs, implementation progress and issues, outputs, outcomes and impacts. It also identified what needs to be done to strengthen the existing programs.

Table 1: RUFORUM Regional MSc training programs and the hosting universities

Name of program	Year started	Hosting university, country
1. Agricultural Information Communication and Management	2008 2010 2009	University of Nairobi, Kenya Haramaya University, Ethiopia Egerton University, Kenya
2. Research Methods	2009	Jomo Kenyatta University of Agriculture and Technology, Kenya
3. Plant Breeding and seed Systems	2008	Makerere University, Uganda

Approach and sample size

The study involved deskwork review and collection of primary data. The consultant visited the five universities hosting RUFORUM Regional MSc programs and held in-depth discussions with Program Coordinators and Chairpersons of the host Departments, Deans of Faculties/Schools, Directors of Council of Graduate Studies and/or Board of Postgraduate Studies. Primary data were collected by administering a semi structured questionnaire either online or face-to-face to all students registered for specific programs and the academic staff teaching the program. The proportions of students and teaching staff respondents are provided in table 2. Primary data was analyzed using Statistical Package for Social Sciences version 22. The analyses involved estimating frequencies and cross tabulations for various variables. Findings of each case study are provided in subsequent chapters.

Table 2: Students and teaching staff respondents of the RUFORUM Regional MSc training program case studies

Name of Program	Student respondents as percentage of total registered	Number of teaching staff respondents
Agricultural Information Communication Management at:		
Haramaya University	24	2
University of Nairobi	18	1
Egerton University	11	1
Research Methods	31	5
Plant Breeding and Seed Systems	31	0

2: MASTERS AGRICULTURAL INFORMATION AND COMMUNICATION MANAGEMENT

2.1 Background and Rationale

The development of Agricultural Information and Communication Management (AICM) program was in response to findings of assessment undertaken by the Regional Agricultural Information Network which showed that the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) region was deficient in agricultural professionals with AICM skills. More specifically, most agricultural professionals lack sufficient skills to generate and disseminate agricultural technologies and other innovations to end users. Further, existing university programs did not contain sufficient ICT content and this contributed to the low ICT competency among graduates. The AICM program is new and was not previously offered at universities in Eastern, Central and Southern Africa. It was developed by stakeholders after extensive consultations at national, regional and international levels. The program aims at contributing to improving food security and regional development by producing graduates who are: knowledgeable in both agricultural sciences and information and communication management, and who can design and manage agricultural information and knowledge management systems. They will be able to support agricultural information and knowledge users, as well as those in dissemination and also carry out research in AICM.

This is a two year program and the first year is fully devoted to course work. The second year is partly devoted to course work and partly to thesis or project. All students must take 10 core and 2 remedial courses. The remedial courses for students without agricultural background are Principles of Crop and Livestock Production and Principles of Natural Resources Management while for students without ICT background are Fundamentals of Computer Programming and Fundamentals of Computing and Networks. The program has thesis and non-thesis (project or dissertation) options. Students who opt for project must take an additional four taught courses in addition to writing a dissertation based on secondary data. Students who opt for thesis take 12 taught courses, develop research proposal and conduct research which leads to development of a thesis. Thesis is examined through oral defense before an examination board consisting of internal and external examiners. The program is offered at the University of Nairobi, Haramaya University and Egerton University and implementation in the three universities is detailed in subsequent chapters. The program will be launched at Makerere University during the 2014/15 academic period.

MASTERS AGRICULTURAL INFORMATION COMMUNICATION AND MANAGEMENT, HARAMAYA UNIVERSITY

2.2 Implementation Progress and demand

The program is hosted by the Department of Rural Development and Agricultural Extension in the College of Agriculture and Environmental Sciences (CAES). Training is offered as a full-time regular semester program and also as summer vacation program. The first students were registered in 2010 and to date 38 Ethiopians have been trained. Details of the registered students are provided in table 3. Haramaya University is not creating publicity for the program and is turning down applicants because of severe shortage of qualified teaching staff to supervise students. Even with minimal publicity, the program is in high demand with two intakes annually and government institutions (especially Universities and the Ministry of Agriculture) putting forward special requests to have their staff trained*. Students are funded by their employers and in addition RUFORUM provided a nurturing grant to cater for students' research and publications. Graduation rate for females is 100% and on average 71% of total students enrolled for at least two years have graduated. Most of the students trained are males and females make up 11% of the total.

Table 3: Applicants and students registered in Agricultural Information Communication and Management (AICM) as of June 2014.

Cohort/Year	**Total applicants**	**Registered Students**	**Gender of Students**		**Students Progress**		**Percentage graduated**
			Male	**Female**	**Males**	**Females**	
1st /2010 Regular	17	13	11	2	8 graduated	2 graduated	76
2nd /2010 Summer	11	9	9	0	6 graduated	-	67
3rd /2011 Regular	4	3	2	1	2 graduated	1 graduated	100
4th /2012 Regular	3	3	3	0	1 graduated	-	33
5th / 2013 Summer	13	7	7	0	on coursework	-	-
6th /2014 Regular	3	3	2	1	on coursework	-	-
Total	*51*	*38*	*34*	*4*	*20*	*3*	-

* 7th cohort- 2014: Ministry of Agriculture and Universities have put a demand for 22 professionals to be trained, will be funded by the Government of Ethiopia but due to shortage of staff to supervise students this may not be feasible (staffing details refer to figure 1)

2.2.1 Characteristics of students registered in the program

Twenty four percent of registered students and consisting of 67% males and 33% females responded to the questionnaire. The program is in demand by young professionals within the 21 to 29 and 30 to 39 years age brackets who make up 89% and 11% of the total respectively. Students are graduates from Ambo University, Gondar University, Haramaya University, Jimma University and Mekelle University - all located in Ethiopia. At Bachelors degree level, the students have a wide range of backgrounds including Applied Geography, Environmental Studies, Business Administration and Information Systems, Cooperative-Agricultural, Rural Development and Agricultural Extension, Computer Science and Natural Resource Management. With the exception of one, all students were employed prior to joining the program. Majority (56%) were lecturers in tertiary institutions while three were employees of the Ministry of Agriculture, Ministry of Finance and International Water Research Institute.

2.2.2 Factors which influenced enrollment in the program

Several factors were catalysts to registering in the program. Foremost the program is based on information technology (IT) which is an interesting field as reported by 66% of the respondents. Further, it is relevant to their professions and has the potential to expand career opportunities as singled out by 33% of the students. Also, the program is new and the training opens doors to information sharing which is important for promoting development in Ethiopia in addition to linking up with the rest of the world as reported by 11% of the students.

2.3 Factors that ensure success and sustainability of the regional program

2.3.1 Unique attributes of the program

Both teaching staff and students noted that there are attributes which make the program unique. As reported by 44% of students and all teaching staff, the combination of information communication technology (ICT), agriculture and innovations which collectively have the potential to positively impact agriculture was singled out as the key attribute. Also, the multi-disciplinary focus of the program and admission of students with diverse backgrounds were cited as unique by students and all teaching staff. Emphasis on information management was also reported as a unique feature. Details of these attributes are provided in table 4.

Table 4: Unique attributes of the Agricultural Information Communication and Management program as identified by students and teaching staff

Unique attribute	**Percentage of student respondents**	**Percentage of teaching staff respondents**

Combination of ICT, agriculture and innovations	44	100
Multi-disciplinary focus	11	100
Admit students with diverse backgrounds	11	100

2.3.2 Curriculum and Delivery

2.3.2.1 Curriculum content

Only 55% of the students responded to the question on curriculum content and they rated it narrow. Suggestions were made to incorporate courses in project management, geographical information systems agricultural field based courses and expand scope for computer science courses. They also recommended that the broadened livelihood courses be omitted from the program. Students reported duplication of efforts because the agricultural communication information management and management of information communication courses which are taught by different instructors have significant content in common. One of the courses should be omitted from the program. All teaching staff rated the curriculum adequate in content and depth.

2.3.2.2 Delivery

Curriculum delivery relied on lectures, seminars, and computer based hands on sessions. In addition, guest lecturers drawn from Mekelle University, Addis Ababa University, Girmma University and Pastoral Forum Ethiopia are also involved in teaching the program. Forty four percent of students responded to the question on curriculum delivery and they reported insufficient emphasis on practical aspects. Suggestions made to improve delivery were to: retool the information technology instructors and also increase their numbers, increase the numbers of computers available to students, and access to the computer laboratory, increase practical sessions, and incorporate field excursions in the program. The need to retool instructors was re-enforced by the program coordinator who noted that the program is mainly taught by what he termed the "analogue generation" of professionals. In addition, the need to incorporate oral presentations so as to develop communication skills was suggested by both students and the program coordinator. Further, the program coordinator recommended that more emphasis be placed on research methods. Strongly recommended by all students was the need to introduce AICM courses online. Currently, the university is piloting e-learning for some undergraduate courses.

The training is imparting discipline depth and fundamental skills. Most students (78%) attested to being better equipped to play their respective roles in the job market. The most important skills acquired that would enhance the performance of professionals in the work place were singled out as: communication, research and knowledge

management as detailed in table 5. In-depth knowledge on accessing market information, innovations and sharing experiences were reported by 66% of students.

Table 5: Useful skills acquired during the training and would enhance job performance

Skills	Percentage respondents
Knowledge management	55
Communication especially presentation and report writing	100
Research	33

2.3.3 Availability of critical inputs for tertiary education training

The critical inputs for tertiary education training include infrastructure, qualified and motivated faculty and support staff, qualified and motivated students, competent administration and resources needed to facilitate learning. The condition of the core infrastructure was assessed by students and staff involved in teaching the program and also the profile of the teaching staff was obtained. The results are summarized below.

2.3.3.1 Availability of teaching staff

Two male teaching staff with doctorate degree training and teaching experience of 1-5 years provided feedback. They are between 30-39 years of age and are expatriates. The university has an acute shortage of teaching staff with doctorate degree training. As documented by the CAES Dean (Figure 1), the college has a population of 1450 undergraduate students, 500 pursuing Masters degrees, and 200 registered for PhD training (the student population figure excludes the number of students in summer, distance education and continuing education programs). The profiles of the total 182 academic staff shows that 9%, 47% and 30% (including expatriates') hold Bachelors, Masters and PhD level training as the highest qualifications respectively. Details of academic staff at CAES are provided in figure 1. Student staff ration is high, shortage of teaching staff is evident and in 2010 students deferred courses because of shortage of instructors. Further, to supervise Masters students', teaching staff must be at least an Assistant Professor which requires one to have doctoral training or hold a Masters degree with track record of publications. The Department of Rural Development and Agricultural Education which hosts AICM program has four Assistant professors and one Associate professor. To alleviate the shortage of staff, the University relies on expatriates but because salaries are low, the strategy is not bearing fruits. Consequently, the host department made a recommendation to Haramaya University Management to revise the salaries for expatriates upwards. In the short term, the shortage of staff can also be resolved by forging partnerships with universities in the region and designing projects with a focus on staff mobility. Currently, Haramaya University is not publicizing the AICM program and is encouraging students to enroll in alternative programs.

2.3.3.2 Infrastructure capacity of Haramaya University CAES as assessed by students and teaching staff

The facilities at the college were assessed by teaching staff and students. Majority of the respondents rated lecture theatres, laboratories and computer facilities as good. However, internet access is a challenge and 33% of the students rated it poor. Generally, access to computer laboratory is limited owing to huge demand and at times students resort to using internet cafes. Some students rated accommodation and sports facilities poor. Details of the assessment are provided in table 6.

Table 6: Infrastructure capacity of Haramaya University College of Agricultural and Environmental Sciences as assessed by students and teaching staff

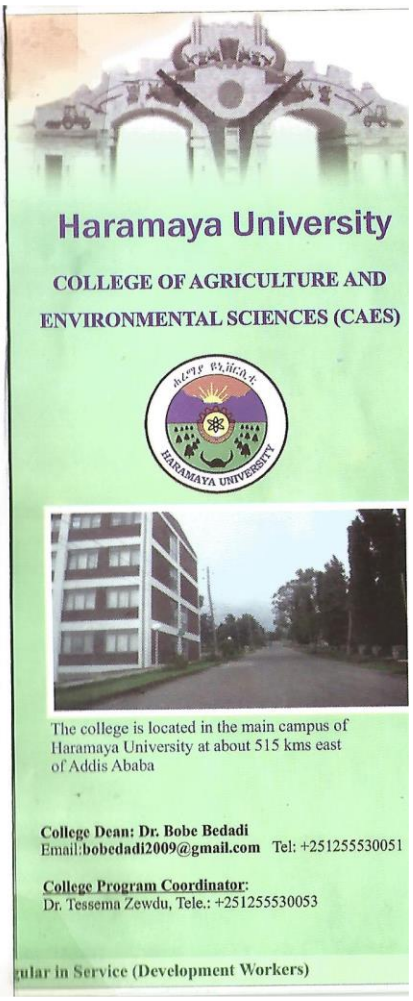
Infrastructure	**Assessment by students**					**Assessment by teaching staff**				
	Very Good %	Good %	Fair %	Poor %	Very Poor %	Very Good %	Good %	Fair %	Poor %	Very Poor %
Lecture theatres	-	-	-	-	-	50	50	-	-	-
Laboratory	-	-	-	-	-	50	50	-	-	-
Computer facilities	78	11		11	-	50	50	-	-	-
Internet access	33	22	11	11	22	-	100	-	-	-
Library	56	33	-	-	11	-	100	-	-	-
Accommodation	22	56	-	11	-	-	50	50	-	-
Sports	44	33	11	-	11	-	50	50	-	-

-means no score was awarded

Figure 1: Profile of academic staff of College of Agriculture and Environmental Sciences as of January 2014.

Academic staff profile of the college (updated on 29 January 2014)

	Academic staff by qualifications							
	TA		BSC		MSc		PhD	
School/Department	Male	Female	Male	Female	Male	Female	Male	Female
School of animal and Range Management	7	0	3	0	15	1	12	-
School of Agricultural Economics and Agribusiness	1	0	0	0	18	4	7	1
School of Plant Sciences	10	1	6	1	18	2	22	-
Rural Development and Agricultural Extension	1	4	0	0	10	2	3	-
School of Natural and Environmental Sciences	3	0	4	2	17	0	8	1
Staff currently on duty	22	5	13	3	76	9	52	2



2.3.4. Academic Quality Assurance Mechanisms

The University is undergoing restructuring and a Directorate of Academic Quality Assurance is in the process of being established. Before admission, students must sit and pass entrance examination which is administered by the Ministry of Education. Admission of students and oral defense of thesis are facilitated by the School of Graduate Studies. Thesis is examined through oral defense before an examination board consisting of internal and external examiners. For students on non-thesis (project option), the report is approved by the supervisor and Departmental Graduate Committee and then examined by a board without being subjected to external examiners. The Council of Graduate Studies makes decision on issues pertaining to processing of thesis and student welfare.

2.4 Results of running the program

Haramaya University Senate approved the Regional Masters degree in Agricultural Information Communication and Management and to date 38 professionals have been trained. The program has produced 20 graduates who are in high demand in the market place and Government Institutions are placing demand for training of their staff. Placement of a sample of graduates is evidence of high demand for the products as shown in table 7. Further, 20 theses have been published and this is an important output from the graduates. However, respondents have not published research findings in peer-reviewed journals and the output in terms of publications was not captured in this study. In addition, teaching staff have enhanced their networks. The University has benefited from income accrued from tuition and faculty has also realized an increase in networks. Also, as a result of Haramaya University running the program, Mekelle University has shown interest to start AICM program.

Table 7: Placement of sample Agricultural Information Communication and Management graduates

Name of graduate	Current Placement	Previous placement
Milkyas Hailu	Director of Library. He has improved communication with top Management and was voted as director for the year in 2013	Staff member, Haramaya University library
Kidesena Subsibe	In the process to join as lecturer and research staff (agricultural information and knowledge management), Haramaya University.	Staff member, Gender Mainstreaming and HIV Directorate, Haramaya University.
Alayu Melaku	Senior Network Administrator, ICT Directorate, Haramaya University	Technical Assistant, Haramaya University

Yibeltal Maru	Head of Teaching, Learning technology and soft ware developer departments , ICT directorate, Haramaya University*	Assistant Lecturer Haramaya University
Endalew Getenet	Lecturer Department of Rural Development and Agricultural Extension	Assistant lecturer, Department of Computing, Haramaya University
Benti T Oljira	Capacity Building Program expert Government of Ethiopia	Monitoring and Evaluation expertise Government of Ethiopia
Dereje Derso	Lecturer and Researcher International Livestock Research Institute	Assistant Lecture and Researcher Ministry of Education
Binyam Abayne	Database administrator for trade license authentication Anlemu woreda trade and industry office	Data & information analysis assistant
Firehiwot Megeresa	Livelihoods Program officer at Head office GOAL Ethiopia, International Non-Governmental Organization	Senior Instructor, Agricultural College
Mesert Tsegaye	Ethiopian Standards Agency Junior Project Manager	Not provided
Tekelab Cherent	Lecturer, Adama University	Assistant Lecturer, Adama University
Wondmeneh Getnet	Pro Pride Ethiopia, Monitoring and Evaluation Officer	Ministry of Agriculture
Elias Damtew	Communication researcher, International Livestock Research Institute	Not provided
Tilahun Gebru	Senior Development Facilitator, World Vision	Not provided
*very competitive position, attractive salary package higher than that of dean and professor		

2.5 Overall assessment

There is demand for the programs, mainly from Ethiopian Government Institutions. But the university is turning away potential candidates due to shortage of staff to supervise students. The program is mostly in demand by young professionals within 21-29 years age bracket because of its relevance and need to acquire discipline depth and skills to expand career opportunities. Further multidisciplinary focus, admission of students with diverse academic

backgrounds and potential to positively impact the agriculture sector were singled out as unique attributes and are likely to have a bearing on the success and sustainability of the program. The program has made a significant contribution to enhancing human resource capacity in Ethiopia and the graduates have been absorbed in training and research institutions, Private sector, Ministry of Finance and Ministry of Agriculture and are contributing to national development. Due to the importance of the program in addressing human capacity needs, Mekelle University has shown interest to launch a similar program. The AICM curriculum is innovative but students rated scope as narrow and also proposed program delivery be enhanced by engaging more IT professionals, re-tooling existing teaching staff, improving access to and expanding computer facilities as well as improving internet access. There is need to review the curriculum to incorporate emerging issues and suggestions made by respondents. Most of the professionals trained are males; females constitute only 11% of the total. It is important to devise means to increase female enrollment. The university is in the process of restructuring and a functional Directorate of Academic Quality Assurance will be in place in the near future. Currently, students must physically sit for entrance examinations and this could be an impediment to enrolling students from the region unless the examination is offered online or through approved institutions in the students' countries of origin. Generally, there is need to accord the program further support by engaging more professionals from the region and beyond in teaching and supervision, offering some courses online and enhancing infrastructure.

MASTERS DEGREE IN AGRICULTURAL INFORMATION COMMUNICATION AND MANAGEMENT AT UNIVERSITY OF NAIROBI

3.1 Implementation progress and demand

The program is hosted in the Department of Agriculture Economics in the Faculty of Agriculture but training is offered at Chiromo Campus located close to Nairobi city. The program was approved by the University of Nairobi Senate in 2008. The university created awareness of the program and students' learnt of its existence through advertisement in daily newspapers, University of Nairobi calendar and various websites as reported by 38%, 38% and 13% of the respondents respectively. The program registered the first students in 2008 and to date 45 professionals have been trained as shown in table 7. With the exception of two, students are mainly self supported.

Table 8: Students registered in Agricultural Information Communication and Management as of June 2014.

Cohort/Year	Registered Students	Students countries of origin	Students progress
1st /2008/2009	12	Kenya	9 graduated in 2013
2nd /2009/20010	12	Kenya	Writing stage
3rd /2010/2011	12	Kenya	Writing stage
4th /2012/2013	9	Kenya, South Sudan & Uganda	Research/writing stage
Total	*45*	-	*9*

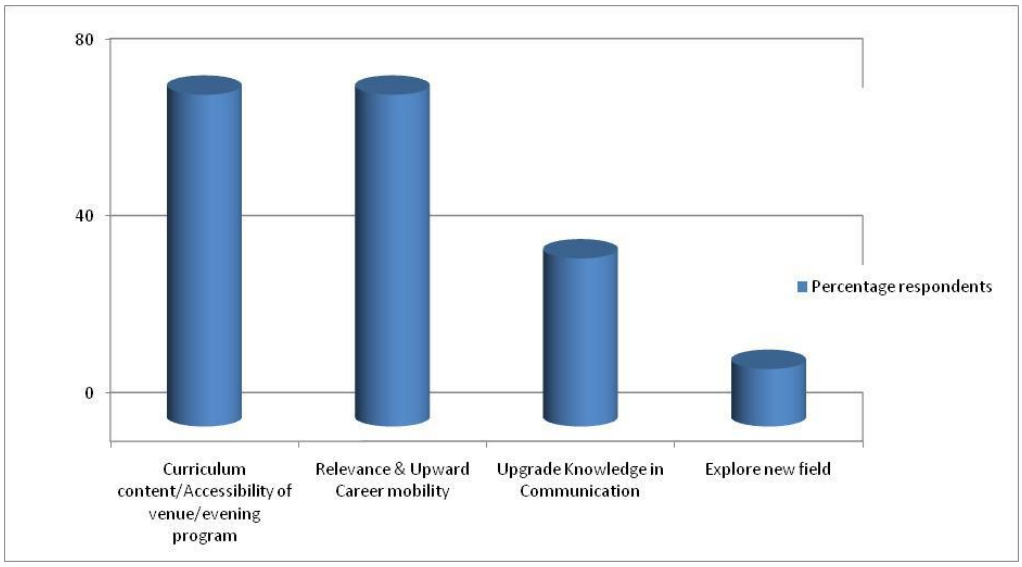
3.1.1 Characteristics of students registered in the program

Eighteen percent of the registered 45 students responded to the questionnaire. Majority (63%) of the students are between 30 and 39 years while the rest are within 40 to 49 years age bracket. Further, most respondents (63%) are males. The program admits students with diverse academic backgrounds and at undergraduate level, most (75%) specialized in agriculture and related fields while the rest hold Bachelors' degrees in Communication. The program is attracting students on full time employment in the areas of agricultural extension, communication specialists and development workers. Majority of the students are employees of the Ministry of Agriculture while three are employees of the Alliance for a Green Revolution in Africa (AGRA), Kenya Forestry Research Institute and the United Nations.

3.1.2 Factors which influenced enrollment in the program

Most students (75%) reported relevance of the program to their professions and need to acquire discipline depth and skills for upward career mobility and to expand career opportunities as the most important factor which influenced them to enroll in the program. Equally important are the course components within the program which were seen as both interesting and adding value to a range of academic backgrounds. Also the flexibility to attend training after office hours and over the weekends was singled out. Other factors were the need to advance knowledge in communication and desire to explore new fields. Relative importance of these factors is illustrated in figure 2.

Figure 2: Factors favoring enrollment in the Agricultural Information and Communication Management Program



3.2 Factors that ensure success and sustainability of the regional program

3.2.1 Unique attributes of the program

Both teaching staff and students noted that there are attributes which make the program unique. All students and the one teaching staff respondent indicated that the integration of information technology communication (ICT) with agricultural extension was a unique attribute. Further, the flexibility to attend training after office hours and over the weekends and easy access of the venue due to close proximity to Nairobi city were singled out as key factors by 38% of the students. The multidisciplinary nature of the programme, and the flexibility to specialize in specific areas of interest, as well as the option of thesis or dissertation were also reported as unique. Details of these factors are provided in table 8.

Table 8: Unique attributes of the Agricultural Information Communication and Management program as assessed by students

Unique attribute	Percentage of student respondents
Integrates ICT will agriculture extension	63
Multidisciplinary nature	38
Flexibility of areas of specialization & option of thesis or dissertation	13
Offered after working hours and accessibility of venue	38
Practical application to field situations	13

3.2.2 Curriculum and delivery

3.2. 2.1 Curriculum content

Both students and teaching staff assessed the curriculum with regard to content, depth and delivery. Teaching staff rated content as adequate. Among students, there was no consensus and 25%, 63% and 13% rated curriculum content narrow, adequate and broad respectively. About 13% of the students recommended that programming be omitted from the program, while teaching staff recommended inclusion of development, risk and science communication courses. Teaching staff and 63% of students rated curriculum depth adequate. Curriculum depth was rated shallow and deep by 25% and 13% of the students respectively. As reported by all respondents, there is need to include field exposure in the curriculum and also put more emphasis on developing communication skills. Some students (25 %) were attached at Pamoja Media East Africa. The attachees rated the institution as relevant, the duration of internship as sufficient, but recommended that stronger collaboration be forged between universities and other institutions to enhance imparting practical skills.

3.2.2.2 Curriculum delivery

As reported by 75% of the students, there is need to put more emphasis on practical aspects of the curriculum. All students rated delivery and lecturer's preparedness as good. Proposed means to enhance delivery were singled out as: to engage ICT specialists in teaching relevant courses, increase practical sessions, and to encourage thematic seminar topics on agriculture as a means to improve presentation skills.

Overall curriculum design is relevant to students' profession to a great extent as reported by 88% of the respondents. Further, the graduates attested to being better prepared to play their respective roles in the market place. The most important skills imparted were singled out as communication, research and knowledge management. The details of these skills are provided in table 9.

Table 9: Skills acquired during training and considered important to enhance performance at work place

Skills	Percentage respondents
Communication especially presentation, report writing, video scripting	100
Research Data analysis and management	63
Information/Knowledge management	25

3.2.3 Infrastructure capacity of the university as assessed by students and teaching staff

The Laboratory and library facilities were generally rated good by majority of the respondents. On the contrary, computer facilities are poor as rated by over 60% of the students. Lecture theatres and internet access were rated poor by about 25% of the students as detailed in table 10. Further, most students (63%) reported challenges of poor internet access, and limited access to computers and software. To enhance internet access students purchased personal laptops and modem. There is need to improve computer facilities and internet access.

Table 10: Infrastructure capacity of University of Nairobi as assessed by students and teaching staff

Infrastructure	**Assessment by students**					**Assessment by teaching staff, n=1**				
	Very Good %	Good %	Fair %	Poor %	Very Poor %	Very Good %	Good %	Fair %	Poor %	Very poor
Laboratory	-	38	25	13	25	-	-	-	-	-
Computer facilities	-	13	13	38	25	-	100	-	-	-
Internet access	-	25	38	13	13	-	100	-	-	-
Library	-	38	25	13	-	-	-	100	-	-
Accommodation	-	38	-	13	-	-	-	-	-	-
Sports	-	13	38		13	-	-	-	-	-
Lecture theatre	-	13	38	25	-	-	-	100	-	-

- means no score was awarded

3.4 Results of running the program

Through the program, 45 professionals have been trained. The graduates are in high demand as evidenced by placement of sample professionals (detailed in table 11). Publication of 9 theses is another output. The University has also benefited from income accrued from tuition and enhanced networks. Further, after running the MSc program for two years, the University of Nairobi launched a PhD in AICM.

Table 11: Placement of sample Agricultural Information Communication and Management graduates

Name of graduate	Current Placement
Estable Trufena	Lecturer Oginga Odinga University, Kenya (formerly in administration, University of Nairobi)
Symon Mwambe	Provincial Agriculture Officer, Trans-Nzoia, Kenya
Hilary nyanganga	PhD student, at University of Nairobi
Ayugi Tesira	Information research Officer, International Livestock Research Institute
Wanjala Titus	PhD student at University of Nairobi, also started an NGO
Adolwa Symon	PhD student in Germany
Pauline Mburu	Agriculture Librarian, Kenya Agriculture Research Institute

3.5 Overall Assessment

There is demand for the program and to date, 45 professionals from the region have been trained. The program has trained policy makers, researchers, communication specialists, lecturers and experts in information diffusion. The program targets persons on full time employment and the flexibility to attend training after working hours and or weekends coupled with easy access to training venue were cited as key selling points. These attributes should be maintained as they have a bearing on the success and sustainability of the program. The curriculum was rated adequate by 63% of the students. After over 5 years experience in running the program, it is important for it to be reviewed to incorporate emerging issues, courses and elements proposed by the respondents. Further, there is need to re-tool teaching staff, put more emphasis on practical components of the program, including developing oral

presentation skills. In addition, there is need to enhance infrastructure, especially computer facilities and internet access.

4. MASTERS AGRICULTURAL INFORMATION COMMUNICATION AND MANAGEMENT AT EGERTON UNIVERSITY

4.1 Implementation Progress and demand

The program was approved by Egerton University Senate in 2009. Students learnt about the program through word of mouth, advertisement in daily newspapers and various websites. The program is offered on full-time semester basis and Egerton University opened her doors to the first 16 students from six countries in Eastern, Central and Southern Africa in 2009. The first students were sponsored by SCARDA and RUFORUM. To date, the program has trained 27 students and 12 have graduated. Details of registered students are provided in table 12.

Table 12: Applicants and students registered in Agricultural Information Communication and Management program as of June 2014.

Cohort/Year	Total applicants	Registered Students	Gender of Students		students home countries	Students Progress
			Male	Female		
1st /2009/2010	16	16	9	7	DR Congo, Sudan, Zimbabwe, Uganda, Ethiopia and Kenya	12 graduated 4 writing up
2nd /2010 /2011	Over 10	5	-	-	Rwanda and Kenya	4 writing up
3rd /2011/2012	-	3	-	-	Kenya	4 writing up
4th /2012/2013	-	3	-	-	Kenya	Research /dissertation
Total	-	*27*	-	-	-	-

4.1.1 Characteristics of students registered in the program

Eleven percent of the total students registered responded to the questionnaire. Majority (67%) of the respondents were within the age bracket of 30-39 years and a further 33% within the 40 to 49 bracket. At undergraduate level, students have Bachelors' degrees in Natural Resources Management or Information Technology. All respondents were employed in the Private sector as Information Technology specialist, or in the civil service in the Ministry of

Education and Ministry of Agriculture prior to enrolling in the program. One student has made local arrangement to continue working as they train while two were accorded study leave.

4.1.2 Factors favoring enrollment in the Program

Several factors were catalysts to enrolling in the program. The need to acquire skills and discipline depth for upward career mobility and expand career opportunities were cited by 67% and 33% of students respectively. One student cited the potential of the knowledge and skills gained to impact the farming communities as important.

4.2 Factors ensuring success and sustainability of the regional program

4.2.1 Unique attributes of the program

Both students and teaching staff indicated there are unique attributes of the program. All students and teaching staff singled out the combination of IT and agricultural extension as the most outstanding attribute. Further, emphasis on IT and hands on activities were singled out as unique features by 67% of the students. The importance of knowledge management was cited by one student.

4.2.2 Curriculum Content and delivery

4.2.2.1 Curriculum content

Both students and staff who teach the program assessed the curriculum with regard to content, depth and delivery. The teaching staff rated curriculum adequate in content and depth. However, 33% and 67% of the students rated curriculum content as broad and narrow respectively. To broaden scope, students recommended inclusion of courses on social media tools and technologies, rural agro-innovation and delivering agro-advisories. Teaching staff recommended the need for more emphasis on research methods aspects. Most students rated depth of coverage as good while one student rated it adequate.

4.2.2.2 Curriculum delivery

Curriculum delivery relied on lectures and computer based hands on sessions. Lecturers from several departments of Egerton University are involved in teaching the program. Most students indicated there is sufficient emphasis on field trips but one student and teaching staff reported insufficient emphasis on field exposure and practical components which was attributed to funding and time constraints. Overall, students rated delivery as very good and also reported that teaching staff were versed with subject matter. To improve delivery, students recommended more emphasis be placed on practical components, increase access to computers and ICT facilities and consider attaching students in agricultural institutions. All students indicated that the program is relevant to their professions to a great extent.

As a result of the training, all students attested to being better equipped to play their respective roles in the market place. The training is imparting discipline depth and fundamental skills especially communication, research and practical skills as detailed in table 13.

Table 13: Most important skills for enhanced job performance acquired during training, as identified by students

Skills	**Percentage respondent**
Research Proposal writing	33
Communication Oral presentation	67
Practical Skills Website design Knowledge management Establishment of agricultural communication data banks	100

4.2.3 Infrastructure capacity of the University

Both students and teaching staff assessed the condition of specific infrastructure. The lecture theatres and laboratory services were rated good by most students but the teaching staff rated the two facilities as poor. Similarly, accommodation facilities were rated as fair or poor by most respondents. The general rating of the various facilities is detailed in table 14.

Table 14: Infrastructure capacity of Egerton University as assessed by students and teaching staff

Infrastructure	Assessment by students					Assessment by teaching Staff				
	Very Good %	Good %	Fair %	Poor %	Very Poor %	Very Good %	Good %	Fair %	Poor %	Very Poor %
Lecture theatres	-	67	-	-	-	-	-	-	100	-
Laboratory	33	33	34	-	-	-	-	-	100	-
Computer facilities	33	33	34	-	-	-	100	-	-	-
Internet access	67	-	33	-	-	100		-	-	-
Library	33	33	-	-	-	-	100	-	-	-
Accommodation	-	-	67	-	-	-	-	-	-	100
Transport	33	33	-	-	-	-	100	-	-	-

- Means no score awarded

4.3 Results of running the program

Egerton University Senate approved the regional MSc training program in 2009 and to date 27 professionals from six countries in Eastern, Southern and Central Africa have been trained. The professionals are equipped with discipline depth, fundamental skills and are in high demand. Nine theses are another important output from the program although respondents have not yet published research findings. The University benefited from enhanced infrastructure through support of the program, income accrued from tuition and enhanced networks.

4.4 Overall Assessment

There is demand for the program but over the years, enrollment and regional representation of students has declined mainly due to financial constraints faced by students. Further, graduation rate is low and 43% of students registered for over 2 years have not graduated. The program is mainly attracting young employed professionals between 30 and 39 years of age. In addition, students are dissatisfied with curriculum content and they rated it as narrow or broad and recommended inclusion of additional courses. The program could benefit from curriculum review to incorporate emerging issues. At Egerton University, full-time semester delivery is the norm. It is recommended that the option of adopting the University of Nairobi delivery approach and shifting the venue to Nakuru town campus which is more accessible be explored as a means to enhance enrollment. The need to improve infrastructure especially computer facilities, upgrading software, access to computer laboratory and putting more emphasis on practical components of the program was identified.

5. MASTERS DEGREE RESEARCH METHODS PROGRAM at JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

5.1 Background and Rationale

The National Agricultural Research Systems (NARS) continue to spearhead research efforts in support of agriculture and rural development. However, the region has limited human capacity who can conceptualize, plan and implement effective research. This is due to a number of factors including the changing need to integrate cross-disciplinary work, the emergence of new disciplines such as environmental economics and sustainability science, the need for multi-scale approaches, and challenging research paradigms such as stakeholder involvement. The research methods needed to work in this new environment are different from the past conventions, and are new and changing rapidly. The training offered by universities in research methods has not kept pace. Furthermore, there is very limited capacity to offer research methods support to researchers. This limited capacity and inadequate support to the changing priorities of agricultural research has unfortunately weakened the quality of research and progress towards increasing food and nutritional security and alleviating poverty (CTA, 1997).

RUFORUM launched the program following regional consultation involving over 300 participants across Eastern, Central and Southern Africa region. The goal of the program is to build, sustain and strengthen regional capacity for teaching, learning and practice of impact oriented research for development and scientific progress. Objectives of the program is to produce professionals able to support multi-disciplinary research, with a solid foundation in research methods, and coupled with soft skills. An important additional aim is to promote collaborative networking amongst regional institutions. The program targets scientists involved in research and university graduates interested in a career in research. It is envisioned that graduates will work in national research institutes, university institutions, non-governmental organizations involved in research, and other similar institutions which need research methods support.

The program has a modular approach with one year of course work and one year of attachment, research and thesis. The coursework is structured into six bridging courses for those requiring up-grading, eight core and two elective courses. Candidates must pass all courses before proceeding to second year of study. The second year of study is devoted to internship/research, seminars and thesis. Theses are examined by internal and external examiners and students must be subject to oral examination. At the regional level, Program quality Control is implemented by the Regional Post-Graduate Academic Advisory Board (RPAAB) comprising representatives of the collaborating universities and other research centers in the region. The Jomo Kenyatta University of Agriculture and Technology Senate approved the program in 2009 and it is hosted in the Department of Horticulture.

5.2 Implementation Progress and demand

Students learnt of the program through various avenues but word of mouth, university calendar and advertisement in the dailies were the main means as reported by 64%, 14% and 13.6 % of the respondents respectively. The program opened its doors to the first students in 2009 when 30 applicants from 8 countries were received. A total of 29 students consisting of 18 males and 11 females registered. One year later, the program registered a further 33 students. To date, the program has trained 70 professionals from 12 African countries and a further 80 applicants were received in 2014. Details of the applicants, gender of students registered and countries of origin are provided in table 15. Females are fairly well represented, making up 44% of the total trained.

Table 15: Applicants and students registered in MSc Research Methods as of April 2014.

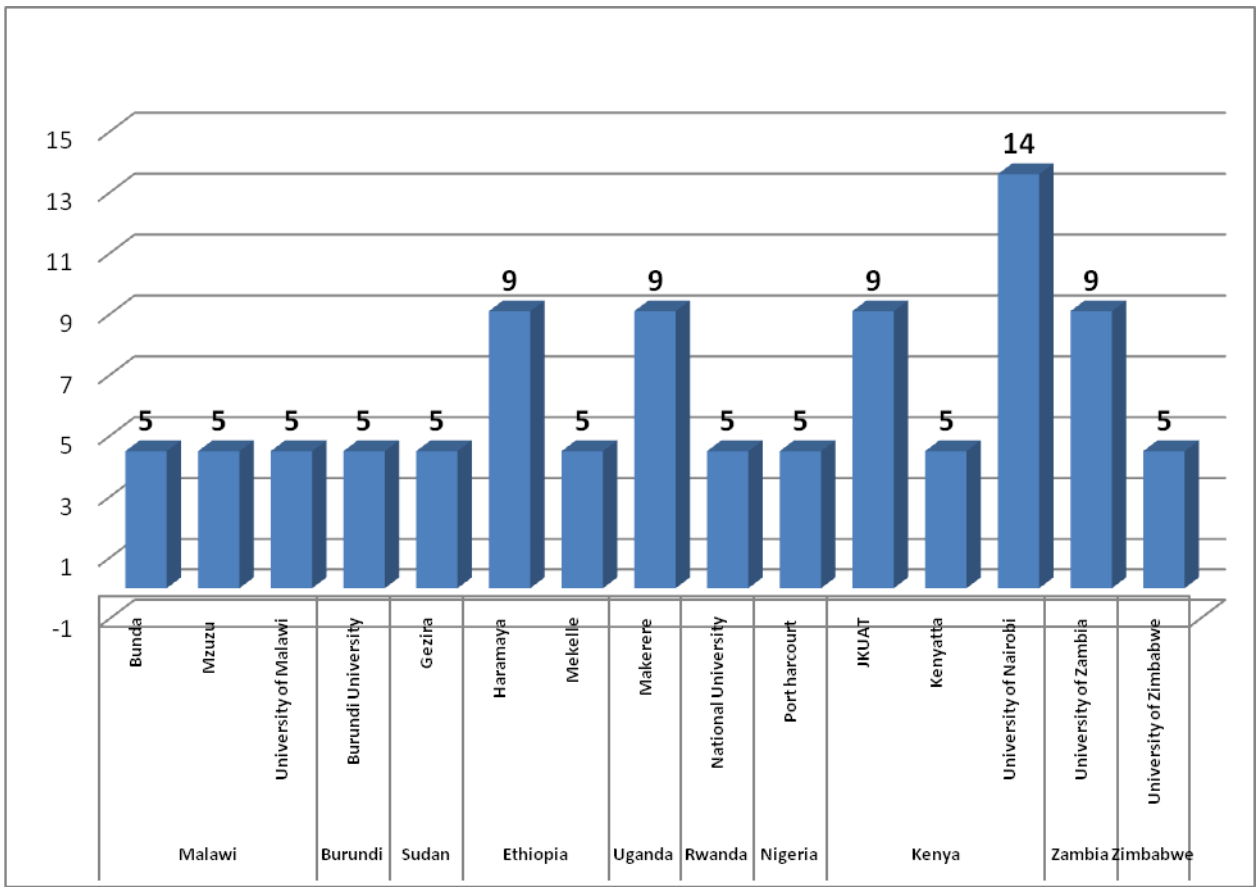
Cohort/Year	Total applicants	Registered Students	Gender of applicants		Students countries of origin	Students Progress
			Male	Female		
1st /2009	30	29	18	11	Kenya, Uganda, Tanzania, Zambia, Ethiopia, Sudan Malawi and Rwanda (39% Kenyans)	27 graduated
2nd /2011	63	33	25	8	Kenya, Uganda, Burundi, Ethiopia, Tanzania, Zambia, Malawi, Rwanda and Zimbabwe (55% Kenyans)	32 graduated
3rd /2012	3	3	0	3	Kenyans	Conducting research
4th /2013	21	5	-	-	Nigeria, Ghana, Burundi, Ethiopia & South Sudan	Completing coursework
Total	**117**	**70**	**43**	**22**	**-**	**59**
5th /2014	80	Not yet	-	-	12 countries	-

5.2.1 Characteristics of the Students registered

Twenty two percent of students representing 31% of the total registered responded to the questionnaire. Most (92%) students are within the 21-39 years age brackets. Only 8% of the students are aged between 40 and 49 years. Thus,

the course is mainly in demand by relatively young professionals. The program has a wide admission base and the students have diverse academic backgrounds at Bachelors degree level. Specialization at undergraduate level include; Bachelors in Agriculture and related disciplines as observed for 64% of respondents and Bachelors in Social Science, Education, Statistics, Geography, Human Nutrition, Environmental Science, Forestry and Wildlife Management, Dental Surgery and Economics as reported for 36%. The Bachelor's degrees were obtained from 15 universities located in 10 African countries as depicted in figure 3.

Figure 3: Universities which awarded the Bachelor's Degrees to 22 students registered in Research Methods program



The program is mainly (77%) attracting employees from the Government Ministries of Education and Technology, Ministry of Agriculture and Livestock, Universities as well as the Private Sector. To undertake studies 36% of students resigned while 27% were accorded study leave. The rest made local arrangements to study and also continue working.

Several factors influenced the graduates' choice of the program. Relevance and need to enhance knowledge and skills demanded in current positions was each reported by 41% of the students. Also, availability of scholarships and program being offered in local institutions was cited by 10% of the students.

5.3 Factors ensuring success and sustainability of the regional program

5.3.1 Unique attributes of the program

Majority (96%) of the students singled out relevance and emphasis on practical components namely; well designed experiments, problem based orientation, data collection and analysis techniques as the most unique attributes of the program. Also, relevance of coursework content was singled out as important by 41% of the students. The importance of regional focus and multi-disciplinary aspects were cited by 18% and 27% of students respectively. In addition, use of modern tools, opportunity to do research in home countries, and attachment aspects were singled out as unique. Details of these aspects as cited by both students and teaching staff are provided in table 16.

Table 16: Unique attributes of Research Methods Program as assessed by students and teaching staff

Attribute	Assessment by students percentage respondents	Assessment by staff percentage respondents
Relevance & practical component	96	80
Regional approach	18	100
Modern tools used in delivery, attachment, conduct research in home countries	36	60
Relevant coursework	41	-
Multi-disciplinary & admits diverse backgrounds	27	60

- Means no score awarded

5.3.2 Curriculum and delivery

5.3.2.1 Curriculum content

Both students and teaching staff assessed the curriculum with regard to content, depth and delivery. Among students, there were mixed feelings and 50%, 32%, 9% and 5% rated the curriculum adequate, broad, narrow and too narrow respectively. Overall students indicated that some aspects of the curriculum were narrow while others were adequate. To broaden scope, students proposed that specialization be done earlier in the course. Most (73%) students rated curriculum depth as adequate while 18% indicated it is deep. A further 9% rated depth as shallow. Overall, 23% of the students rated the curriculum as relevant to their professions to a very great extent and 46% indicated it was to a great extent relevant to their professions. A further 32% rated it relevant to their professions to a moderate extent. All teaching staff rated curriculum adequate in content and depth.

5.3.2.2 Delivery

Both teaching staff and students assessed the program with regard to balance between theoretical and practical components of the curriculum. Delivery relied on use of modern tools, lectures, guest lecturers, practical sessions, individual studies, assignment and attachment in relevant institutions. As indicated by 81% of students and teaching staff, the program has sufficient emphasis on practical aspects. However, most students' (64%) and 40% of teaching staff assessed field exposure as insufficient. Students requested they be attached to research organizations during the long holidays, provision of more statistical software and training on wider range of computer packages.

All students and staff hailed the attachment component of the program. Students attested to having been attached to relevant institutions, confirmed that duration for the attachment was sufficient and they received appropriate support from the host organizations. Most were attached in the regional centres of the International Agricultural Research Centres (IARCs) of the Collaborative Group on International Agricultural Research (CGIARs) namely, African Centre for Technology Studies, CABI Africa, International Centre for Insect Physiology and Ecology, International Livestock Research Institute, International Institute of Tropical Agriculture, International Potato Centre, The World Agro-forestry Centre and World Fish. Others were attached to Bunda College of Agriculture, Jomo Kenyatta University of Technology and Agriculture, Kenya Forestry Research Institute, Kenya Medical Research Institute, and the University of Nairobi. To improve attachment, students had a number of useful proposals. These included the introduction of thesis as opposed to attachment report (entails journal of activities students are involved in as opposed to original research), more support be accorded to students looking for places to do their attachment, options for attachees to visit multiple institutions, and early communication and consultation with students on their areas of research. Overall assessment of the mode of delivery was rated good or very good by 91% of the students. Generally, as attested by 96% of students, there is sufficient emphasis in developing communication skills.

As a result of the training and as attested by 86% of students they are better equipped to play their respective roles in the market place. Discipline depth and core skills have been imparted. Core skills singled out by students include research, communication, team building, Personal Mastery, technical support and organizing workshops and seminars. Details of these skills are provided in table 17.

Table 17: Skills acquired during the training and considered critical for enhanced performance in workplace

Skills	Frequency	Percent
Research Project planning, implementation, monitoring and evaluation Design and writing up of research projects Data collection, data entry, data analysis and data management, critical analysis and review of research documents	22	100
Team work & Networking	4	18
Communication	10	46

Writing and presentation		
Organization workshops and seminars, Personal mastery and technical support in research	10	46

5.3.3 Availability of critical inputs for tertiary education training

The critical inputs for tertiary education training include infrastructure, qualified and motivated faculty and support staff, qualified and motivated students, competent administration and resources needed to facilitate learning. The condition of the core infrastructure at JKUAT was assessed by students and staff involved in teaching the program and also the profile of the teaching staff was obtained. The results are summarized in 5.3.1 and 5.3.2.

5.3.1 Teaching staff

Five teaching staff consisting of four males and one female provided feedback. One staff has a Masters' degree while four have PhD level training. Majority (60%) of the teaching staff were aged between 40 and 49 years while the rest were between 30 and 39. The staff have teaching experience of 6 to 20 years.

5.3.2 Infrastructure capacity of the University

Most students and teaching staff rated the lecture theatres, laboratory and computer facilities as good. Internet access at the university is also good. Most (60%) rated accommodation and transport services as fair. The University has good facilities for tertiary education training as summarized in table 18.

Table 18: Infrastructure capacity of Jomo Kenyatta University of Agriculture and Technology as assessed by students and teaching staff

Infrastructure	**Assessment by students**					**Assessment by teaching staff**				
	Very Good %	Good %	Fair %	Poor %	Very Poor %	Very Good %	Good %	Fair %	Poor %	Very Poor %
Lecture theatres	27	46	18	9	-	-	80	20	-	-
Laboratory	32	36	14	-	5	20	40	20	-	-
Computer facilities	50	41	-	5	-	20	60	20	-	-
Internet access	32	55	5	5	-	-	100	-	-	-
Library	32	55	5	5	-	-	80	20	-	-
Accommodation	18	27	27	5	14	-	20	60	-	-

Sports	27	32	18	5	9	-	-	-	-	-
Transport	-	-	-	-	-	-	-	60	20	-

- Means no score awarded

5.4 Results of running the program

Running the program has resulted in multiple benefits including trained professionals, publications and enhanced networks as detailed below.

1. The program has trained 70 professionals from the region and 59 (84%) have graduated and returned to serve in their respective home countries. All students are equipped with discipline depth in multiple areas, soft skills, equipped to support even multi-disciplinary research and they have also enhanced their networks. Graduates are in demand and a sample of professionals reveal that they are engaged in research institutes and tertiary institutions as detailed in table 19.
2. Publications: Fifty nine theses have been published. Reports generated by the 1st cohort did not contain sufficient information for publication in peer-reviewed journals but subsequent work has. Four students have collectively published 5 articles in peer-reviewed journals.. Also, about 60% of the teaching staff have published at least one article.
3. As a result of teaching the program, teaching staff (80%) have registered benefits in supervision and enhanced networks. Further, the teaching staff enhanced their networks to a small, moderate and great extend as reported by 20%, 40% and 40% of the respondents respectively.
4. The University has also benefited in multiple ways including enhanced infrastructure, accommodation facilities were refurbished, monetary gains accruing from tuition and enhanced partnerships. By virtue of registering students from the region, JKUAT has registered enhanced linkages with the scientists.
5. The hosting of the regional program strengthened JKUAT application and was awarded Pan African University in Basic sciences.

Table 19: Placement of sample graduates of Research Methods Program

Name of graduate	Current Placement	Previous placement if available
Juma Yabeja	International Institute of Tropical Agriculture, Tanzania	-
Richard Wamalwa	Jomo Kenyatta University of Agriculture and	JKUAT

	Technology (JKUAT)	
Steve Macharia	CABI	Unemployed
Verah Akinyi	ICRAF	unemployed
Gabriel Otieno	Unite States International University, Kenya	Barclays Bank
Patrick Likongwe	Fish Node-Malawi	-
Gregory Sikumba	International Institute of Livestock Research, Nairobi	-
Chester Kalinda	Lecturer, Copper Belt University, Zambia	-
Collins Abuga Marita	International Centre for Insect Physiology and Ecology	-
- Means information not available		

5.6 Overall assessment, Issues and Conclusions

There is demand for the program and 70 professionals from 12 African countries have been trained. Graduation rate is high (84) but efforts should be made to ensure all students complete studies within the stipulated two years.. Demand is chiefly attributed to relevance of the program and need to acquire discipline depth and skills needed in current positions. Perhaps owing to the broad admission base, only half the respondents considered curriculum as adequate in scope and this should be taken into account during the forthcoming review. The design of the program is in line with the expectations of the students and 70% rated it relevant to their professions to a great extent. RUFORUM's innovation to include the unique mix of diverse theoretical components, emphasis on practical aspects and attaching students to relevant institutions were hailed as unique attributes of the program. Generally, the program is equipping students with discipline depth and fundamental skills particularly research and soft skills and support in research which is in line with program objectives. Graduates have been absorbed in national and international research institutions and universities. The number of applicants has remained relatively high but due to limited financial support enrollment in the program has declined. Consequently, 40% of applicants have not been trained. Further, in the initial intake, financial support made it possible to engage professionals from University of Zimbabwe, Makerere University in Uganda and 4 universities in Kenya. In the 2nd intake, professionals from 4 universities in Kenya were involved in course delivery. As financial support declined, so did staff mobility and the 3rd and 4th cohorts are mainly being taught by JKUAT staff. This may explain why students recommended that staff be

retooled. Further, students recommended that a PhD program in Research Methods be launched. To meet demand and maintain regional representation, the program requires funding particularly to support students and staff mobility.

6. MASTERS DEGREE IN PLANT BREEDING AND SEED SYSTEMS AT MAKERERE UNIVERSITY

6.1 Implementation progress and demand

Makerere University Senate approved the Masters degree in Plant Breeding and Seed Systems program in 2008 and immediately engaged in creating awareness about the program. Word of mouth and various websites were the most popular means through which 50% and 25% of the students learnt about the programs. The university calendar and advertisements in print media were the sources of information for 25% and 6% of the respondents respectively. Some students learnt about the program from multiple sources. The first cohort of 16 students drawn from five African countries was registered in 2008. A further 19 students from 7 countries registered in 2010. To date, the program has trained 56 professionals from 10 African countries as detailed in table 20.

Table 20: Students registered in MSc Plant Breeding and Seed Systems as of April 2014.

Cohort/Year	Registered Students	Students countries of origin	Students Progress
1st /2008	16	Uganda, Burundi, Rwanda, Sudan and South Sudan (38 % Ugandans)	All graduated within 18-20 months
2nd /2010	19	Kenya, Uganda, Ethiopia, Tanzania, Malawi, Rwanda and Mozambique (55% Ugandans)	50% graduated
3rd /2012	21	6 countries	Data analysis & write up stage
Total	**56**	**-**	**-**
4th /2014	29 (Reporting in August 2014)	Benin, Kenya, Ethiopia, Ghana, Malawi, Rwanda, Tanzania, Uganda and South	Due to commence studies in August

		Sudan	

6.1.1 Characteristics of students registered in the program

Thirty percent of the total students registered responded to the questionnaire. The program is in demand by relatively young professionals within the age brackets of 21 to 29 and 30 to 39 years who make up 24% and 35% of the total. Only 6% of the students are aged between 50 to 59 years. The rest of the students did not disclose their age. All students have academic background in agriculture related fields. Most students (91%) were employed prior to joining the program. The Ministry of Agriculture and Livestock/Forestry and the National Research Institutes in Uganda, Rwanda and Mozambique were the employers of 58% and 25% of the students respectively. Private sector employees make up 13% of the total. To undertake studies, 35% of the students resigned, 29% were accorded study leave while 6% made local arrangements with employers and continued working.

6.1.2 Factors which influenced enrollment in the program

Several factors contributed to the enrollment in the program. Relevance of the program to students' career and potential to impact lives were singled as the most important factors by all students. The short two year duration to complete studies and credibility of the host institution were also core as reported by 18% and 12% of the students respectively. The need to advance knowledge and skills in plant breeding and seed systems as a means to expand career opportunities was singled out by 18% of the total students. Regional focus was also important. Details of these factors are provided in table 21.

Table.21: Factors influencing enrollment in Plant Breeding and Seed Systems program

Factor	Percentage respondents
Short 2 year duration to complete studies	18
Relevance to career and potential to impact lives	100
Regional focus of the program	18
Credibility of the host Institution	12
Need to enhance discipline depth and expand career opportunities	18

6.2 Factors that ensure success and sustainability of the regional program

6.2.1 Unique attributes of the program

As reported by 74% of the students, intensive training within the coursework and research approach coupled with strong emphasis on practical components were singled out as the most important unique attribute of the program. Other attributes highlighted by 24% of the students were the dedication of teaching staff and short 2 year duration to complete studies. Also indicated by a similar proportion of students was the unique component of attaching students in research institutions and seed companies where mentoring and enhancement of practical skills were emphasized. Regional aspect which serves to bring together students from different countries and promote peer learning and establishing networks for future collaborations was hailed by 18% of the students. Also engagement of professionals from diverse institutes as guest lecturers was singled out as unique. Details of these attributes are shown in table 22.

Table 22: Unique attributes of Plant Breeding and Seed Systems program as assessed by students

Attribute	**Frequency**	**Percentage respondents**
Attachment to National Research Institute	4	24
Regional approach	3	18
Short duration to complete studies	2	24
Intensive Training within the Coursework and research approach and emphasis on hands on activities	2	74
Dedicated lecturers	4	24
Engagement of qualified experienced guest lecturers	1	6

6.2.2 Curriculum and delivery

6.2. 2.1 Curriculum content

Curriculum was assessed with regard to content, depth, delivery and balance between theoretical and practical components. Content was rated adequate by most (53%) students. A further 18% and 6% rated content as broad and too broad respectively. The later recommended that courses in crop pest ecology and conservation of plant genetic resources be omitted from the program but these are core for any breeding program. Most students rated depth of coverage as adequate and only 20% indicated depth of coverage was deep.

6.2.2.2 Curriculum delivery

The teaching approaches used were lectures, laboratory hands on and field based activities, interaction with guest

lecturers and attachment in relevant institutions. Assessment of curriculum with regard to balance between theoretical and practical components revealed there is sufficient emphasis on practical aspects as indicated by 85% of the students. There is need to increase field based activities which were assessed as insufficient by 50% of the students. The program has provision for attachment with research organizations and seed companies but only one respondent went on attachment and the experience was rated as relevant but duration was short. The program is employing diverse approaches to promote learning and students rated delivery as good or very good. Means to improve delivery were singled out as incorporating e-learning, increase hands on activities especially for molecular biology, practical activities be handled in smaller groups and to engage more technical and teaching staff in course delivery as suggested by 18% of the students.

As attested by all students, the program is relevant to their professions to a great extent and the training equipped them to effectively play their respective roles in the market place better. Fundamental skills in communication, research and practical, as detailed in table 23 were singled out as the most important to enhance performance in the workplace. Discipline depth was also imparted.

Table 23: Most important skills imparted during the training and will enhance performance

Skills	**Percentage of respondents**
Practical	77
Research Project management, monitoring and evaluation Proposal writing Statistical and analytical skills	100
Communication presentation skills proposal writing Using internet to explore solutions to existing problems	29.41
Leadership, team building and interpersonal	18

6.2.3 Infrastructure capacity of the university as assessed by students

The students assessed the condition of selected infrastructure and services at the university. They rated lecture theatres and laboratories as being in good condition. Also, most students rated computer facilities and internet access as fair. Based on the rating for library services and internet access, there is need to improve the facilities.

Assessment of the infrastructure is summarized in table 24.

Table 24: Infrastructure capacity of the university as assessed by students

Infrastructure	**Assessment by students**				
	Very Good %	Good %	Fair %	Poor %	Very Poor %
Lecture theatres	11.8	35.3	23.5	-	-
Laboratory	-	41.2	23.5	5.9	-
Computer facilities	-	11.8	47.1	11.8	-
Internet access	11.8	29.4	35.3	23.5	-
Library	11.8	17.6	64.7	5.9	-
Accommodation	5.9	35.3	47.1	5.9	5.9
Sports	-	23.5	11.8	29.4	35.3

2.3 Results of running the program

The Program has trained 56 professionals from 10 Africa countries and the graduates have returned to their home countries and are contributing to national development. Further, graduation rate has remained high and students cited commitment of staff as a unique attribute of the program. The graduates are equipped with discipline depth and fundamental skills and are in high demand. In addition, the elite varieties of beans, cassava, sorghum, upland rice, finger millet and groundnuts were developed and are in the process of being released. These will contribute to enhancing nutritional and food security in the region. Also students reported enhanced networks which are being exploited in forging partnerships for regional research collaboration. Makerere University benefitted from income accrued from tuition, enhanced infrastructure especially modern laboratory equipments and refurbished students hostels and staff houses. Over 25 theses have been published by graduates although respondents are yet to publish research findings in peer-reviewed journals.

6.4 Overall assessment, Issues and Conclusions

There is regional demand for the program and to date 56 professionals from 10 African countries have been trained. Graduation rate is relatively high and stands at 74%. Nevertheless, as requested by students, it is important to fast

track thesis processing and enhance supervision of students' to improve graduation rate further. Interesting to note is that students felt isolated in Kabanyolo farm and they recommended that arrangements be put in place for students to participate in seminars, conferences and workshops as members of the wider Makerere University Community. The need to disseminate research findings to more countries was cited by students. Over 83% of the professionals trained are civil servants while the Private sector employees constitute 13% of the total. Students are keen to enhance knowledge and skills needed in current positions, for upward career mobility and to expand career opportunities. Further, the program is relevant to students' profession, curriculum is adequate in content and depth and training is imparting discipline depth and fundamental skills. These factors are likely to enhance attractiveness of the program and contribute to its success and sustainability. The regional aspect also has a bearing on program success. In addition the research being conducted is relevant to the region and focuses on important staples in the region. Elite materials developed have a potential to boost productivity and enhance food and nutritional security in the region and beyond. The program has been running for over 5 years and could benefit from review.

6. CONCLUSIONS

The following conclusions can be drawn from the study:

1. There is demand for all the programs, graduation rate is fairly high but should be enhanced to ensure all students complete studies within the stipulated period. Further, with the exception of Plant Breeding and Seed Systems, enrollment has declined and yet not all admitted applicants have been trained due to financial constraints. Offering certain courses online could increase program access and make it possible to engage resource persons while based in their host institutions.
2. All RUFORUM programs are relevant to students' professions', they impart discipline depth and soft skills and address genuine needs in the region. Also, the programs promote regional networking for future collaboration and expand knowledge pool by having programs taught by experts from diverse institutions in Africa and beyond. However, in each of the universities offering AICM, a proportion of students rated the curriculum narrow and also recommended improvement in delivery.
3. Programs have made significant contribution to human resource capacity by collectively training 236 professionals. A total of 126 professionals have graduated and returned to their home countries where they are playing important roles in national and regional development.
4. So far, 126 theses and several articles have been published in peer–reviewed journals and are an important contribution to the body of knowledge.
5. Running the programs has contributed to improving delivery in the host institutions including wide use of multiple and modern tools and deliberate emphasis on practical aspects. In addition, the programs have catalyzed other desirable changes in host universities. Example, Mekelle University in Ethiopia has shown interest in starting AICM program while University of Nairobi has started a PhD program in AICM. Similarly, as a result of JKUAT running the Research Methods program and involving professionals from Masinde Murilo University in Kenya in teaching, the latter has launched a program in Research Methods.
6. All programs require further support especially in enhancing infrastructure and retooling teaching staff and could also benefit from curricula review and support for staff mobility. Generally, to maintain regional representation in individual training institutions and enhance staff mobility, there is need for substantial funding.
7. The Plant Breeding and Seed Systems program was established along Center of Excellence model. In launching new programs which require heavy investment of specialized equipments, infrastructure and human capital, RUFORUM should adopt the Center of Excellence approach. However, funding is critical for staff mobility and regional representation of students.
8. For the AICM and Research Methods programs, curricula were developed by regional and international

stakeholders, universities adapted the curricula and delivery evolved based on the scenario on the ground. Advantage of having the programs offered in multiple institutions is that human capacity development to serve the region is fast tracked. As individual universities run the regional programs there is need to have harmonized quality assurance mechanisms in place.