

**Sciences
(MUCATS)**

A large gorilla is the central focus, sitting in a lush green forest. It is surrounded by several smaller monkeys, some of which are perched on its back and shoulders. The scene is set in a dense, tropical environment with tall trees and thick foliage.

Forward

This report was written, edited and produced by Makerere University College of Agricultural Sciences (MUCAES) Communications office for the year ending 2011. The report covers major milestones the college registered in the past six years. It focuses on major achievements in form of outputs against the budget allocations to the college and its constituents, challenges and future plans for improvement. It highlights core functions of the college namely teaching, research, innovations and outreach services. It includes the status of the support functions such as human resources and development, the organization and management of the college, physical infrastructure and financial resources among others. The report brings you the College Strategic Direction for the next 10years (2011 to 2021)

The communication office expresses gratitude for the entire staff for the cooperation accorded during the compilation of this report. Special thanks go to the Deputy Principal Prof. Frank Kansiime for the provision of the valuable information and guidance. We also recognize the contribution from respective Deans and Heads of Departments for their input. This report was compiled by Jane Anyango, the Communications Officer and designed by James Kisoro, the Web Administrator.

Overview of the activities

Makerere University College of Agricultural and Environmental Sciences has endeavored to live up to its mission to advance training, knowledge generation and service delivery in order to enhance agricultural development, sustainable natural resource utilization and environmental management.

In the past six years, the college recorded success in research geared towards addressing emerging national and global Agricultural and Environmental issues such as climate change, environmental degradation, waste management, pest and disease control and resilient crops to drought.

The college made significant strides in the area of agro processing technologies and value addition to contribute to the development of Uganda.

The college successfully conducted the teaching of all undergraduate and post graduate programmes as well as industrial trainings for students as a routine practice to turn theories, concepts and techniques into practice through laboratory and field experiments in different parts of the country.

With a highly qualified academic, technical and support staff of incredibly successive history, good teaching and research facilities, the college is in unrivalled position to take leadership in agro processing, nutrition, agricultural mechanization, research, environmental conservation and technology transfer partnerships.

The college was able to attract funding from government for value addition, machinery and structures. External funding from donors was earmarked to strengthen research and training programmes in the college.

Efforts were made to review the curriculum to undertake critical capacity development activities to develop and support emerging issues such as climatic change adaptation agenda for Uganda and the region.

Organization of the report

The overview above highlights the activities that were undertaken in the College of Agricultural and Environmental Sciences followed by the organization of this report.

Section One covers achievements in the college core functions such as management under the collegiate system, teaching and learning, major breakthroughs in research, innovations and outreach activities.

Section Two highlights the support functions of the college which include, the status of the human resources, library services, achievements under the collegiate system of governance, resource mobilization and investments, student support services and financial resources.

Section three places emphasis on the efforts put in place to address cross cutting issues such as Quality Assurance, Gender Mainstreaming, Information and Communication Technologies including Internationalization and Collaborations. Under each section, the report points out the challenges facing the college including proposals and the way forward. The report ends with the college strategic direction for the next 10 years.

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Abbreviations

AGRA	Alliance for Green Revolution in Africa
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BNF	Biological Nitrogen Fixation

CAEC	Centre for Continuing Agricultural Education
CAS	Current Awareness Service
CEO	Chief Executive Office
CRSP	Collaborative Research Support Programme
DABE	Department of Agricultural Bio systems engineering
EIA	Environmental Impact Assessment
EU	European Union
FT&HN	Food Technology and Human Nutrition
GINA	Gender Informed Nutrition and Agriculture
HRD	Human Resource Development
ICT	Information Communication Technology
IPM	Integrated Pest Management
IUCEA	Inter University Council for East Africa
LKPLS	Lake Kivu Pilot Learning Site
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MDGs	Millennium Development Goals
MSc	Master of Science
MUARIK	Makerere University Research Institute Kabanyolo
MUBFS	Makerere University Biological Field Station
MUCAES	Makerere University College of Agricultural and Environmental Sciences
MUIENR	Makerere University Institute of Environment and Natural Resources
NAADS	National Agricultural Advisory Service
NBDBC	National Bio diversity Data Bank Centre
NEMA	National Environmental Management Authority
NEPAD	New Partnership for African Development
NFA	National Forest Authority

NGO	Non Governmental Organization
NORAD	Norwegian Agency for Development
NWSC	National Water and Sewerage Corporation
PhD	Doctor of Philosophy
PI	Principal Investigator
PIBID	Presidential Initiative for Banana Development
PMSS	Personal Mastery Soft Skills
RUFORUM	Regional Universities Forum for Capacity Building in Agriculture
SAS	School of Agricultural Sciences
SCARDA	Strengthening Capacity in Agricultural Research and Development
SDI	Selective Dissemination Information
SFNB	School of Food Technology, Nutrition and Bio engineering
SIDA	Swedish Internal Development Agency
SSA	Sub Saharan Africa
SSACP	Sub Saharan Africa Challenge Programme
STK	Soil Testing Kit
UDSM	University of Dar es Salaam
UGX	Uganda Shillings
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollar
UWA	Uganda Wild Life Authority
VicRes	Lake Victoria Research Initiative

SECTION ONE

CORE FUNCTIONS

1.1 Teaching and Learning

1.1.1 Management under the College system of governance framework

1.1.2 College brief

Makerere University College of Agricultural and Environmental Sciences (MUCAES) is one of the nine colleges of Makerere University. MUCAES was formed by the integration of the former Faculty of Agriculture, the Faculty of Forestry and Nature Conservation, Makerere University Institute of Environment and Natural Resources (MUIENR) and the Department of Geography. The college comprises three schools and eight departments.

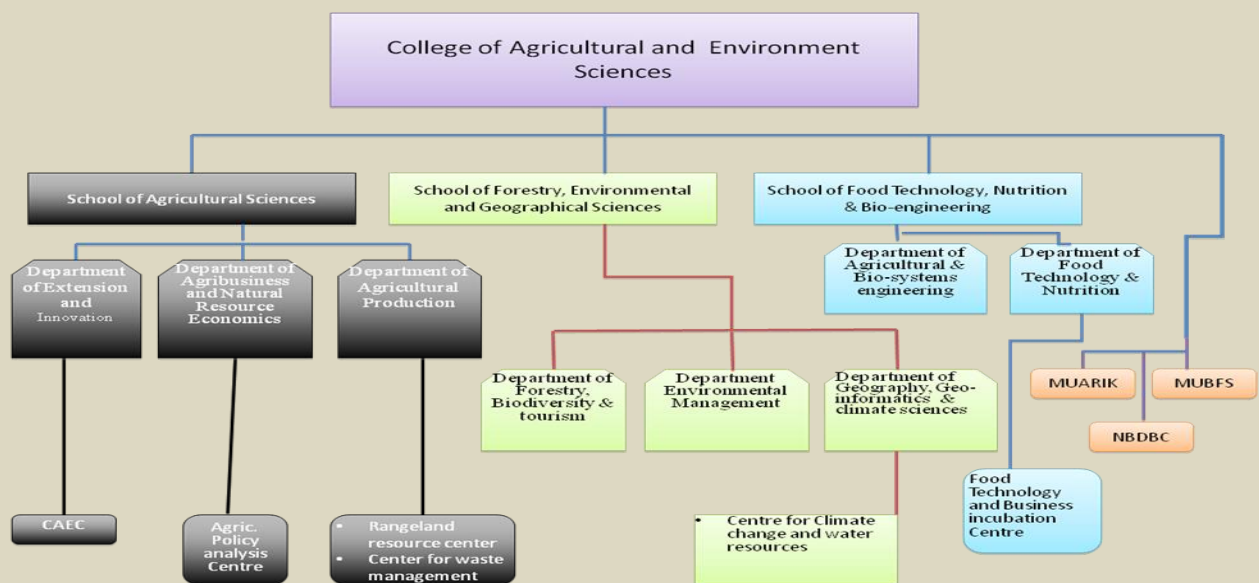
The School of Agricultural Sciences has three departments namely; Agricultural Production, Extension and Innovations studies and Agribusiness and Natural Resources Economics.

The School of Food Technology, Nutrition and Bio engineering is composed of the department of Agricultural and Bio-systems Engineering, Food Technology and Nutrition.

The School of Forestry, Environmental and Geographical Sciences has three departments. These are: Geography, Geo informatics and Climatic Sciences, Forestry, Bio-diversity and Tourism and Environmental Management.

The college has two institutes that handle research. These are Makerere University Research Institute Kabanyolo (MUARIK) and Makerere University Biology Field Station (MUBFS). The college has ten centers serving as a base for knowledge transfer partnerships.

Fig. 1 CAES organizational structure



CAEC= Continuing Agricultural Education Centre; MUARIK = Makerere University Agricultural Research Institute Kabanyolo; MUBFS = Makerere University Biological Field Station; NBDBC = National Biodiversity Data Bank Centre

1.1.3 Vision: The College strategic framework is in response to Makerere University vision; *“To be a leading institution of academic excellence and innovations in Africa”*.

1.1.4 Mission:

“To advance training, knowledge generation and service delivery in order to enhance agricultural development, sustainable natural resource utilization and environmental management.”

1.1.5 Core Values

- Commitment
- Transparency, accountability, honesty and openness
- Collective action, teamwork and shared responsibility
- Ethical conduct and integrity
- Timely delivery of services
- Positive attitude towards change
- Confidence and believing in our abilities
- Respect and trust in one another
- Customer care and clientele services

1.1.6 Leadership and Management of MUCAES









The College is headed by the Ag. Principal assisted by the Deputy Principal. These two ensure that the college runs smoothly while maintaining high academic and research standards. The Principal is the Chief Executive Officer (CEO) as well as the Chief Public Relations Officer of the College.









The Schools are headed by Academic Deans elected from among the Academic Staff at the rank of at least Senior Lecturer, by the academic members of staff and appointed by the University Appointments and Promotions Board.

The Departments are headed by heads and are assigned academic duties by the Dean.

Field Stations (MUBFS) and Research Institutes (MUARIK) are headed by Directors. The institutes are at a level of a school and the director reports to the College Principal. The centers are units within departments specializing in conducting research on particular strategic areas. Coordinators head them.

Fig 2. MUCAES LEADERSHIP AND MANAGEMENT

			
Prof.Samuel Kyamanywa, Principal		Prof. Frank Kansiime, Deputy Principal	
SCHOOL DEANS			
			
Prof. Benard Bashaa sha Agricultural Sciences	Assoc. Prof. Mnason Tweheyo Forestry, Environmental and Geographical Sciences	Prof. John Muyonga Food Technology, Nutrition and bio engineering	
HEADS OF DEPARTMENTS			
School of Agricultural Sciences			
			
Dr. Denis Mpairwe Agricultural production	Assoc. Prof. Johnny Mugisha Agribusiness and Natural Resources Economics	Dr. Paul Kibwika Extensions and Innovation studies	
School of Forestry, Environmental and Geographical Sciences			

		
Assoc. Prof. Philip Nyeko Forestry, Bio diversity and Tourism	Dr. James Okot Okumu Environmental Management	Dr. Fredrick Tumwine Geography, Geo Informatics and Climatic Sciences
School of Food Science, Nutrition and Bio engineering		
		
Prof. William Kyamuhangire Agricultural Bio systems engineering	Assoc. Prof. Archileo Kaaya Food Technology and Human Nutrition	
HEADS OF INSTITUTES		
		
Assoc. Prof. Tenywa Moses (Director MUARIK)	Dr. Kabi Fred Head CAEC	Dr. Lwanga Jeremiah Head MUBFS

1.1.6.1 Management of MUCAES

The college is managed the academic and administrative boards. In addition the student council was also established to coordinate student activities.

1.1.6.2 The College Academic Board

All important Academic matters of the College (details of undergraduate courses, syllabi, examinations, postgraduate studies, etc) are discussed and decided upon by the College Academic Board, which is composed of the Principal as the Chairperson, the Deputy Principal, the Deans of the three Schools, the Heads of the 8 Departments, the Directors (MUARIK, MUBFS), Two student representatives (Under and post-graduates), A representative of the Senate, Coordinators of Centres, the College Librarian, Two Senior members of the Academic staff and the College Registrar.

The College Academic Board has four committees:-

- (i) ***Examinations, Irregularities and Appeals Committee***: Members are; Deputy Principal, College Registrar and Deans of CAES.
- (ii) ***Academic Programs and Library Committee***: Members are; Deputy Principal, College Registrar, Deans, Two representatives from Committee of each School and Heads of Departments.
- (iii) ***Quality Assurance Committee***: Members are Deputy Principal, College Registrar, Deans, Representative from the respective School Committees and Heads of Departments.
- (iv) ***Graduate Studies and Research Committee***: Members are; Deputy Principal, College Registrar, Deans, Heads of Departments and 2 people from Higher Degrees.

1.1.6.3 College Administrative Board:

All important issues of administration are discussed by the College Administrative Board. The board consists of the Principal; Deputy Principal; College Bursar; College Registrar; Dean of Students; Human Resource Manager; A student Representative; A representative of Senior Administrative Staff; Two representatives of Academic Staff. The College Administrative Board has committees responsible for Finance, Planning, Estates and Security and Students Welfare.

In addition, there are other two independent committees:-

- (1) **Establishment, Appointment and Promotions Committee** responsible for appointments and promotions in the college. It is constituted by the Principal, Deputy Principal, Two elected members by Academic Board, Two Senior Members of Academic Staff at a rank of Associate Professor and above, one representative of Senior Administrative Staff and One representative of Support Staff.
- (2) The College has a **Contracts Committee**, which is a Subcommittee of the University's Contracts Committee.

1.1.6.4 The students Council

MUCAES students council was constituted as embodied in the Makerere University Act 1970 (as amended by Decree No.1 of 1975). Each of the three schools is represented by student leaders on the council to create a sense of responsibility, belonging and representation of student affairs and issues. These leaders serve as link between students and staff.

1.1.6.4.1 Main objectives of the student council:

- Foster unity among students
- Stimulate and promote academic and social affairs
- Create, source and solicit for funds to run student affairs and
- Promote cooperation between students and the staff.

1.1.6.4.2 Organs of the students Council

The student council is composed of three organs;

The general Assembly: Composed of the whole student body.

The Council Executive: Made up of fourteen members: (The President moving to the final year, vice president, General secretary, Finance secretary, organising secretary, Project coordinator, Academic Affairs Secretary, Information secretary, Secretary for women affairs, the speaker, presidents of the three schools, representative of government students and representative of private students).

1.1.6.4.3 Student Council Committees

There are six committees which were appointed by the executive council. They include the Academic Affairs committee, Editorial, Information committee, Disciplinary, Administrative and Finance committees.

1.1.7 Leadership and Management challenges, proposals and way forward

a) How to develop a visionary and result oriented management system for MUCAES

The College recognizes a challenge of having leaders at all levels with good management competence. There is need to introduce a basic management training programme for the current research managers/leaders at all levels and put in place a system for developing and nurturing future leaders.

The opportunity: Addressing this issue can best be done at University level especially building on programmes run by Directorate of Research. The College can also develop mandatory training programmes for its leadership. Some of the skills needed for managers/leaders include: basic management skills (human resource and financial management skills), team building, staff motivation and performance appraisals, strategic planning, participatory monitoring and evaluation of programmes and projects, public relations, lobbying and advocacy.

b) How to effectively market the college to different clientele

One of the major weaknesses of the College is the inability to proactively market itself as a credible service provider. It is important that the College urgently develops a strategy to market its products including its training programmes and portray itself as a credible institution that has a lot to offer to different clientele.

The opportunity: Career guidance in secondary schools to create awareness of opportunities for its academic programmes among potential entrants is one way of advocacy. But a more comprehensive strategy is needed to market the College to a wide range of clientele including the politicians/policy makers.

1.1.8 Student Enrolment

The college has a student population of about 3700 students. Of these about 3000 are undergraduates, 703 are masters and 83 are taking PhDs. In addition the Department of Geography services about 3822 students from other units. The college recorded a rise in the number of student's admission every year. This is attributed to increased number of enrolments in primary and secondary school increasing demand for university enrolment.

1.1.8.1 Current Student Enrolment in the Units that formed MUCAES

Unit	Bachelors	Masters	PhD	Diplomas	Total
Faculty of Forestry & Nature Conservn.	212	64	06	0	282
Faculty of Agriculture	1,200	449	55	0	1704
MUIENR	200	180	18	0	398
Department of Geography	1278	10	4	0	1278
Geography (Service to other units)	3,822	0	0	0	3,822
TOTAL	6,772	703	83	0	7,544

1.1.8.2 Student population by degree programmes at MUCAES.

Undergraduate prog	Annual population		Postgraduate	Annual population	
	Capacity	Admitted		Capacity	Admitted
School of Agricultural Sciences					
BSc. Agriculture	60	55	MSc. Crop science	40	30
BSc. Land use & Mgt	60	50	MSc. Animal Science	10	7
Bachelor of Agric.& Rural Innovations	60	52	MSc Soil Science	10	17
			MSc. Agric Extension	17	10
Bachelor of Agribusiness Management	80	50	MSc. Plant breed & seed systems	10	16
B.Sc. Horticulture	30	24	MSc. Agricultural Economics	15	10
			Master of Applied & Agric. Economics	18	10
			Master of Agribusiness	18	10
			PhD	5	5
			PhD Plant Breed & Seed System	10	22

Sub-total	290	231		153	137
School of Forestry Environmental and Geographical Sciences					
Bachelor of Forestry	40	30	M.Sc. Land-use & Regional development	30	20
BSc. Community Forestry	27	20	M.Sc. Forestry	15	5
BSc Social and Entrepreneurial Forestry	30	27	M.Sc . Agro forestry		5
BSc Conservation For. & Production Technology	30	27	PhD in Forestry	5	3
BSc. Environmental Sciences	80	65	M.Sc. Environ. & Nat. Res.	50	30
BSc Wood science and Technology	14	14	PhD Environmental Science	13	10
			Post Grad. Dip.- Impact assessment	20	5
			Post Grad. Dip.- Information Management	20	5
B.Sc. Meteorology			M.A Geography		
Sub-total	221	183		143	83
School of Food Technology, Nutrition and Bioengineering					
B.Sc. Food Sci. & Technology	40	30	M.Sc. Food Science	10	5
B.Sc. Human Nutrition	20	20	M.Sc. Agricultural Engineering	5	-
B.Sc. Food Processing Tech.	28	20	M.Sc. Applied Human Nutrition	20	10
B.Sc. Agricultural Engineering	28	20	PhD	10	3
Sub-total	116	90		34	18
Sub total	80	55		143	66
Grant Total	591	469		439	286

1.1.8.3 Student population projection in the next 10 years

	2010/11	2011/12	2012/13	2014/15	2015/16	2016/17	2017/18	2015/16	2016/17	2017/18
SCHOOL OF AGRICULTURAL SCIENCES										
UG	893	1373	1853	2333	2813	3293	3773	4253	4733	5213
PG	456	557	658	759	860	961	1062	1163	1264	1365
SCHOOL OF FORESTRY, ENVIROMENTAL & GEOGRAPHICAL SCIENCES										
UG	1690	2366	3042	3718	4394	5070	5746	6422	7098	7774
PG	268	348	428	508	588	668	748	828	908	988
SCHOOL OF FOOD TECHNOLOGY, NUTTRITION & BIO ENGINEERING										
UG	259	362	1038	1714	2390	3066	3742	4418	5094	5770
PG	48	67	147	227	307	387	467	547	627	707
Total	3614	5013	7166	9259	11352	13445	15538	17631	19724	21817

UG = Under graduate; PG = Post graduate

1.1.9 Programmes offered

The college successfully conducted undergraduate and post graduate programmes approved by the National Council for Higher Education (NCHE). A total of 17 undergraduate, 18 Masters and 10 PhD programmes are offered covering a number of disciplines; Agriculture, Food Science, Forestry, Environment, Natural Resources, Geography and emerging themes like Climate Change and Biodiversity Management.

Summary of the Academic programmes offered at MUCAES

Undergraduate programmes	Post graduate programmes
Agricultural Production	
B. Sc. Horticulture, B. Sc. Agriculture, B. Sc Land Use & Management	M. Sc Crop Science, M. Sc Animal Science, M. Sc Soil Science, M. Sc. Plant Breeding and Seed Systems, M. Sc. Land Use and Rural Development, PhD Plant Breeding Biotechnology, PGD in Animal Production
Agribusiness and Natural Resource Economics (ANRE)	
Bachelor of Agribusiness Management	M. Sc. in Agricultural and Applied Economics, Master of Agribusiness management, MSc. in Agricultural Economics, PhD in Agricultural Economics
Extension and Innovation Studies (EI)	

Bachelor of Agriculture and Rural Innovations, Bachelor of Agricultural Extension Education, Bachelor of Social and Entrepreneurial Forestry	M. Sc. Agro forestry, M. Sc Agricultural Extension/Education, PhD in Agriculture and Rural Innovations (ARI), PhD in Agricultural Extension Education
Dept. of Forestry Biodiversity and Tourism (FB&T)	
Bachelor of Tourism, B.Sc. Conservation Forestry & Products Technology , Bachelor of Social and Entrepreneurial Forestry	M.Sc. Forestry PhD in Forestry
Environmental Management (EM)	
Bachelor of Environmental Sciences	M. Sc Environment and Natural Resources, PGD in EIA, PhD in Environment & Natural Resources, Short courses in EIA and Environmental Audit
Geography Geo-informatics and Climatic Sciences (GCS)	
B. Sc. Meteorology, Geography as a service subject	Master of Arts in Geography, PGD in Meteorology, PGD Environmental Information Management, PhD Geography
Agricultural & Bio-systems Engineering (ABE)	
B. Sc. Agricultural Engineering, B.Sc. Conservation Forestry, B.Sc. in Wood Technology , Supports Food Engineering for B.Sc. in Food Science and Technology Supports Wood Science and Technology courses in Forestry	M.Sc. Agricultural Engineering
Food Technology and Human Nutrition (FT&HN)	
B.Sc. Food Science and Technology, B. Sc. in Human Nutrition	M.Sc. in Food Science and Technology, MSc. in Human Nutrition, PhD in Food Science and Technology, PhD in Human Nutrition

1.1.10 Training for other institutions

The college has supported the strengthening of human resources of other Agricultural Training Colleges in the country. Support has been rendered to the Diploma training colleges (Bukalasa, Nyabyeya and formerly Arapai Agricultural Colleges). Makerere has partnered with these colleges to upgrade their staff to BSc level through joint partnerships. To date the college is training staff from other universities and colleges.

1.1.11 Regional training and short courses

Makerere University is a member of various national, regional, continental and global organizations that promote training research and development activities. These organizations include the Association of African Universities, Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), African Economics Consortium and diverse multi and bilateral partnerships within and outside of Africa

The College, has been identified as a the regional *centre of leadership* for MSc and PhD training in Plant Breeding and Biotech, Seed systems, Agricultural and Applied Economics, and Agricultural Extension and Education and novel approaches in teaching and farmer participatory R&D. All these programmes have a foreign student population of about 50%. The students come from Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Sudan, Tanzania, Zambia, Liberia and Zimbabwe. The college has also participated in Design of Strengthening Capacity in Agricultural Research and Development (SCARDA).

1.1 12 Short courses

The School of Food Technology, Nutrition and Bioengineering has been offering short courses indicated below for the last five years:

- Certificate in Food Safety and Quality Assurance. This program was supported by the United Nations Development Organization. Trainees were mainly drawn from central and local governments and included people involved in the enforcement of food safety regulations.
- Certificate in Fruit and vegetable processing: This course has been offered twice in the past 2 years. The second offering was sponsored by the Ministry of Education while the first training was paid for by participants. About 80 participants were trained in the 2 groups.
- Certificate in Dairy Processing: This course was offered in 2010 and was sponsored by the Ministry of Education. About 40 participants were trained.
- Certificate in Baking and Cereals Technology: This course was also supported by the Ministry of Education and about 40 people were trained.
- Certificate in Quality Management for Grains: This program was organized in partnership with Partnership Worldwide, a non-governmental organization.
- Certificate in Entrepreneurship: A total of 240 people, mainly fresh graduates and students were trained in entrepreneurship. This program was supported by the Innovations at Makerere program and implemented in partnership with the Makerere University Business School Entrepreneurship Centre.

1.1.13 Newly developed courses

In response to demand for human resources needs and challenges, the University through former units that constitute MUCAES developed diverse training programmes. These programmes reflect response by Makerere University in part to the Government of Uganda Education sector strategic plan (2004 – 2015) which advocates for client responsiveness. As a college, these new programmes reflect a robust and committed college set to make a significant contribution to national and regional development. The programmes are summarized below:

Programmes developed over the last six years (2004-2011)

1.BSc. Agricultural Land Use Management	10. BSc Food Processing Technology
2. Bachelor of Agricultural and Rural Innovations	11. PGD in animal sciences
3. Bachelor of Agribusiness Management	12. Master Agricultural and Applied Econ.
4. B.Sc. Horticulture	13. Master of Agribusiness
5. BSc. Community Forestry	14. MSc Applied Human Nutrition
6.BSc Social and Entrepreneurship in Forestry	15. MSc. land-use & regional development
7. BSc Conservation Forestry and Products Techn	16. MSc Plant Breeding and biotechnology
8. BSc Wood Science and Technology	17. PhD Plant Breeding and biotechnology
9. BSc Human Nutrition	18. PhD in Agricultural and Rural Innovation

Plans are under way to start other graduate programs in the fields of Disaster Risk Reduction and Management, Tourism Management, Urban Planning and Management and Integrated Water Resources Management, Waste Utilization and management, Water and Irrigation and a PGD in Environment & Natural Resources. Consultations are going on to have a master's programme in Climate Change Science to address this global challenge.

1.1.14 Academic performance

Our students have continually improved academically as manifested by high completion rates and first class degrees. In the 62nd graduation held on 16th January 2012 January, 8 students got PhDs, 1 PGD, 73 were awarded Masters while over 360 graduated with Bachelors degrees. We are grateful to our staff for their continued dedication, innovativeness and desire to continue upgrading that have greatly improved the performance of our graduates.

1.1.15 Industrial training

In addition to classroom teaching and learning, the college offered field based practical training activities including on-job internship for different programmes in various industries

and institutions across the country. As a routine practice, we strive to turn theories, concepts and techniques into practice through laboratory and field experiments under the guidance of experienced professionals. This provided an opportunity for students to get contacts with potential employers who also benefit from the students technical and labour contributions to the work environment.

The internship has demonstrated tremendous benefits in the learning process providing new direction for training in agriculture, agro processing and environmental conservation. Several Field days and dissemination workshops were held. The results of this kind of training have had policy implications for adoption to improve agricultural and environmental conservation in the country.

1.1.16 Innovations in teaching, learning and research

Over the years, MUCAES has transformed its R&D agenda for client-responsiveness and development impact. The programmes implemented are those that promote farmer participatory R&D, integrating the University into Uganda's rural transformation processes. Pioneering R&D in biotechnology and new/or contemporary R&D approaches such as integrated pest and disease management have been undertaken; linking producers to markets as well as incubation of innovation for market products have been undertaken. Major research and innovation are highlighted the next sub section.

1.2 Research and Innovations

1.2.1.1 Establishment of the Food Technology and Business Incubation Centre (FTBIC)

The FTBIC was established at the School of Food Technology, Nutrition and Bio engineering to develop new food value addition businesses based on research conducted at Makerere University to support the University to produce job creators. With the financial support of 4.5bn UGX, from government through the Presidential Initiative for Value addition, the centre procured equipment including Mobile fruit processor to be utilized for collection and processing of fruit to juice concentrates in the communities and Twin screw extruder for processing of starchy staples to ready-to-use products. To boost meat and milk processing, meat processing and dairy lines have been procured.

To support the centre community outreach activities and engagements, the centre has acquired a 30 seater mini bus, a Utility double cabin pickup and a Refrigerated truck to maintain a cold chain during distribution. The centre has also ordered for machinery for processing breakfast cereals like corn flakes and is in the process of acquiring a mobile fruit and vegetable processing plant to facilitate processing of fruits from production areas.

The incubatees (mostly fresh graduates) were offered access to processing facilities and provided with technical support to boost their capacity in production, marketing and business management. This has led to the development of new food value addition enterprises. So far, 12 agro processing enterprises have been set up. Products such as Omulondo liquor, canned

Katunkuma, lemon grass flavored tea, nutrient dense cookies, amarathus products, are in leading retail outlets in the country, contributing to import substitution.

116 direct jobs in production and marketing of value added foods and another 400 jobs for raw material suppliers have been created. It has trained over 500 youths in the areas of fruit and vegetable processing, dairy processing, cereal processing and entrepreneurship. The FTBIC targets to create 20 new agro-processing enterprises and 5000 jobs annually by 2014.

1.2.1.2 Constructed Wetland Technology for Waste water Treatment

Makerere University in collaboration with University of Dar es Salaam through the BIO-EARN (East African Regional Network for Biotechnology and Bio-Policy) with funding from SIDA constructed a wetland to treat wastewater generated by Seeta High School Mukono. The project cost 25, 000 US Dollars with 10,000 US Dollars contributed by the school. The school had already been given warnings by NEMA to treat its wastewater before discharging it into the surrounding environment. To alleviate the problem scientists from Mak (Prof. Frank Kansime; PI, Dr Charles Niwagaba (Engineer) and Omara John (Research Assistant) and University of Dar es salam (UDSM) constructed the wetland, monitored it and it is now fully functional, with waste water from the school flowing into a septic tank and the effluent is discharged into the Constructed Wetland.

1.2.1.3 Research aimed at producing drought and disease resistant Cowpea varieties

The college is developing five improved high yielding and pest resistant Cowpea varieties for Ugandan conditions. The five year cowpea Improvement project commenced in 2009 is funded by the McKnight Foundations titled “*Improving Food security through participatory Development of high yielding and pests resistant cowpea varieties in Uganda*”. The total cost of the project is \$300,000 (US\$690 million). The project is headed by Dr. Jennifer Bisikwa of the Department of Agricultural Production.

The goal of this project is to increase cowpea production, income and nutrition of resource poor farmers in Uganda through participatory development of improved high yielding, pest and disease resistant varieties. So far three graduates, one at PhD and two at Masters have been recruited to the school of Agricultural Sciences sponsored by this project.

The project has identified, assembled and tested promising varieties for Ugandan conditions. These are ACCWC28, ACCWC35B, ACCWC35C, ACCWC39 and ACCNE 44 but more work is being done to establish their resistance to major pests and diseases before they can be disseminated back to the farmers for adoption.

1.2.1.4 Research aimed at producing HIV/AIDS Drugs from Medicinal Plants

Makerere University under the umbrella organization of the Inter-University Council of East Africa embarked on a new project aimed at producing drugs to alleviate HIV/AIDS in East

Africa. The three year project titled “*Value chain analysis and development of plant-derived medicinal products for management of HIV/AIDS in the face of climate change in the Lake Victoria basin*” is supported by the Swedish International Development Cooperation Agency (SIDA) and is implemented by the Inter-University Council for East Africa (IUCEA), through the Lake Victoria Research Initiative (VicRes). The project has a budget of USD 600,000.

This project will determine and evaluate plants to produce new anti-HIV therapies and because traditional medicinal plants are threatened, the project will also research, demonstrate and promote plant conservation. This is a regional project with partnering Universities in Uganda, Kenya, Rwanda and Burundi.

The project is headed by Prof. Philip Aduma of Maseno, Kenya. Professor John Tabuti, an ethnobotanist, of Makerere University College of Agricultural and Environmental Sciences is leading the Ugandan team. The research is being conducted in five districts of Mpigi, Kaliro, Palisa, Mukono and Kampala where traditional healers have enrolled.

1.2.1.5 Production of new soybean varieties resistant to Soybean rust disease

Soybean production in Uganda had come to a standstill because of the outbreak of soybean leaf rust disease which was devastating soybean crop throughout the country. To reduce the problem, the School of Agricultural Sciences through its Soybean breeding program, bred, developed and released four improved soybean varieties that are high yielding, early maturing (95-105days) and resistant to leaf rust diseases for commercial production in Uganda. The soybean breeding work has been supported by the Vegetable oil development project of the Ministry of Agriculture Animal Industry and Fisheries, and the Alliance for the Green Revolution in Africa (AGRA). The lead researcher behind the new varieties is Dr. Phinehas Tukamuhabwa, Department of Agricultural Production.

The new varieties are Maksoy 1N, Maksoy 2N, Maksoy 3N and Namsoy 4M released in between 2004 and 2010. As a result of these release, soybean yield has gone up (2000-3000kg per hectare) providing an affordable source of protein for the country’s population. Currently, all the soybean varieties grown in this country are Maksoy lines and have been recommended in Nigeria and other countries in Africa by AGRA. These varieties grow well wherever maize is grown, and don’t demand any extra attention compared to the old varieties. The crop can be grown in both the first and second seasons of the year. This has improved farmer’s income, food security and reduced poverty at rural households. Multi field trials to scale up the production of new soya bean varieties with multiple attributes are being conducted in all regions of the country.

1.2.1.6 New Tomato Variety MT 56 Developed

The School of Agricultural Sciences screened a Tomato Variety MT56 which is resistant to Bacterial wilt (caused by *Ralstonia solanacearum*) which is one of the most serious diseases of Tomatoes without easy means of controlling. Most farmers in the areas around the central region were abandoning tomato production because of this disease. The new tomato variety is resistant to the bacterial wilt disease and is high yielding. Professor Emeritus Rubaihayo of the Department of Agricultural Production is working on getting the variety officially registered and released by the Variety release committee. Some of the farmers groups in Busukuma - Wakiso and Mukono districts have already started growing the variety.

1.2.1.7 Biotechnology Laboratory producing protocols for Banana Tissue Culture

The School of Agricultural Sciences established a Biotechnology laboratory which has produced many protocols (recipes) for banana tissue culture production. Most of the protocols used in tissue culture banana in the region were developed by the Department of Crop Science. Tissue culture is the growing of plants from single cells. This technique has enabled the production of clean planting material (without diseases) and their quick multiplication. Use of clean planting materials has resulted in over 40% increase in yield of most of the vegetatively propagated plants like cassava, sweet potato and banana.

The school has also developed molecular diagnostic tools for a number of diseases including banana bacterial wilt, sweet potato viral disease, cassava brown streak, passion fruit woodiness virus etc. Correct diagnosis is always the first step in successful management of any disease problem.

1.2.1.8 Generation of data to enhance understanding and harnessing of nature

The college carried out research and training in environment and natural resources through its laboratories (Molecular Genetics Laboratory, Water and Wetlands Research Laboratory and Geographical Information Systems Laboratory). Data generated improved the understanding of functioning of nature and how nature can be harnessed to improve livelihoods.

In the Molecular Genetics Laboratory, molecular population genetic studies were done on a wide range of species and their pathogens. The purpose was to understand processes that are responsible for the generation and maintenance of the high biological resources in Uganda and Africa in general. It is through understanding these processes that we are able to design appropriate conservation strategies.

Species such as the Mountain Gorilla, Uganda Kob, Buffalo, Hippo, Hearbeast, Bush pig, Giant forest hog, Topi etc were found to harbor appreciable levels of genetic diversity with no apparent threat to their survival resulting from genetic adaptation. Results so far reveal unexpectedly different patterns of genetic divergence with wide ranging implications for conservation and management. In the last 10 years, over 40 publications have been generated and are being used to make management decisions and the trend has continued in recent years.

1.2.1. 9. Research on water and wetlands aimed at influencing policy

In the water and wetlands research laboratory, research has been carried out on water and wetlands resources with the focus on assessment and monitoring. MUCAES has been able to demonstrate the importance of wetlands in water treatment and pollution control. Results have influenced policy by demonstrating the importance of urban wetlands like Nakivubo wetland. The Ministry of Water and Environment is in the process of gazetting this wetland so that it can be used sustainably to continue providing waste water treatment function. This wetland provides waste water treatment function estimated at over 1 million US dollars per annum.

Studies on the potential of different plants in pollution and flood control have also been done. We worked closely with government institutions like, the Wetlands Management Department in the Ministry of Water and Environment, the National Environment Management Authority, National Water and Sewerage Corporation and the Directorate of Water Resources Management. The college trained 4 PhDs (2 from the Islamic University in Mbale, One from Gulu University and one from Makerere University) and 10 MSc students in that area.

The college was also involved in identifying, promoting and conserving useful plant species (ethnobotany) to which value could be added in order to create opportunities of benefit sharing by identifying markets for priority species. Results show that many plants are known to be useful by local communities. It is also clear that many of these useful plants, especially woody species, are threatened by over-exploitation, habitat conversion and habitat degradation. In collaboration with Tropical Aloe lands and some other NGOs we have started projects to study the biology of priority woody species with a view to understanding their germination and early seedling establishment behavior to contribute to their domestication.

1.2.1.10 Developing Inoculants for Pine Tree Seedlings in Uganda

Chief Investigator Prof. Majaliwa J.G. with a team of four scientists: Sebuliba E. Prof. Tweheyo Mnason, Dr. Babweteera Fred and Prof. Nyeko Phillip in partnership with commercial tree planters and Uganda Timber Growers Association embarked on a project to improve pine production for commercial purposes focusing on improving pine tree seedlings. Although many tree nurseries for farmers have been set up by NFA & private individuals to support commercial tree planting, farmers are challenged by Quality assurance of material used that are pest and disease free plantlets, the volume of soils used for the seedlings excavated from pine forests (mycorrhizal inoculum), transport costs and the mycorrhiza content in the excavated soil.

The project aims at developing mycorrhizal inoculant products for pine tree seedlings, characterize mycorrhiza diversity in pine plantations, evaluate the performance through greenhouse/field and identify suitable packaging and inoculation methods. By the end of this project the school expects to put in place improved method of plant inoculation, reduced bulkiness of inoculants and pathogen transmission, improved seedling quality and plant growth with cost effective process for seedling inoculation.

Field trials are promising. The application of isolates improved the appearance and vigor of initially nutrient deficient pine seedlings. Secondly the inoculated plantlets do not show any signs of nutrient deficiency.

1.2.1.11 Research aimed at improving Apple Production in Kabale district

The School of Forestry is carrying out research in Kabale district to improve on apple production. The research team led Dr. Fred Babweteere seeks to address the challenge of rooting. The biggest challenge apple producers face is lack of seedlings with sufficient roots that can support plants. Originally seeds were obtained from Germany but this research seeks to domesticate the production and multiplication of apple seedlings with sufficient roots in Uganda.

1.2.1.12 Four New books for Secondary Schools published

The long serving Prof. Elly N Sabiiti of the Department of Agricultural Production, in 2010 published three books on Agriculture. The books were delivered by the Fountain Publishers Uganda and are available in various bookshops like Aristoc, University Bookshop for children taking Agriculture in Secondary schools and colleges. The official launch is being organized by Fountain Publishers with the Office of the DVC (AA). The books have good illustrations, are simple to follow, readable by those interested in agriculture and can be used as references for both the students and teachers.

Titles of the books.

1. Agriculture: Principles and Practices for Secondary Schools and Colleges: Crop Production. E N Sabiiti, S Katurumunda and A Kitakwebwa (2010).
2. Agriculture: Principles and Practices for Secondary Schools and Colleges: Animal production. E N Sabiiti, S Katurumunda and A Kitakwebwa (2010). pp 278
3. Agriculture: Principles and Practices for Secondary Schools and Colleges: Farm Structures, Machinery and Agricultural Economics E N Sabiiti, S Katurumunda and A Kitakwebwa. 2010. pp 297

Another book for Geography has been published. The book entitled, “*A contemporary Geography of Uganda*” is the first of its kind since 1975. Published in 2010 by Mkuki na Nyota Publishers in Dar es salaam Tanzania, the book is meant for Geography paper III for A-level and third year students at university studying Geography of Uganda. The book was authored by different experts. It holds an unrivalled position with the most current data like voting patterns, political landscape, weather forecasting, soils and oil degradation in Uganda. Writers include, Dr Tumwine Fredrick, Prof. Mukadasi Buyinza and Prof. Jocky Nyakaana of the school of Forestry and Bob Nakileza. These books have beefed up the reference materials for Agriculture and Geography in learning institutions.

1.2.1.13 Water purification technology using plant seeds

MUCAES embarked on another innovation on water treatment using Moringa, Jack fruit and Java Plum (Jambula) seeds. The two year research that started in 2010 is aimed at addressing the problem of clean and safe drinking water for Uganda's rural and peri-urban populations. The research is lead by Dr. Okot Okumu, head Department of Environmental Management and is being carried out from the Water Resources Laboratory at the Department. Moringa has been proved for water treatment elsewhere in Masaka and Mozambique but our research on Jack Fruit and Java plum is the first of its kind.

The innovation comes as an alternative to the National Water and Sewage Corporation (NWSC) which raises concerns of limited coverage. Advantages associated with this technology include the availability of Plant materials in many homesteads making it cheap and affordable. They are also environmentally safe because they can decompose. The technology is to be tested for another year to ensure its safety after which researchers will come up with recommendations on the usage and packaging.

1.2.1.14 Soil Testing Kit and Bio fertilizer developed

The college succeeded in assembling some testing reagents that can evaluate soil nutrients and also developed a Nitrogen Bio- fertilizer to boost production of leguminous crops in Uganda and the region. The high cost of mineral fertilizers and access to technical services and knowledge on soil health are among the major challenges hampering agricultural productivity. In addition, Nitrogen has been widely documented as one of the major nutrients limiting crop production in Uganda.

In response, the Department of Agricultural Production has been carrying out research for over a decade in the Biological Nitrogen Fixation Laboratory (BNF) that was established with the help of NifTAL Project/BNF Technologies for International Development College of Tropical Agriculture and Human Resources University Hawaii with the support from USAID. The activities were spearheaded by the former Dean of the then Faculty of Agriculture, Prof Bekunda Mateete, Mr. Nkwine Charles and Gadi Gumisiriza of MAAIF who domesticated the technologies at Makerere. NifTAL seconded personnel to set up the laboratory and helped in conducting BNF technology workshops including field demonstrations in Bushenyi, Mityana and Northern Uganda.

The college is proud to have recorded success from this laboratory by developing a *Soil Testing Kit and a Bio - fertilizer* to contribute towards solving the problem of food insecurity.

The Soil Testing Kit (STK)

The Soil Testing Kit (STK) is an assembly of testing reagents used for semi quantitative evaluations of five nutrient investigative parameters namely; the soil pH, organic matter, Nitrogen, Phosphorus and Potassium which are the cardinal elements that influence plant growth.

Prior to the introduction of the STK on the market, the department embarked on a training programme for both agricultural service providers and the farmers on how to use this kit in the districts of Rakai, Arua, Manafwa, Mokono, Mpigi and Sironko where “*Soil Testing Kit management committees*” were set up in some villages to ensure equitable and efficient use of the kits donated. NAADS has also taken on the technology as package to the farmers.

The country’s demand for the kits is rapidly increasing because of its application to aiding extension staff in improving service delivery. About 60% of Uganda’s District local governments have procured at least three kits for distribution in Sub counties. Recently, 27 kits were supplied to CIAT-TSBF, Nairobi. Malawi has also placed an order following the positive results from the first kits supplied.

A total of about 50 to 60 tests can be performed using the STK reagents. Advantageously, the test reagents can be replaced in the Department at a modest cost to allow for continuity in STK use. Presently, the cost of the STK is Ug Shs. 200, 000.

Bio- Fertilizer Technology

The department of Agricultural Production made a contribution to solving the problem of soil nitrogen deficiencies by producing bio-fertilizers containing legume nodule bacteria that fixes nitrogen and makes it available to the crops. Makerere University is the sole producer of the bio-fertilizer in Uganda. The packet is sold at Ug Shs. 2,000 each, capable of mixing 15 kg of seeds.

The bacteria are mixed with a suitable carrier material and packaged with clear, simple and illustrated application details. The benefits accruing from the use of this technology include: improved crop yield, soil fertility, reduced cost of crop production and avoiding pollution of the environment with mineral fertilizers. The bio- fertilizer is applied by seed coating and immediately planted.

1.2.1.15 Artificial Insemination in Pigs succeeds

The College successfully helped a pig farmer located in Kira town council to produce 12 piglets using Artificial Insemination technology. The first delivery was reported on the 13th November 2011. The research work was conducted for two and half years at Makerere University Research Institute Kabanyolo (MUARIK) as a pilot project to evaluate the performance of Artificial Insemination technology in pigs in Uganda.

The research team was led by Prof. David Mutetika with Dr. Leonard Kawule and Robert Natumanya as co-investigators. They came up with the idea of using fresh semen and established a boar stud at MUARIK to collect, examine, package and distribute good genes to piggery farmers as a cheaper and safer option than using boars that require lots of feeds and space on the farm and at times spread diseases. The project was funded by The Regional University Forum for Capacity building in Agriculture (RUFORUM) at an estimated cost of US\$ 60,000.

Despite the fact that Artificial Insemination in pigs is widely practiced elsewhere, it had not been successfully implemented in Uganda due to lack of skilled manpower and technical preservation of the semen. Ugandan farmers have been limited by access to quality and disease free boars (male pig) to fertilize the females, high cost of raising the male pig and lack of technical know-how to detect heat period and insemination.

With this technology, the college is looking forward to working with NAADs and other stakeholders to have centers at the sub county level to train technicians so that when a farmer observes that the female is ready for service, he rings the center and technicians collect the semen and inseminate the sow. Other strategies include training youth at the level of senior four and six to administer this technology, promote the rearing of high quality breeds of pigs through careful selection of good boars and building farmers' capacity to detect the females on heat, record keeping and proper feeding to increase farmers' productivity and income.

1.2.3 Development engagements

- Incubation of technologies and market ideas to support private public partnerships in agribusiness were established.
- Industrial scale development of the banana industry was developed under the Presidential Initiative for banana Industrial Development (PIBID),
- Sustainable management of pastures among vulnerable communities in SW and mid-central Uganda.

Other contributions include: hands-on experience in farming operations; skills for sourcing, managing and integrating knowledge; communication skills; facilitation skills; entrepreneurship and business skills; systemic thinking and linking different actors in the value chain; and mobilisation and local organization development skills.

1.2.4 Community outreach and action research

- Farmer field schools were established to support engagement with communities in agricultural R&D. These schools were established mainly in eastern and central Uganda for management of pests and diseases.
- The college strengthened value chains for smallholder farmers via the ***Link farmer to market*** project. Through the School of Food Technology, Nutrition and Bioengineering, new processed food products have been put on the market. In general the College reached out to over 3000 small scale farmers every year through student internship, research and extension.
- The College has informed policy on legislating on use of polythene bags.
- Under I@mak.com indigenous knowledge for improved soil fertility management was piloted and “farmer friendly” soil fertility testing kits tested and promoted
- Novel extension approaches included linkage of school programmes to extension, ICT based extension with communities, Community forestry and nature conservation,

nutrition improvement among communities- mothers and children and HIV Aids support.

1.2.5 Research and Publications

The college was involved in over 100 major research projects supported by different donors. This is a manifestation of the high quality caliber of the members of staff capable of writing grant-winning proposal. Consequently, the College is providing leadership on a number of projects including;

- Lake Kivu site for SSA Challenge Programme.
- East Africa IPM CRSP program, Peanut CRSP,
- Strengthening East African Resilience and Climate Change Adaptation Capacity through Training, Research and Policy Interventions
- Enhancing Food Security through Improved Seed Systems and Varieties of Cassava, Potato and Sweet potato Resilient to Climate Change in Eastern Africa.
- Pro-Poor Tourism Research Capacity Building and Knowledge Exchange for East African Universities;
- Strengthening the competitiveness of the tourism and hospitality enterprises and education in Uganda;
- African-European Academic Alliance for Sustainable Tourism Development, Environmental Sustainability and Poverty Reduction for Eastern and Southern Africa;
- East African Alliance for Curricula in Tourism and Logistics
- Molecular population genetic studies on a wide range of species (lions, elephants, warthog, Uganda Kob, buffalo, hippo, heart beast, bush pig, giant forest hog, topi) and their pathogens so as to design appropriate conservation strategies;
- Criteria for re-allocating wild animals (e.g. elephants) back to national parks (Luwero to Murchison Falls National Park);
- Re-introduction of Girraffes in Kidepo Valley National Park;
- Assessment of selected viral diseases in livestock (e.g. those that cause Foot-and-Mouth disease in the east African region);
- Assessment and monitoring of water and wetlands resources with focus on ecosystem services;
- Use of wetland plants in pollution control;
- Assessing the studying the potential of different plants and natural wetland systems in and flood control
- Identification, promoting and conserving useful plant species (ethnobotany)
- Developing sustainable production systems through ecological resource management and value addition
- Livestock productivity in rangelands for pastoral communities
- Feed for livestock in urban and peri-urban areas in Uganda
- Restoration of Tropical High Forests,
- Innovative tools and techniques for sustainable utilisation of shea better tree,
- Biology, ecology and management of Eucalyptus gall wasp,
- Ethno-ecology and utilisation of tamarind
- Enhancing the food security of peri-urban and urban poor through improvement of the quality, safety and economics of street vended foods in Uganda.

- Retention studies on processed products from orange-fleshed sweet potato: a staple for rural communities.
- Assessment of on-farm conservation strategies, post harvest handling, and nutritional value of the shea butter (*Vitellaria paradoxa*) tree and shea products in Uganda.
- Linking Functional Agro biodiversity to Land Use & Nutraceutical -based Cropping as a Poverty & Hidden Hunger Reduction Strategy: A Pilot Study on Women smallholders in the Lake Basin.
- Fisheries and HIV/AIDS in Africa: Investing in sustainable solutions
- Enhancing the nutritional and economic value of Moringa products as a strategy to improve diets and livelihoods of low-income rural communities
- Improving the traditional banana juice extraction Technology
- Piloting commercial banana juice extraction and processing in Uganda
- Improving the quality of dried pineapple products in Kayunga District.
- Assessing the Role of Food and Nutrition Education and Training in Equipping Mothers with Knowledge and Skills as a Strategy to Improve the Nutritional and Health Status of Young Children in Rural Uganda
- Assessment of the Effect of Supplementation with Zinc and other Minerals and Vitamins (Iron & Vit. A) on Growth and Overall Nutritional Status of School Children in a semi-urban, low income area of Uganda
- Gender Informed Nutrition and Agriculture (GINA)
- Enhancement of food security and nutrition status among households in the wetlands of Late Victoria basin
- Investigation of effects of dehulling techniques on the occurrence and levels of aflatoxins, and nutritional composition of maize
- Improving the health and livelihood of people of East Africa by addressing aflatoxin and gender-related constraints in peanut value chain
- Value addition to traditional Ugandan foods for improved nutrition and health
- Harnessing the commercial potential of indigenous fermented cereal products
- Developing of high-energy, nutrient dense products from indigenous cereals
- Enhancing nutritional value and marketability of beans through research and strengthening key value chain stakeholders in Uganda and Rwanda
- An aflatoxin free peanut-based recovery and functional food
- Indigenous Ugandan medicinal plants as sources of food bio-preservatives/antimicrobials
- The nutritional quality and feeding value of malted and extruded finger millet (*Eleusine coracana*) based weaning foods.
- Production of wine from pineapple peel waste generated by small scale fruit dryers
- Fusarium incidence and fumonsin contamination of maize produced in Uganda
- Structure and in vitro bioaccessibility of pro-vitamin A carotenoids in raw and processed orange fleshed sweet potatoes
- Developing starter cultures for Obushera – a Ugandan traditional fermented cereal beverage and weaning food”
- Potential of amaranth grain to improve nutrition and health status of school age children.
- Banana tissue culture and nutrient enhancement for improved food security and income among PLWHA in LVB.

- Enhancing the use of science and technology for enterprise development through increased interaction with high education institutions and research organizations.
- Potential of Nile perch belly flaps as source for therapeutic fish oil.

As a result of the research, over **100** research publications are produced every year.

1.2.6 Challenges to institutional research and innovations and way forward

a) How to strengthen and promote graduate and research training as strategic niche

Following Uganda's liberalization policy, the education sector was opened up leading to the emergency of other private Universities offering same undergraduate programmes. To strengthen its position as a centre of excellence in knowledge and technology generation, the College needs to focus more on graduate training as a niche.

The opportunity: There is a comparative advantage in doing so. Given the calibre of staff, research and training infrastructure including MUARIK, Makerere University Biological Field Station in Kibaale and Budongo Conservation Field Station in Masindi are opportunities that can be harnessed. By strengthening and expanding graduate training, the College will be able to engage more in research and increase its productivity in terms of new knowledge and technologies that enhance agricultural development. This is likely to increase its visibility on scientific and development frontiers.

b) How to enhance impact of MUCAES training and R&D on the community

Although the college has been engaged in R&D through graduate training and other research there is limited development impact at the community level because much of it remains inaccessible to community due to inadequate dissemination approaches.

The opportunity: The College has the potential to intensify its development impact by engaging in problem-oriented or demand-driven research and strengthening outreach programme through CAEC is critical. The College can build on the successes of internship, on-farm research and incubation partnerships, to scale-up engagements in solving real-life problems. In addition the capacity to publish and communicate with the scientific and development communities needs strengthening.

c) How to develop functional partnerships with the private sector impact and resource mobilization

Relevance of training and research in the College is only possible by engaging stakeholders in programme review. African Universities in general have not been very good at developing and managing partnerships especially with the private sector which has the potential to contribute resources for training and research.

The opportunity: MUCAES will build on past experiences in public private partnerships to build and strengthen its linkages with private sector including industrialists, NGOs, farmer organizations, farmers and other training, research and development agents. These partnerships have high potential to leverage resource mobilization for training, research and outreach but these have to be relevant for the partners.

2.0 SUPPORT FUNCTIONS

2.1 Human Resources and welfare

2.1.1 Staff establishment in the college of Agricultural and environmental sciences

MUCAES has multi-disciplinary staff and currently stands at about 345 Members of staff. Of these, 188 are academic staff and 142 are support staff.

2.1.1.2 Available academic staff by department

School	Departments	Numbers
Agricultural Sciences	• Agribusiness and Natural Resource Economics	22
	• Extension and Innovation Studies	19
	• Agricultural Production	47
Forestry, Environmental and Geographical Studies	• Forestry, Biodiversity and Tourism	30
	• Environmental Management	18
	• Geography, Geo-informatics and Climatic Sciences	15
Food Technology, Nutrition and Bioengineering	• Food Technology and Human Nutrition	18
	• Agricultural and Bio-Systems Engineering	19
TOTAL		188

2.1.1.3 Academic Staff establishment in the college by rank

Position	SAS	FEGS	SFTNB	Total
Professor	6	5	2	13
Associate Professor	8	6	2	16
Senior Lecturer	21	6	7	34
Lecturer	25	16	8	49
Assistant Lecturer	16	26	12	54
Teaching Assistant	12	5	5	22
Total	88	64	36	188
Technicians in the college				

Position	SAS	FEGS	SFTNB	Total
Chief Technician	0	0	1	1
Principal Technician	3	0	2	5
Senior Technician	5	1	2	8
Technician 1 & 2	10	3	1	14

2.1.1.4 Academic staff establishments in the Departments of the School of Agricultural Sciences

	Departments			
Position	DAP	ANRE	EI	Total
Professor	4	2	0	6
Associate Professor	4	3	1	8
Senior Lecturer	16	2	3	21
Lecturer	10	6	9	25
Assistant Lecturer	9	5	2	16
Teaching Assistant	4	4	4	12
Total	47	22	19	88
Technicians				
Chief Technician	0	0	0	0
Principal Technician	2	1	0	3
Senior Technician	4	0	1	5
Technician 1 & 2	8	1	1	10

2.1.1.5 Academic staff establishment in the School of Forestry

	Departments			
Position	FTB	EM	GGICS	Total
Professor	3	1	0	5
Associate Professor	4	0	2	6

Senior Lecturer	4	1	1	6
Lecturer	8	6	2	16
Assistant Lecturer	7	9	10	26
Teaching Assistant	4	1	0	5
Total	30	18	15	64
Technicians				
Chief Technician	0	0		0
Principal Technician	0	0		0
Senior Technician	0	0	1	1
Technician 1 & 2	0	1	2	3

2.1.1.6 Academic staff establishment in the School of Food Technology, Nutrition and Bioengineering

	Departments		
Post	ABE	FT&HN	Total
Professor	0	2	2
Associate Professor	0	2	2
Senior Lecturer	2	5	7
Lecturer	4	4	8
Assistant Lecturer	8	4	12
Teaching Assistant	4	1	5
Total	18	18	36
Chief Technician	0	1	1
Principal Technician	1	1	2
Senior Technician	0	2	2
Technician 1 & 2	1	0	1

2.1.1.7 Required Academic staff in the college

Based on the required staff complements computed against what is available the college, MUCAES will require an additional staff of over 300.

Required academic staff establishment in MUCAES

Department	Professor	Assoc. Professor	Senior Lecturer	Lecturer	Asst. Lecturer	Teaching Assistants	Staff Required
Agric Economics & Agribusiness	2	2	4	9	9	4	30
Agricultural Engineering	1	1	2	5	5	2	17
Agricultural Extension/Educ	1	1	3	6	6	3	20
Animal Science	1	1	2	4	4	2	15
Crop Science	2	2	4	9	9	4	31
Food Science and Technology	1	1	2	4	4	2	15
Soil Science	1	1	2	5	5	2	16
Geography	7	7	15	29	29	15	103
Community Forestry and Extension	1	1	1	3	3	1	10
Forest Biology, Ecosystem Management	1	1	2	4	4	2	13
Forest Management	1	1	2	4	4	2	12
Forest Products Engineering	1	1	2	3	3	2	12
Environment	2	2	3	6	6	3	23
Total staff required	23	23	45	90	90	45	317

2.1.2 Centers for MUCAES and their establishment

The College has ten centers that takes care of groups of scientists coming together with interests for service and knowledge-transfer partnerships in strategic areas of the college or the their respective departments. Given the proposed nature of their services, college centers are self sustaining headed by a Director and accountable to the College Principal through their respective heads/chairs of departments)

Centre	Post			Total
	Director	Research Coordinator	Research Fellows	
National Biodiversity Data Bank Centre	1 (PhD)	1(PhD)	3(MSc)	5
Centre for Climate and Water Resources	1 (PhD)	1(PhD)	3(MSc)	5
Geographic and Environmental Information Centre	1 (PhD)	1(PhD)	3(MSc)	5
Centre for Waste Management	1 (PhD)	1(PhD)	3(MSc)	5
Centre for Mountain Resources and Disaster Management	1 (PhD)	1(PhD)	3(MSc)	5
Food Technology and Business Incubation Centre	1 (PhD)	1(PhD)	3(MSc)	5
CAEC	1 (PhD)	1(PhD)	3(MSc)	5
Rangeland Resources Centre	1 (PhD)	1(PhD)	3(MSc)	5
for Agricultural Policy Analysis Centre	1 (PhD)	1(PhD)	3(MSc)	5
centre for Plant Biotechnology	1 (PhD)	1(PhD)	3(MSc)	5

2.1.3 Support staff

The college has about 145 support staff. These include but not limited to cleaners, drivers, messengers, farm workers, laboratory attendants, store keepers, forest workers and security guards. However, there is a shortfall of about 50 support workers.

2.1.3.1 Required support staff in the college

POST	DEPARTMENT	ESTAB.	FILLED	VACANT
Senior technician	Principal's office	1	0	1
	Extension & Innovation studies	1	0	1
	Geography and Climatic Science	1	0	1
	Agricultural Bio-System	1	0	1
	Engineering	1	0	1
	Food Technology and Human			

	Nutrition	1 3	0 2	1 1
Technician I	Extension & Innovation Studies Geography & Climatic Science Agricultural Bio – System Engineering	2 1 3	0 0 1	2 1 2
Technician II	Principal’s office Agricultural production Forestry, Bio Diversity & Tourism Geography & Climatic Science Agricultural Bio-System Engineering Food Technology and Human Nutrition	2 6 2 1 5 3	1 0 0 0 1	1 6 2 2 4
Lab Assistants	Principal’s office Agricultural production Extension & Innovation studies Food Technology and Human Nutrition	1 6 1 1	0 3 0 0	1 3 1 1
Lab Assistants II	Principal’s office	1	0	1
Lab Attendant	Agricultural Production	5	4	1
Personal Secretary	Principal’s office Agricultural production Extension & Innovation studies Geog, Geo-informatics & Climate Change Agricultural Bio-System Engineering Agribusiness & Natural Resource Economics	1 3 1 1 1 1 1	0 0 0 0 0 0	1 3 1 1 1 1
Principal copy typist	Principal’s office Agricultural production Agricultural Bio-System Engineering Agribusiness and Natural	1 1 1	0 0 0	1 1 1

	Resource Economics	1		
Copy typist	Principal's office	2	0	2
	Extension & Innovation studies	1	0	1
	Geog, Geo-informatics & Climate Change	1	0	1
	Agribusiness and Natural Resource Economics	1		
Chief custodian	Principal's office	1	0	1
Audio visual assistant	Principal's office	1	0	1
Store keeper	Principal's office	1	0	1
CLEANERS/ Messangers	Principal's office	4	3	1
	Agribusiness and Natural Resource Economics	5	4	1
	Agricultural Production	8	6	2
	Food Technology and Human Nutrition			
Stenographer	Agricultural production	3	1	2
	Forestry, Bio Diversity & Tourism	1	0	1
	Forestry, Environment & Geographical Sciences	1	0	1
	Geography & Climatic Science	1	0	1
	Agricultural Bio-System Engineering			
Stockmen	Agricultural production	3	2	1
Labourers	Agricultural production	15	8	7
Asst foreman	Agricultural production	1	0	1
Met. recorder	Agricultural production	1	0	1
Nursery men	Agricultural production	4	3	3
Gardeners/Labourers	Agricultural production	8	5	3
Driver/ tractor operators	Agricultural Bio – System Engineering	2	1	1
		5	1	4
Pilot plant supervisor	Agricultural Production	1	0	1
Custodian	Forestry, Bio Diversity & Tourism	1	0	1
	Food Technology and Human Nutrition			1

Forest worker	Forestry, Biodiversity and Tourism	1	0	1
Cartographer	Geography & Climatic Science	1	0	1
Map curators	Geog, Geo-informatics & Climate Change	2	1	1
Weather recorder	Geog, Geo-informatics & Climate Change	1	0	1
Machine operator	Geog, Geo-informatics & Climate Change	1	0	1
Workshop assistant	-Agricultural Bio-System Engineering	1	0	1
Headman	Agricultural Bio-System Engineering			1
Drivers/tractor operator	Agricultural Bio-System Engineering			1
Headman	Agricultural Bio System eng Engineering	1	0	1

2.1.4 Staff recruitment, Promotions and Retirements

2.1.4.1 Staff recruitment

The college received new staff members and new offices were created as a result of the University's transformation into a collegiate system. This includes the college communication office manned by the communication officer and the web administrator. The two Jane Anyango and James Kisoro assumed duty on 1st April 2011. The communication office comes with new opportunities to streamline the communication framework within the college. The establishment of the communication office has led to the designing of college and school websites enhancing communication among staff and external publics and stakeholders. The office has been able to produce publications such as the college brochures, newsletter, and the college prospectus and the Annual report. The office has enhanced relationship with the media and other stakeholders like parliament.

The college also received the Assistant Human Resource Officer / Assist Administrative Assistant Ms. Kevin Nabiryo currently handling human resource issues. The office has helped in streamlining, recruitment, supervising and monitoring of the manpower.

Other administrative offices created include the procurement office which took charge of the college procurement, the accounts department headed by the team leader, Tom Vok and the Academic Registrar's office headed by Mrs. Rose Bwire who is also secretary to the Ag. Principal.

 <p>Tom Elwana Team Leader Accounts</p>	 <p>Ms. Kevin Nabiryo Human Resource</p>	 <p>Ms. Rose G Bwire College Registrar</p>	 <p>Mr. Deo Ibanda Procurement Officer</p>
 <p>Mr. Onan Mulumba Librarian</p>	 <p>Ms. Jane Anyango Communication Officer</p>	 <p>Mr. James Kisoro, Web Administrator</p>	

2.1.4.2 Appointments

New appointments included assistant lecturers and teaching assistants in different departments

Name	department	post
Frank Mugagga	Geography	Appointed Assistant lecturer
Alice Turinawe	Agricultural Bio systems engineering	Appointed teaching assistant
Thomas Makumbi	Agricultural Bio systems engineering	Appointed teaching assistant
Fildah ayaa	Agricultural Bio systems engineering	Appointed teaching assistant

2.1.4.3 Staff Promotions

A number of staff members were elevated at the college, national and international level

2.1.4.4 Prof. Elly Sabiiti nominated 1st ASARECA President

Long serving Prof. Elly Sabiiti was on 16th December 2011 appointed the 1st President of ASARECA General Assembly. Uganda was honored by the Board of Directors ASARECA who decided that Uganda be the host country of the General Assembly. Prof. Sabiiti was nominated by Ministry of Agriculture among five candidates as the best during the two day 1st ASARECA General Assembly, held on December from 14 -16 December, 2011 at Imperial Resort Beach Hotel in Entebbe, Uganda under the theme, “*Feeding our region in the 21st century*”.

The Assembly followed the approval of ASARECA’s new Constitution in 2010, providing for the establishment of Patron Ministers and a General Assembly to offer strategic guidance to ASARECA in order to promote economic growth, fight poverty, eradicate hunger and enhance sustainable use of resources in Eastern and Central Africa. This was a great achievement for Makerere and Uganda. ASARECA is a sub-regional not-for-profit association established in 1994 by 10 member countries: Burundi, the Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda.

2.1.4.5 Staff promotions in teaching

Name	Department	Promotion
Dr. John Bosco	FB&T	Associate professor
Assoc. Prof. Philip Nyeko	FT&B	Full professor
Dr. Nichola Kiggundu	ABE	Lecturer
Dr. Charles Muyanja	FTN	Associate Professor
Dr. Peter N Walekhwa	ANRE	Lecturer
Sarah Aloba Rosemary Isoto	ANRE	assistant lecturer
Dr. Yazid Bamutaze	Dept. of Geography	Lecturer
Dr. Tumuhairwe		Lecturer
Dr. Edward Mwavu	FT&B	Senior lecturer
Dr. Kizza Banarbas	ANRE	Associate Professor
Dr. Gorretti Nsubuga Nabanoga	Extensions & Innovation	Associate Professor
Dr. Patrick Okori	Agricultural Production	Associate Professor

Dr. Dick Serunkuma	ANRE	Associate Professor
Dr. Levi L. Kasisira	ABE	Associate Professor
Dr. David Osiru	Agricultural production	contract
Dr.Margaret Kabahenda		Confirmed lecturer
Dr. Gregory Olupot	Depart of Agricultural production	Confirmed assist lecturer
Mr. Ivan Mukasa		Assistant Lecturer

2.1.4.6 Career development

A number our staff enrolled for further studies in and outside the country as summarized

Name	Department	Qualification	University
Dr. Benard Obbo	Extensions and Innovations	PhD	USA
Dr. John Okiror	Extensions and Innovations	PhD	MAK
Issa Kabenge	Agricultural Bio systems engineering	PhD	USA
Dr. Jackie Bonabana	Agribusiness and Natural Resources Econ	PhD	

2.1.4.7 Awards

2.1.4.7.1MUCAES wins two awards in the 2011 Nile Agricultural and Trade show

The college in June emerged as overall best in a week - long Source of the Nile Agricultural and Trade show that was organized by Uganda Farmers Federation in Jinja from the 18th to 24th July 2011. The show comprised large to small scale show cases staged by government bodies, private companies and NGOs. The college scooped two trophies; one for best overall in all categories and two; for winning in the first positions in Crop and Value addition categories among government institutions at the closing ceremony presided over by H. E the president of Uganda, Yoweri K. Museveni. The exhibition attracted over 100 competitors including Madhivan Group of Companies, BATU, NARO, Ministry of Agriculture, NAADS, UWA, Heifer International, JICA, Uganda Coffee Development Authority, Balton, Uganda Prisons and all private seed companies. Over 30 participants came from the School of Food Technology, Agricultural Sciences and Makerere University Agricultural Research Institute Kabanyolo. Over 50 products were showcased. As a college, this victory was a big vote of confidence by the stakeholders in Agricultural Research and Development to the effect that stakeholders are now sure that students are getting good training at Makerere University.



2.1.4.7.2 Prof. Moses Tenywa wins First Africa College Prize

Prof. Moses Tenywa, Director MUARIK, brought the Africa College First Prize. He effectively implemented phase I of the “*Proof of Integrated Agricultural Research for Development-IAR4D*” concept an experiment supported by FARA sub-saharan Africa Challenge Programme (SSACP) in the Lake Kivu Pilot Learning Site (LKPLS) covering the three countries (Uganda, Rwanda and DR Congo).

The experiment was to prove that Innovation Systems Approach (ISA) as one of the four (4) pillars of the Knowledge Economy postulates that the key to economic growth and development including agriculture is a linkage of institutions and the interactions to share and create knowledge to address existent and emerging challenges.

From 22-24th June, 2011 the PIs presented the work to Africa College Conference in University of Leeds and it won the First Prize. Prof. Tenywa Locally, *presented* a paper titled “*A critical review of Uganda’s soil fertility and fertilizer use*” to the EPRC organized conference on the theme “*The role of fertilizer in Uganda’s agricultural transformation; reality or myth?*” at Imperial Royale Hotel. The work was hailed for providing evidence for institutional reforms of NAADS and the MAAIF to enhance effectiveness and efficiency.



2.1.4.7.3 Dr. Phinehas Tukamuhabwa Tripple Awards

Dr. Phinehas Tukamuhabwa of the Department of Agricultural Production won three awards in three different years. In 2010, he was awarded a Certificate of Recognition from the Faculty of Agriculture for his exemplary service. In 2007, he got the RUFORUM Certificate of Merit for his outstanding impact oriented Soybean research that was presented to him during the RUFORUM Biennial Conference that took place from 23rd-27th April 2007 at Mangochi Malawi. In 2006, Dr Tukamuhabwa won in the first position the Annual Makerere Vice Chancellor's Innovations and Academic Excellence Award.

2.1.5 Retirements

The long serving lecturer and researcher, Prof. Elly Sabiiti tendered in his request to retire after clocking 60 years. Prof. Sabitti served for a period of 30 years in the School of Agricultural sciences and was awarded a four year contract by the university. He also served in different capacities including: TWAS Research Professor, Member of TWAS Agricultural Sciences Prize Committee, Vice President Uganda National Academy of Sciences, Chairperson, Makerere Mentoring Initiative for Women Administrators/Academicians, President of Association of Uganda Professional Agriculturalists, Makerere University.

We recognize his contribution to the university and wish him a happy retirement.

2.1.6 Resignations

The Dean School of Agricultural Sciences Dr. Bernard Bashaasha tendered in his resignation with effect from 5th December, 2011 citing limited resources to enable him execute his duties.

2.1.7 Exhibitions Meetings, Seminars and workshops

2.1.7.1 Exhibitions

In addition to participating in the Annual Agricultural and trade show, the college participated in a series of exhibitions to show case various products and technologies developed.

2.1.7.2 Makerere University Media week:

Makerere University on Friday 16th December, 2011 concluded its one week media activities that started on 12 December 2011. The activities were meant to show case innovations in different colleges and schools under the theme, “*Unveiling the Innovative Power of Makerere Univeristy*”. MUCAES displayed five innovations ending the media week.

- The Water Purification Technology using Moringa, Jack fruit and Java plum (Jambula) seeds aimed at enhancing access to clean and safe water for rural and peri urban communities. This was presented by Dr. Okot Okumu, Head department of Environmental Management who is also the PI together with Robert Natumanya, the Assistant researcher.
- The MAK Soil Testing Kit and the Bio fertilizer aimed at providing affordable technical knowledge on soil health and addressing the problem of Nitrogen deficiencies in the soil. This was demonstrated by Peter Ssenyonga, a technician at the Department of Agricultural Production.
- Multi regional trials to develop more MAK soybean varieties with several attributes. Four soy bean varieties were show cased by the Assistant researcher, Tonny Obua on behalf of the PI, Dr. Phinehas Tukamuhabwa.
- Newly published books for Agriculture and Geography to promote the subjects and beef up reference book stores in the country. The communication officer stood in for the authors.

2.1.7.2 The 2nd Biennial Food science exhibition

The School of Food Technology on 14th April, 2011 held its 2nd Biennial exhibition under the theme, ‘*Application of science and technology for job creation and improved livelihoods*’. The function was presided over by the then minister for Finance, Planning and Economic Development Prof. Ephraim Kamuntu who hailed the school for *contributing* to addressing the problem of youth unemployment. Prof. Kamuntu expressed government commitment to modernize agriculture, invest in science education and other infrastructure. Products such as, sausages, smoked meat, Omulondo liquor, canned Katunkuma, amarathus products, health bars, soya milk and yoghurt, stable low shelve Bushera were exhibited.

2.1.7.3 Workshops, seminars /short courses

The College in its efforts to facilitate staff professional growth and provide a platform for critical discussions and sharing of experiences on key issues in Agriculture and Environment and to inform policy, theory and practice held and participated in a number of meetings, workshops and seminars.

Among the notable meetings was the 1st College Retreat that was held at Essella Country Hotel between, 31st May and 2nd June. Members were oriented through the collegiate system and discussed ways to effectively and efficiently run the college. Top university officials like the Assistant University Academic Registrar James Okello and the Vice Chancellor Prof. Venansius Baryamureeba addressed the staff promising semi autonomous status to the colleges.

On 20th June 2011, the College team lead by Ag Principal Prof. Samuel Kyamanywa, comprising Prof. Elly Sabiiti, Prof. Charles Basalirwa and Assoc. Prof. Patrick Okori met the Parliamentary committee on Agriculture at Parliament and discussed policy issues that need redress to boost agriculture in the country. Policies on the need to change MUARIK status into a public research institute, Seed systems, Procurement & Climate change, the need for a professional body of Agriculturalists, an Agricultural policy and revival of the meteorological department topped the agenda.

Also held was the first conference to promote the new technology of making Interlocking Stabilized Soil Bricks (ISSB) at Makerere University Continuing Adult Education Centre (CAEC) in Kabanyolo. Technicians from Senegal, Rwanda, Kenya , Ethiopia and Uganda converged at the centre to implement the project under the African Biogas Partnership Programme aimed at reducing costs and stress on environment by promoting the use of new marram bricks and biogas technology .This will reduce over dependence on natural environment for charcoal and firewood for fuel and brick burning, one of the serious environmental problems developing countries are grappling with.

The college hosted the ATLAS Africa Conference 2011 from 6th to 8th June under the theme “*Sustainable tourism and environmental education: natural link*”. The two day conference was organized by Makerere University in conjunction with Kent University , University of North Texas UK, UWA, Nature Uganda and Uganda Tourism Board. Makerere was represented by the Department of Forestry, Biodiversity and Tourism. Over 110 abstracts were submitted. The conference discussed how tourism and environmental education can be linked into a major strategy for nature conservation and sustainable development.

The College also participated in the CMAAE Thesis dissemination workshop that was held at Fairway hotel in Kampala on 18th July under the theme, “*Overcoming barriers to sustainable growth and wealth creation in Agriculture*” It was coordinated by Dr. Jackline Bonabana of department of Agribusiness. Dr. Mathias Wakulira presented a paper on Factors influencing hulling of coffee among farmers in Masaka district, Mabel Sebikari on the analysis of costs associated with control of Banana xanthomonas wilt, while Jude Asimwe presented a topic on Technical efficiency of upland rice producers in South Western Uganda among others.

Two research dissemination workshops were also held in Kamuli and Soroti districts in Eastern Uganda. Two Masters students Stella Apolot and Dorcus Loga of the department of Extensions presented the findings on the Potential of School gardening to mitigate short term hunger and its effects on schooling in UPE schools in Eastern Uganda from 21st to 23rd August, 2011. Major findings revealed that hunger contributed to the poor performance and school dropout while agriculture was not practically taught hence the need to revive school gardening programme and include schools on NAADS Program.

The College also participated in the 3rd Annual Research and Innovations Dissemination Conference from 11 to 12th April at Hotel Africana in Kampala under the theme, *“Transforming Society Through Research and Innovations”* Wilber Munyisa Ahebwa from the School of Forestry presented a paper on Tourism Revenue sharing policy at Bwindi Impenetrable National Park Uganda; A Policy Arrangement Approach. Prof. Mukadasi Buyinza and others presented on Natural Resource Economic Efficiency under mangoes based agro forestry systems in Buyaza County Kamuli district. Another team lead by Prof. Mukadasi Buyinza presented on Nutrition Analysis and Innovative Approaches in Value Addition of Ruspolia Niyugula (Nsenene) for income generation in Central Uganda Masaka and Kampala while Dr. Peter N Walekwa and Johnny Mugisha presented on the economic viability of Bio gas energy production from family sized digesters in Uganda among many others.

2.1.8 Visitors

Several visitors came to the College for research consultations and establishing or furthering collaborative linkages. On 29th November, 2011, the Chancellor Makerere University, Prof. Venansius Baryamureeba visited the college to interact with staff. He implored staff to draw a plan for the relocation to Kabanyolo including the projects they would like to establish to contribute to the development of Uganda. He assured the staff of government and donor support towards realizing this goal.

On 24th November, 2011, H.E the President of the Republic of Uganda inspected the Food parlor and Food Technology Incubation Centre after launching the CEDAT Electric car and inspecting stalls for other colleges. The president, in his address at the school conference hall was impressed with the innovations and promised to support science and technology including review of salaries for scientists to an international standard. This was the president's second visit in a period of two years after he launched the Incubation center in 2009.

The Collaborative Research Support Program (CRSP) governing council on the 26th July 2011 visited the College to acquaint itself with what was happening in the field of Research and training in the university. The 20 man delegation led by Prof. R. Muniappan comprised USAID Officials, CRSP Council Members, Programme investigators and Regional coordinators from different countries across the world.

The team was walked through a poster exhibition to show case what the college was doing to improve agricultural production in the face of the current environmental and climatic challenges. They toured the Parthenium weed management site and later went to MUARIK

Aqua Fish CRSP site where the college was testing a new technology of purifying pond water using a constructed wetland.

They also visited the tomato FFS (IPM CRSP) Farmer field school in Namulonge spearheaded by Dr. Jeninah Karungi where farmers were introduced to various technologies such as soil sterilization and preparation. US team leader on International Research and Bio technology at the United States International Development Robert Bertram, pledged his country's commitment to support Uganda's farmers in area of field visits and knowledge sharing for better farming practices and livelihoods.

On 4th July 2011, Rockefeller Vice president Heather Grady visited the college and paid a courtesy call to the Ag Principal Prof. Samuel Kyamanywa. They were walked through the stalls showcasing progress made by the foundation support and later addressed a conference and media on the topic, *"Building adaptation and resilience to climate change and its effects on African Agriculture, Food Security and Health"*. She pledged foundation commitment to support research and reinforce training capacity at African universities to build climate change resilient programmes and capacities, develop new drought resistant seed varieties and ensuring good dissemination of knowledge from these institutions to agricultural extension services and farmers.

On 1st August 2011, Makerere University Chancellor Prof. Mondo Kagonyera made an impromptu visit to CAES School of Food Technology, Nutrition and Bio –engineering at the time when the country was experiencing high inflation, food and sugar crisis. Kagonyera sought advice from academicians on how government should involve them to solve the sugar crises by way of advising and promoting programmes and technologies to empower people manufacture sugar at family level.

2.1.9 Staff development challenges and way forward

Training and student learning

a) How to re-orient training in MUCAES towards problem based learning

Critics have raised concern over competence deficiencies among University graduates to effectively deliver services, in dynamic and complex environments such as innovation systems. Most graduates have failed to meet societal expectations in terms of hands-on experience in farming operations; skills for sourcing, managing and integrating knowledge; communication skills, facilitation skills, entrepreneurship and business skills, systemic thinking and mobilization. It has been observed that although the curriculum is not so deficient of practical skills, the nature of practicals conducted are not fully relevant to deal with real-life field based problems.

The opportunity: It is therefore important that the College re-orient its training towards problem based learning to meet the needs of employers and to enable the graduates effectively engage in agriculture-related businesses as professionals. Strengthening learning through internships is one avenue to enhance problem-solving skills of students. In order to develop graduates for differentiated employment market, it is important that MUCAES pursue a delineated curriculum for agricultural scientists and practitioners.

b) How to manage quality training with increasing student enrolment

Overall, the demand for University education is increasing, growing at 20% per year. MUCAES is widening options to benefit from this challenge by developing new programmes, as well as increasing intake on existing programmes. However, the infrastructure and staff complement does not match the student numbers. The situation will be soon be exacerbated by the universal primary and secondary education being pursued as Government. This poses a big challenge to teaching and learning amidst the demand for more interactive and problem based learning which require intensive engagement with students sometimes at the individual level.

The opportunity: An option to cope with this situation lies in the use of ICT in teaching and learning. Computer mediated learning including e-learning may be potential solutions but this requires associated skills as well as ICT infrastructure. However, for MUCAES to turn out quality graduates, it must consider a realistic intake that matches the available resources and infrastructure. The focus on running franchise and off-Campus programmes as envisioned in the Makerere University strategy provide options to address this challenge.

c) How to re-orient staff in new ways of teaching and learning and R&D

If the lecturers are to impart the skills being demanded among their graduates, they must themselves have those skills. The participative development paradigm shift demands on lecturers to engage in research for development (R4D) and instill them among students. Some of the issues include: critical thinking, analytical capacity, creativity, adaptability, and ability to transfer learning into practice among other things. But a typical African university reproduces itself. It recruits from among its best performing students (academically) and entrusts them to teach others without any training in learning approaches. This calls for pragmatic action to retool the lecturers first.

The opportunity: MUCAES can institutionalize pedagogy training for all staff, although this is only part of the solution. Other training programmes could also target developing competencies for systemic thinking, team building, personal development, etc. The Personal Mastery/Soft Skills (PMSS) approach pioneered in the past by the Faculty of Agriculture provide an excellent model of an integrated package to transform learning, research, and consultancy for development impact. The College should scale it up for greater impact.

2.2 Library facilities in the College

CAES Library is one of the libraries in Makerere University. It was established after the formation of the College of Agricultural and Environmental Sciences (CAES) in 2011.

CAES Library comprises six (6) libraries stationed at the different Schools, departments, and centers of the College and four (4) book banks stationed in the School of Agricultural Sciences (SAS).

The different libraries are thus stationed at the School of Forestry, Environmental and Geographical Sciences (SFECS), School of Food Technology, Nutrition and Bio-Engineering (SFTNB), Makerere University Institute of Environment and Natural Resources (MUIENR), Department of Geography, Makerere University Agricultural Research Institute Kabanyolo (MUARIK), and Makerere University Biological Field Station (MUBFS).

2.2.1 Library Staff

The College library is composed of 12 staff members headed by Mr. Onan Mulumba, assisted by eight Assistant Librarians and cleaners spread across the schools.

2.2.2 Library Services

This library is mandated to provide information resources and services to all the students and staff of the college. Information resources offered range from print to electronic books, journal databases, theses and dissertations, magazines, newspapers, reports, manuscripts. Services include rendered include but not limited to; Current Awareness Service (CAS), Selective Dissemination of Information (SDI), User Education and Reference Services.

2.2.3 Innovations at the library

The library has advanced to online circulation system but this is affected by un-reliable electricity and internet breakdowns.

2.2.4 Institutional contribution to the library.

Most of the information resources, i.e. print and electronic are funded by the institution and a few by the departments. The College library is not income generating and therefore not self-sustainable. The operations and activities of the Library are fully funded by the institution.

2.2.5 Challenges and Way forward

Given the high number of library users and limited human resources, we look forward to having all College library units at the main campus amalgamated under a single roof, for easy management and better service delivery.

2.3 Governance:

2.3.1 Outcomes of the Collegiate System of governance

The introduction of the collegiate type of University system has in one way or the other increased efficiency. This was manifested in different ways including the following:-

Diversity of Programs being offered

The units that formed CAES offer a number of programmes cover a number of disciplines; Agriculture, Food Science, Forestry, Environment, Natural Resources, Geography and emerging themes like Climate Change and Biodiversity Management. This has enabled the students to diversify their knowledge foundation through increased number of electives they can select from.

Teaching and Research

The College system has helped to consolidate the teaching and research that has been on going in the different units. For example the Bachelors of Environmental Science and Environmental Management have been merged and a new curriculum is being developed. Overall this approach has reduced course-duplication, and increased the sharing of expertise within the different units.

Most important is that the system has helped to build research capacity to address all issues that affect agricultural production and environmental management in a holistic manner. Having the units responsible for agricultural production, forestry, environment, climate science and agricultural processing under one roof has made it much easier to handle issues of sustainable agricultural development at the same time managing our environment and resources therein. This arrangement made it easier to undertake cross cutting research themes like climatic change.

Sharing of training and research infrastructure

The bringing together of the four unit has helped increase the pool of infrastructural resources available to students and staff. For example all college students are now utilizing the computer laboratories of the four units. Similarly the students of geography are no longer going to School of veterinary medicine or St. Francis for space to attend lectures but are using lecture rooms in former units (environment, agriculture, forestry and food science). Each unit had different high technology equipment, which could not be accessed by scientists from other units, for example, the -80°C refrigerators; high-speed centrifuges are now available to all biotechnologists in the college.

Reduction in Bureaucracy

One of the biggest challenges the units used to meet were delays due to bureaucratic systems. The most limiting bureaucracy was the centralized procurement system. The creation of college systems has empowered Units to carry out their own procurement which is reducing the time spent and promoting value for money. We are looking forward to processing academic transcripts at the college to stop unnecessary delays.

In the nutshell, the college arrangement is enhancing programmes to:

- Contribute to solving National and Global environmental problems like Climate Change, Biodiversity Conservation, and Water Resources Management
- Contribute to attainment of Millennium Development Goals (MDGs) and the National Development Plan
- Integrate related disciplines of Agriculture, Environment, Geography and Forestry hence reducing duplication of courses while maximizing the use human resources
- Promote value addition and agro- processing that are strategic national areas.

2.4 Resource mobilization and investment

2.4.1 Financing strategy

The College has continued to serve a triple mandate; to conduct research, train human resources for the agricultural sector, environmental conservation and also does outreach. The college resources are spent in these core activities.

To achieve greater harmony, consistency and predictability in funding from MUCAES principal donors such as Government and development partners the college formulated a financing strategy to ensure a well systematized funding mechanism, expenditure and accountability systems. This strategy takes into consideration three critical issues namely:

- Clear budget and finance projections.
- Strategies for securing the funds and resources.
- How financial resources will be managed.

2.4.2 Investment areas

Although the College is still under development from mergers of faculties, schools and institutions into fully fledged constituent units of the University it has earmarked a period of 5 years (2011-2016) to relocate and establish MUCAES at the off-campus site based at the Makerere University Agricultural research Institute (MUARIK). Some of the critical investment areas during the period for the foundation, establishment phase and the growth and development phase include the following:

2.4.2.1 Teaching, and research facilities and equipment. This cost area includes improving size, scope, functionality and maintenance of facilities and equipment. This includes, upgrading facilities to for core competencies and research-related services. The costs areas include building of new facilities (laboratories, offices, and lecture theatres, rehabilitation of laboratories and field research stations and other training and research related services. Upgrade includes putting in place state of the art facilities such as, hi-tech teaching facilities with online and video conferencing capabilities.

2.4.2.2 Strengthening leadership and management. In order for the college to have continuity in scientific leadership and access to expertise in specialized areas of science, communications, and product development and delivery mechanisms, the College will invest in HRD over medium to long term.

2.4.2.3 Capacity building and training. The College continues to contribute to the development of human capacity for agricultural and environment related sector development in Uganda and Africa. The College through its academic programmes seeks to deliver high quality human resources to be part of and lead agricultural development.

2.4.3 Long term plan for the development and growth phase (2016 and beyond)

In pursuit of the second phase of strategy implementation, MUCAES will implement actions that ground it as a leader in agricultural and environmental training, research and development. The targets during this growth and expansion phase are outlined below:

2.4.3.1 Stabilizing funding for mission fulfilment: The College will develop a consolidated fund derived from all its constituents and development partners and alumni that responds to national and regional development challenges. This will also include the implementation of the college investment plan for generating funds for mission fulfilment.

2.4.3.2 Consolidating community and national development. The College will use its schools and centres to scale-out innovations, knowledge and other outputs to support evidence based planning and targeting of development initiatives. Specifically, the College will target meeting of MDGs, CAADP targets through DSIP and other national to global agenda. The College will also support national foresight analysis and planning. ICTs and off campus tools and investments and strategic partnership will be used to reach out to the university stakeholders.

2.4.3.3 Expanding regionalization and international agenda. The College will leverage past experiences and best practices to secure a competitive position for the MUCAES. The College will during this period strategically expand its international programmes in R&D and training.

2.4.3.4 Proactively support the development and implementation of relevant national and regional policies. This will be achieved via a number of well-targeted outreach messages and policy dialogue activities. The College communication office has developed a communication strategy for advocacy, policy information and visibility of College. Through this strategy, the College shall contribute to relevant and evidence based planning and policy responsibilities that lead to improved formulation of new policies, strategies, programmes and projects; Improved public education and communication around key agriculture and natural resource issues; Increased capacity for decision making in planning and budgeting processes improved by accurate and up-to date climate information and analysis.

2.4.3.5 Build national and regional human capacity for broader agricultural and environmental sub-sectors of the economy. This goal aim at developing and implementing undergraduate, graduate and graduate programmes and short courses that meet stakeholder needs in the fields of Agriculture, Food and Nutrition Sciences, Forestry, Environmental and Geo-Informatics and Climatic Sciences, Bio engineering Sciences.

2.4.3.6 Generate innovative and well-targeted development solutions.

This will be achieved by supporting research projects in areas of scientific and technical competencies, developing novel contributions to bring improved products to the market, designing and deliver research products that are responsive to dynamic society needs and to build basic scientific foundation to stimulate national development.

2.4.3.7 Capability strengthening to deliver high quality services. Develop highly professional staff in adequate numbers to undertake innovative and adaptive training, research and practice.

2.4.3.8 Mobilize resources.

Generate and mobilize resources both internally and externally in order to achieve the strategic goals.

2.4.4 Expected Outputs from investment areas

Capacity developed: At least 300 MSc graduates in diverse disciplines offered by the College yearly, 20 PhDs in selected disciplines and 10 postdoctoral studies completed, in association with Ugandan public research agencies, other universities, and African and Northern partners with special emphasis on young scientists, women scientists and those young institutions and post-conflict countries in Africa.

In-service and mid-carrier skills developed: Continuing professional development of mid-career scientists in National Agricultural Research Institutions, Universities and diverse development agencies.

Outreach and publications: Outreach messages such as publications and conferences conducted to promote knowledge transfer and sharing.

Infrastructure developed: Physical infrastructure for teaching and learning, research innovation as well as management upgraded and developed to service.

ICT infrastructure developed: Modern and well functioning ICTs equipment and laboratories put in place to support training research and outreach.

Innovations: Well-targeted research innovations generated for diverse stakeholder needs and demands.

Finance generated. Adequate funds generated to finance and invest in activities that produce the above outputs.

2.4.5 Mobilizing Financial resources

2.4.5.1 Finance management principles in MUCAES

The College established clear financing principles that draw from national to global best practices. The requirements for projects are summarized as:

- Have a financing plan and be fully funded; no project will be started until it has adequate financial support.
- Have project grant agreements in place
- Have a separate ‘project account’ and an authorizing officer.
- Be subject to regular review, not only of the science but also of the financing plan.

2.4.5.2 Sources of funding and budgeting

MUCAES has five main sources of finance and over the years the college has relied on these sources.

- Government of Uganda
- Private paying students for training

- Development partners through bilateral and multilateral funding streams,
- Regional and National development partners for academic programmes,
- Various partnerships.

2.4.5.2.1 Support from Government of Uganda

In the period under review the School of Food Technology, Nutrition and Bio engineering received 4.5 billion shillings under the Presidential Initiative for Value addition to develop the Food Technology and Business Incubation Centre (FTBIC).

Financial Performance

Item	Budget
Construction	1,804, 421,952
Machinery/ equipment	1,660,795,288
Technology development	525, 267, 230
Incubation services	509, 515,530
Total	4.500, 000,000

2.4.5.3 Income from tuition fees through academic programme

Another reliable source of income over the years has been funds generated by academic programmes.

2.4.5.4 Statement of Financial Performance for fees collected FY 2010/2011

		muier	Agric	forestry	consolidated	expenditure	variance
	INCOME						
	Bal B/f	8,429,132	109,755,855	82,227,216	200,412,203		200,412,203
142209	Educational/Instructi on related levies				-		
	Miscellaneous Revenue		111,174,300	22,128,853	133,303,153		133,303,153
	EXPENDITURE				-		-
211102	Contract staff salaries	16,920,000	15,120,000	13,800,000	45,840,000	48,812,600	(2,972,600)
211103	Allowances (top-up allowances & salaries for Part time Staff)	121,145,000	191,311,000	960,000	313,416,000	391,154,423	(77,738,423)
221001	Advertising and Public relations	1,000,000	10,950,000	8,000,000	19,950,000	4,920,957	15,029,043

221002	Workshops and Seminars		21,000,000	12,000,000	33,000,000	12,404,500	20,595,500
221005	Hire of venue	1,000,000			1,000,000	1,873,000	(873,000)
221007	Newspapers Books and periodicals/Library	366,000	1,095,000	4,000,000	5,461,000	1,329,100	4,131,900
221008	Computer Supplies	4,200,000	15,260,000	8,095,000	27,555,000	10,347,000	17,208,000
221009	Welfare entertainment	1,604,300	14,200,000	3,600,000	19,404,300	17,818,850	1,585,450
221010	Special Meals and Drinks	1,000,000			1,000,000		1,000,000
221011	Printing stationary Photo copying & Binding	2,073,400	11,109,500	2,400,000	15,582,900	19,050,296	3,467,396
221012	Small Office Equipment	595,000		1,200,000	1,795,000	1,050,000	745,000
221014	Bank Charges	74,710	2,800,000	484,200	3,358,910	3,905,688	546,778
222001	Telecommunications		7,200,000	4,080,000	11,280,000	7,064,345	4,215,655
222002	Postage and courier		500,000	2,000,000	2,500,000		2,500,000
223004	Quard and Securityn Services			2,400,000	2,400,000		2,400,000
223007	Other Utilies	84,000			84,000		84,000
224001	Medical and Vet Supplies	1,920,000			1,920,000		1,920,000
224002	General Supply of Goods and services	2,320,000	3,844,000	2,400,000	8,564,000	123,875,048	115,311,048
	Teaching materials	10,605,296			10,605,296		10,605,296
226002	Licenses	956,400	4,068,000	1,000,000	6,024,400		6,024,400
227001	Travel inland	28,800,000			28,800,000	202,055,500	173,255,500
227002	Travel Abroad		6,000,000		6,000,000		6,000,000
227003	Carriage haulage, freight and transport hire	2,000,000			2,000,000	1,359,322	640,678
227004	Fuel oil and lubricants	2,000,000	43,839,000	3,600,000	49,439,000	62,145,000	(12,706,000)
228001	Maintenance Civil	9,600,000	10,450,000	3,600,000	23,650,000	19,925,220	3,724,780
228002	Maintenance Vehicles	8,000,000	51,880,000	38,420,000	98,300,000	40,759,376	57,540,624
228003	Maintenance equipment/furniture				-	219,379,300	(219,379,300)
228004	Maintenance other	3,980,000			3,980,000		3,980,000

262201	Contribution to international organizations	2,617,636			2,617,636		2,617,636
	Total Budget Requirement	222,861,742	410,626,500	112,039,200	745,527,442	1,189,229,525	(109,986,727)
Source: Tom Vok Elwana(Team Leader)							

2.4.5.5 Project overheads

The operational procedures established for the College proposed that each project hosted by the College contribute towards the overall running costs of the College by paying an agreed overhead charge and direct costs. In order to increase its finance base generated in this manner, the College assists scientists to prepare research proposals for funding, not only from development agencies but also from science-funding agencies.

Revenue from project administrative charges for academic year 2010/2011

	Date	Project Name	PI	Department	%age charge in USD
18	5/7/2010	lund univ	Prof. Bashaasha	Agri Business	69.00
19	5/7/2010	Ruforum	Dr. Mutetikka	Animal science	1,468.00
20	9/7/2010	ACP	Dr. Isubikalu	Agric extension	2,052.00
21	9/7/2010	Fredkorpset	Dr. Mugisha	AgriBusiness	1,494.00
22	9/7/2010	SSCP	Prof. Tenywa	MUARIK	1,960.00
23	9/7/2010	IMPHOS	Dr. Ebanyat	Soil science	1,050.00
24	9/7/2010	Agra Soil Healrth	Dr. Mulumba	Soil science	7,800.00
25	23/7/2010	water is life	Dr. Muyanja	Food science	407.07
26	23/7/2010	SSCP	Prof. Tenywa	MUARIK	3,536.33
27	23/7/2010	Watershed	Prof.Tenywa	MUARIK	1,080.00
28	23/7/2010	Watershed	Prof. Tenywa	MUARIK	2,370.42
29	23/7/2010	Bio Earn	Dr. Settumba	crop science	488.25
30	23/7/2010	ASARECA Cp	Dr. Settumba	crop science	700.00
31	23/7/2010	ASARECA TCp	Dr.Settumba	crop science	875.00
32	19/8/2010	ASARECA TCp	Dr. Settumba	crop science	1,000.00
34	3/9/2010	Carnegie	Dr. Karungi	crop science	840.00
35	3/9/2010	ASARECA	Prof. Tenywa	MUARIK	

					663.60
36	3/9/2010	SSACP	Prof. Kyamuhangire	Food science	1,330.00
38	9/9/2010		Prof. Kyamanywa	crop science	325.28
39	13/9/2010		Soil Science	Soil science	27.11
40	27/9/2010	Danida	Dr. Mangheni	Agric extension	350.00
41	5/10/2010		Dr. Kugonza	Animal science	285.00
42	5/10/2010	ASARECA conservation		Animal science	800.00
43	5/10/2010	ASARECA	Dr. Kasenge	AgriBusiness	350.00
44	5/10/2010	SSACP	Prof. Tenywa	MUARIK	1,689.94
45	5/10/2010	Peanut	Dr. Kaaya	Food science	550.20
46	5/10/2010	ASARECA	Dr. Kasenge	Agribusiness	315.00
47	5/10/2010	EduLink	Dr. Kibwika	Agric extension	7,521.43
48	9/12/2010	ASARECA	Prof. Tenywa	MUARIK	1,657.11
49	9/12/2010	Mcknight	Dr. Bisikwa	crop science	5,810.00
50	9/12/2010	Mcknight	Prof. Bareeba	Animal science	2,030.00
51	9/12/2010	Mcknight	Prof. Muyonga	Food science	4,235.00
52	9/12/2010	BBSRC	Dr. Settumba	crop science	1,576.16
53	9/12/2010	Ruforum	Dr. Okori	crop science	1,240.00
54	4/1/2011	ASARECA TCp	Dr. Settumba	crop science	875.00
55	4/1/2011	Carnegie	Dr. Karuhanga	Agric extension	840.00
56	4/1/2011	Enrecca	Dr. Edema	crop science	2,231.36
57	4/1/2011	CAPS	Dr. Bashaasha	Agric extension	873.63
58	4/1/2011	ASASRECA	Dr. Settumba	crop science	700.00
59	4/1/2011	ASARECA	Dr. Edema	crop science	482.50
60	37/1/2011	Purdue	Dr. Sserunkuuma	AgriBusiness	555.00
61	37/1/2011	Bio Earn	Dr. Okori	crop science	300.00
62	17/2/2011	RUFORUM	Dr. Tusiime	crop science	1,313.00
63	17/2/2011	Climate change	Dr. Bukenya	Agric extension	

		adoption			1,213.00
64	25/2/2011	Progro	Dr Kabi	Agric extension	2,618.24
65	7/3/2011	Mcknight	Dr. Okori	crop science	2,205.00
66	4/4/2011	Ipm food seceurity	Prof. Kyamanywa	crop science	3,791.83
67	6/4/2011	Purdue	Dr. Sserunkuuma	AgriBusiness	700.00
68	7/4/2011		Dr. Kasisira	Agric engineering	757.00
69	7/4/2011	AAU	Prof. Muyonga	Food science	2,002.38
70	11/4/2011		Dr. Mugisha	AgriBusiness	24.00
71	27/4/2011	peanut CRS	Dr Kaaya	Food science	1,260.00
72	18/5/2011		Dr. Kasisira	Agric engineering	135.00
73	16/5/2011	ASARECA	Dr. Settumba	crop science	2,740.00
74	26/5/2011	Unibrain	Prof. Kyamanywa	crop science	3,500.00
75	27/5/11	CRSP Beans	Dr. Nakimbugwe	Food science	1,648.36
76	27/5/11	International pot. Centre	Dr. Bagamba	AgriBusiness	1,380.50
77	27/5/11	Vicres	Dr. Bannadda	Food science	1,320.00
78	27/5/11	L3f	Prof. Tenywa	MUARIK	88.80
79	27/5/11	Unibrain	Prof. Muyonga	Food science	3,500.00
80	27/5/11	CRSP HORT	Dr. Isubikalu	Agric extension	816.44
81	27/5/11	RUFORUM	Dr. Nabasirye	crop science	581.05
82	27/5/11	RUFORUM	Dr. Bisikwa	crop science	1,249.80
83	27/5/11	RUFORUM	Dr. Edema	crop science	1,205.25
84	27/5/11	RUFORUM	Dr. Mangheni	Agric extension	1,325.00
	TOTAL	100,178.04			
Source of information: Project Accountant. Rachael Nerima					

2.4.5. 5.1Statement of Financial Performance – Administrative charges for the period ended 30th June 2011 FY 2010/2011

Account Revenue	USD
------------------------	------------

G271 (overhead charges)	100,178.04	
FY 2009/2010 Surplus	96,125.67	
Total revenue	196,303.71	
Expenses		
Salaries & wages	16,856.00	
Bank charges	5,011.65	
Equipment service & repair	11,786.89	
Fieldwork costs	12,000.00	
Travel	56,878.43	
Vehicle	63,369.21	
workshop expenses	3,970.00	
Total expenses	169,872.18	
Suplus/(deficit)	26,431.53	
Source: Nerima Racheal - Project Accountant		

2.4.5. 3 The College Capacity Building Fund (CBF)

To increase the financial base the college proposed that a College Capacity Building Fund be established. The capacity building component of the College may be attractive to investors, and financed through a proposed College Capacity Building Fund. These funds will be based on contributions to a Trust Fund, and/or multiyear commitments to an agreed programme and achievement of milestones. The fund will be available to scientists on a competitive basis and will assist scientists access and start up of activities. The CBF will:

- Fund Uganda scientists on a competitive basis, for thesis research, postdoctoral fellowships, and/or as principal investigators for specific projects.
- Fund non Uganda scientists on a competitive basis, for thesis research, postdoctoral fellowships, and/or as principal investigators for specific projects.
- Specifically target awards toward women and young scientists, and those from post-conflict countries in Africa.
- Ensure scientific leadership by supporting scientists with a mix of competencies and experience via north south partnerships to mentor young programmes and scientists undertaking research and postdoctoral studies.
- Support short-term training courses and graduate studies (MSc and PhD) where there is demonstrated need in the country and region.
- Provide small grants to assist with proposal preparation.
- Encourage proposals with links to colleagues in national agricultural research institutes and universities in Africa, international research institutes, and/or the international scientific community.

The Terms of Reference for the establishment of the CBF will be set by the College Board

with support from the University Graduate and research Board and other relevant bodies. The CBF will build on experiences of NORAD, climate change and IPM CRSP projects which have all implemented similar activities in the past

2.4.5 Challenges for Resource Mobilization and future plans

2.4.5.1 How to mobilize and effectively utilize resources for training, research and outreach

Although the College contributes significantly to agricultural research, human resources and development, it does not get core funding for investment in research largely because it falls under the Ministry of Education and Sports. The new NARS policy only provides a window of opportunity via competitive funding. It is justifiable that MUCAES benefits from core government funding in these functions.

The Opportunity: Achieving this requires lobbying and influencing national policy. One way of doing so is to engage in dialogue with policy makers but also to demonstrate the potential benefits of doing so through policy research. Other strategies include writing research proposals that attract funding for research and post-graduate training. Here, MUARIK and other existing infrastructure are huge resources to build on. MUARIK however, needs serious rehabilitation to be attractive and to be able to supply products that clients expect.

2.5. Student support services and welfare

The core student welfare and support services such as accommodation, counseling, recreation and sports and university health services are centrally managed. The Dean of students at the University level handles issues of accommodation. The University hospital provides health and counseling services to all students. Several University recreation grounds are used by students for sports. Students are sensitized on all these facilities during the orientation week on the first reporting in the semester.

MUCAES in support of students has created a conducive environment for students to socialize and engage in social and academic activities such as symposiums, conferences; seminars beach parties, outreach, dinner parties and sports. These activities are organized by the student associations and council based on schools and programmes

2.5.1 Summary of the student Associations by school

School of Agricultural Sciences
Makerere University Land Managers Association(MULIMA)
Makerere University Agricultural and Rural Innovation Student's Association(MUARISA)
Makerere University Bachelors of Agriculture Students Association(MUBASA)
Makerere University Agribusiness students Association(MUABSA)
Makerere University Horticulture Students Association(MUHOSA)
School of Forestry, Environmental and Geographical Sciences

Forestry Association of Makerere University(FAMU)
Makerere University Tourism Association (MUTA)
Makerere University Environmental Management Association(MUEMA)
School of Food Technology Nutrition and Bio engineering
Makerere University Agricultural Engineering Students Association(MUAESA)
Makerere University Food Science and Technology Students Association (MUFOSTA)

2.5.2. Students Financial Support

The collegiate within its limited resources has put in place strict measure geared towards funding students developmental activities leaving out social activities like beach bashes as a matter of policy.

School activities are financially supported by students' contributions including outsourcing from organizations like NGOs, Government ministries and companies.

The College finances academic, outreach and income generating projects and activities that market the college. The Principal as patron to the student's council instituted a mechanism of encouraging students to write project proposals and offered loans for income generation and promoting entrepreneurial skills.

2.5.3 Challenges to student support services and way forward

In its former Faculty system student's welfare was fully catered for by the Dean of students. During the transformation of the University into colleges, student councils were instituted without a budget allocation. Inadequate funds to fully support diverse student projects and activities including delays in release of funds due to the procurement procedure have been major concerns by the students.

Opportunity: A window of opportunity to allow student associations to generate income was opened by the Principal. Through this channel, a group of students with winning project proposals can borrow money at no interest to execute their projects and later return the money and retain the profits. A number of projects have been successful.

However, lack proper accountability and management skills have been major setbacks to the continuity of projects from one group to another. Working out on how to streamline students support and welfare services into the budget and forging a way of incorporating entrepreneurial management skills in programmes could be part of the steps to address the situation.

3.0 SECTION THREE: CROSS CUTTING FUNCTIONS

3.1 Quality Assurance and change management framework.

The college constituted the quality assurance committee which is a subcommittee of the academic board to ensure quality standards. It is constituted by Deputy Principal, College Registrar, Deans, Representative from the respective School Committees and Heads of Departments. *3.1.1 Innovations in management of quality assurance*

MUCAES established principles that enhance its contribution, effectiveness and impact in training, research and development within Makerere University, Uganda and the region. The core principles are: performance over equity, competitiveness, value addition, development of relevant programmes, well targeted training and capacity building programmes, subsidiary rule in management and accountability.

Training is done at Department level but overseen by Schools. Research and development Projects and interventions are coordinated by project leaders from Departments and Institutes. In past six years a lot has been achieved in terms of Quality Assurance as highlighted below.

3.1.2 Knowledge transfer and partnerships

The MUARIK and the Continuing Adult Education Centre Kabanyolo, have been used as off-campus learning centres for participatory learning and action research approaches for technology dissemination, networking, information and knowledge sharing. These have improved the value of the findings and enhanced spill over across schools. For better links between R&D institutions in the country, strategic partnerships have been formed including policy-makers, scientists of various disciplines, NGOs and civil society organizations, farmers' representatives, public and private sector players.

3.1.3 Monitoring evaluation of teaching and learning

Makerere University in its effort to improve teaching and learning, piloted an online teaching and learning evaluation tool dubbed "*Academic Records Management System(ARM)*". In response, MUCAES web administrator Mr. James Kisoro was trained and later organised training sessions for both the staff and students. Students can now use their registration numbers and an auto generated password to log in to evaluate lecturers on three components namely; the relevance of the teaching materials, teaching methods for and lecturers personality. The college will continue to adapt methodologies and tools that can capture and quantify issues in processes and activities as part of a viable and effective M&E system.

3.1.4 Research and innovation indicators

A number of new technologies were made available for transfer as explained earlier. Our students under lecture supervision have linked with farmers, processors, and others who have adopted new technologies. These technologies include agro processing, improved farming practices, wild life and environmental management.

3.1.5 Human resources capacity indicators

Over the six years, the number of students graduating has continued to increase with high completion rates. The college has tremendously contributed to the production of high caliber human resources working in different public and private sectors offering basic, technical and consultancy services in field of agriculture, forestry, environment among others.

3.2 Gender mainstreaming

Makerere University has put in place a gender mainstreaming policy. This policy guides operations of all University Units and especially how it relates with all its partners. To improve participation of women in MUCAES programmes, the college has put in place the following strategies:

Improving women student enrolment:

The College has improved the participation of women in training programmes to address the issue of pre-university barriers by:

- Re-branding agriculture to dispel gendered myths and stereotypes of sciences.
- Addressing barriers that hinder women from progressing to post-graduate training. A special programme to address this shall be put in place.
- Adopting gender budgeting to ensure that scholarships address the gender needs of both female and male married students.
- Investing in training of women training and providing research opportunities.

Conducting awareness campaigns.

This involves conducting sensitization programmes regularly as well as progress review meetings of all leaders and staff on gender and development. This has increased awareness about importance of gender analysis and implementation.

Strengthening gender policy understanding: This includes strengthening institutional gender policies that commit institutions in taking lead role in ensuring gender equality.

Enhancing gender mainstreaming: The implementation of this involves institutional arrangements that support multi-disciplinary activities, teamwork, creative thinking, flexibility and risk-taking. The College will also develop a mechanism for monitoring progress of institutional learning on gender mainstreaming.

Scaling up training of younger graduates on gender analysis: This will include the following activities:

- Providing training on basic gender analysis to all students
- Increase students' skills in gender and diversity through the curriculum
- Build a supportive and participatory environment for all gender
-

Introduction of mentoring programmes: The College will provide strong mentoring programmes for female students and staff on career professional upgrading. This effort is meant to build capacity of staff and students in gender and diversity.

Enhancing gender mainstreaming among partners: Partnerships between local and international institutions, NGOs and farmer organizations to help move towards success in addressing gender issues in agriculture. This will include up-scaling of best practices for gender mainstreaming.

Gender mainstreamed research agenda: The College will expand the research agenda to include the needs and problems of women farmers and other engaged in environmental R&D and development in general. Other actions include revisiting the criteria for research priorities from a gender perspective.

3.3 Information Communication Technology (ICT) Report

The College has fairly equipped computer laboratories. Most of the equipment are functional and incur soft ware problems that are worked upon as they emerge. However, MUARIK computer laboratory has major hiccups with almost all computers not functioning. Power cuts and inadequate internet portals are other challenges. Below is tabular summary of the ICT in the College.

3.3.1 School of Food Technology, Nutrition and Bio-systems engineering					
No. of Laboratories.		Capacity	Available Computers	Functional Computers	Faulty Computers
1	Lab 1	28	28	22	6
Other Equipment					
No. of Staff Computers					
Laptops					
Printers		3			
Scanners		1			
Projectors		1			
Projector Screens		0			
Generators		1			
Modems		0			
Points to note/Actions taken:					
<ul style="list-style-type: none"> ➤ Looking forward to provision of funds by the college to repair the faulty ones. ➤ There is room for more 28 Computers in the building ➤ The <i>student : Computer</i> ratio is very low ➤ There is a need to provide a wireless network to ease access to those with their own laptops so as to reduce congestion in the laboratory (mak air is very poor around the school) 					

3.3.2 School of Forestry, Environmental and Geographical Sciences

Department of Forestry, Tourism and Bio-diversity

No. of Laboratories.		Capacity	Available Computers	Functional Computers	Faulty Computers
4	Room 300	25	25	25	0
	Room 209	50	30	25	5
	Room 208	12	12	12	0
	Room 111	10	8	8	0
		Total =97	Total = 75	Total = 70	Total = 05

Other Equipment

No. of Staff Computers	64			
Laptops	23			
Printers	23			
Scanners	5			
Projectors	8			
White Screens	Fixed : 6 Mobile : 4			
Generators	2			
Modems	0			

Points to note/Actions taken:

- Most are functional. Looking forward to provision of funds by the college funds to repair the faulty ones.

Department of Geography, Geo-informatics and Climatic Sciences

No. of Laboratories		Capacity	Available Computers	Functional Computers	Faulty Computers
2	GIS Lab	32	20	20	0
	Masters Lab.	20	0	0	0
		Total = 52	Total = 20	Total = 20	Total = 0
Other Equipment					
No. of Staff Computers		3			
Laptops		1			

Printers	1				
Scanners	0				
Projectors	1				
White Screens	0				
Generators	0				
Modems	0				
Department of Environmental Management					
No. of Laboratories		Capacity	Available Computers	Functional Computers	Faulty Computers
2	GIS Lab	12	12	6	6
	Wet Lab.	33	33	4	29
	PhD Lab.	25	25	24	1
	Molecular Lab	4	4	4	0
		Total = 74	Total = 74	Total = 38	Total = 36
Other Equipment					
No. of Staff Computers		15			
Laptops		11			
Printers		9			
Scanners		2			
Projectors		6			
White Screens		2			
Generators		2			
Modems		0			
3.3.3 School of Agricultural Sciences					
No. of Laboratories		Capacity	Available Computers	Functional Computers	Faulty Computers
8	Undergraduate Lab	40	38	38	0
	Sida Sarec (Masters) Lab.	20	20	20	0
	Soil science Lab.	18	18	18	0
	Animal science Lab.	10	10	5	5
	Agric Economics Lab.	10	10	5	5
	Agricultural Engineering Lab.	8	8	5	3
	Agriculture extension Lab (Masters).	10	7	7	3

	MUARIK Undergraduate Lab.	35	7	0	7
		Total = 151	Total = 118	Total = 98	Total = 23
Other Equipment					
Staff Computers					
Laptops		2			
Printers					
Scanners		3			
Projectors		6			
White Screens		3			
Generators		1			
Modems					
Fax machines		1			
Points to note/Actions taken <ul style="list-style-type: none"> ➤ All cases were reported to HODs by IT Systems administrators ➤ Maintenance falls under respective departments ➤ MUARIK undergraduate Lab has been abandoned Source: IT Systems Administrators					
Source: College IT Systems Administrators					

3.3.4 Challenges for ICT development, proposals and way forward

How to develop and rationalize modern research and training infrastructure

Given the resource constraints, it is wise to rationalize investments in R&D infrastructure development especially for cutting-edge science and technology. It is also recognized that the existing equipment and infrastructure could be better utilized if their use is rationalized.

The opportunity: The former faculty systems made each department own and control their R&D facilities which often, made it difficult for other departments to access such facilities. With this collegiate system students can now access and share available resources irrespective of the school or programme. Secondly the relocation of the college to Kabanyolo will provide a lasting solution in the long run.

3.4 Partnerships and Networking

3.4.1 Collaborators and Donors

The College through writing proposals for competitive grants has continued to receive funding from a number of donors including:- DFiD-British Council, EU-ACP EDULINK; Millennium Science Initiative, RUFORUM, Rockefeller Foundation, Carnegie foundation, AGRA, ASERCA, Sida, NORAD, DANIDA, USAID, MacArthur Foundation, The Dutch Government, McKnight Foundation to mention but a few.

Similarly the College has had strong collaborative programs with a number of centres of excellence nationally, regionally and internationally. Notable among these are Ohio State University, Iowa State University, Swedish University of Agricultural Sciences, University of Wageningen, National Agricultural Organization, UNESCO-IHE, Institute for Water Education in The Netherlands, Trinity College Dublin, University of Copenhagen, Edmonton Waste Management Centre of Excellence in Canada. These partners have played a significant role in human capacity building and research.

Our Makerere University Biological Field Station at Kibale has continued to attract and host international researchers from renowned universities both nationally and internationally. These include:

- Professor Richard Wrangham from Harvard University, USA
- Professor David Watts from Yale University, USA
- Professor John Mitani from Michigan University, USA
- Professor Colin Chapman from McGill University, Canada
- Professor Lauren Chapman from McGill University, Canada
- Professor Tonny Goldberg from University of Wisconsin, Madison, USA
- Professor Jessica Rothman from Hunter College of the City University of New York, USA
- Professor Joana Lambert from University of Texas, USA
- Professor Heikki Roininen from University of Eastern Finland
- Professor Kiremire, Makerere University, Uganda
- Assoc. Prof. Philip Nyeko from Makerere University, Uganda
- Dr. Freerk Molleman, from University of Eastonia, Eastonia

A number of national and international field training courses have been conducted at the field station. The national ones include field courses from Makerere University (Institute of Environment and Natural Resources; Departments of Botany and Zoology; Centre for Continuing Education and Wildlife Clubs of Uganda.

Internationally, courses included those from the Tropical Biology Association, University of Liverpool, Imperial College London, UK; and, McGill University, Canada.

We have worked closely with government institution like, the Wetlands Management Department in the Ministry of Water and Environment, the National Environment Management Authority, National Water and Sewerage Corporation and the Directorate of Water Resources Management. The College trained 7 PhDs (2 from the Islamic University in Mbale, One from Gulu University, three from the University of Eastern Finland and one from Makerere University) and 10 MSc students from different universities in the country.

3.4. 2 Benefits from collaborations

The College staff and students have had numerous projects supported by different stakeholders in different areas of crop, animal, food processing and environmental related

research. They include the following the AGRA, ASERECA, SCARDA, BBSRC, BIOEARN, BMGF CARNNIEGE, NORAD, RUFORUM, McNight Foundation, DANIDA, FANRPAN, JICA, EU, SIDA,USAID,VICRES. Government also extended support under the Presidential Initiative for value addition that led to the establishment of the Food Technology and Incubation Centre.

Some of the funded projects are listed below:

3.4.2.1 Summary of ongoing projects

Code	Project Name	Project PI
001-AAU-001	AAU- Enhancing contribution of Science & tech	Prof. Muyonga John
001-AGRA-001	AGRA Soil health	Dr.MulumbaN. Lukman
001-AGRA-002	Master in crop science -Uganda & Rwanda	Dr. Edema Richard
001-AGRA-003	Development of rust tolerant Soybean varieties	Dr.Tukamuhabwa Phinehas
001-ASERECA-001	Efficient Use of Crop Residues-Mt. Elgon	Prof. Tenywa M. Moses
001-ASERECA-002	Promotiing sustainable Natural Res. Management Governance	Prof. Kasenge Valentine
001-ASERECA-003	ASARECA Tissue Culture project	Dr. Settumba Mukasa
001-ASERECA-004	ASARECA Conservation project	Dr. Settumba Mukasa
001-ASERECA-005	SCARDA	Dr.Edema Richard
001-BBSRC-001	BBSRC Sweet potato project	Dr. Settumba Mukasa
001-BIOEARN-001	BIOEARN PhD student Mbanzibwa	Dr. Settumba Mukasa
001-BIOEARN-002	BIOEARN-Harness' common Cereal Beverages	Dr.Byaruhanga B. Yusufu
001-BMGF-001	PROTA -Plant Resource of Tropical Africa	Dr. Nakabonge Grace
001-CARNG-001	Pepper Project	Dr. Karungi Jeninah
001-CARNG-002	Production of high value peanut based-gnut Af	Dr.Bisikwa Jenipher
001-CARNG-003	Assess't &coop of corp advntgeof RICE pc	Dr. Hyuha S. Theodora
001-CARNG-004	Assessment of the impact of HIV on management and production of livestock.	Dr. Karuhanga M. Beraho
001-CHICAGO UNIV-001	Monitoring and evaluation of COMPACI program in	Dr. Haroon Sseguya
001-CIP-001	International potato project -climate vulnerability	Dr. Bagamba Fredrick
001-CIP-002	AHIPA-Enhancing Yam Bean 4 food quality and farm systems	Dr.Tukamuhabwa Phinehas
001-COL-001	Lifelong learning for farmers (L3F)	Tenywa M Moses (prof)
001-DNDA-001	SHIP - Seed health Improvement Project	Kyamanywa Samuel (Prof)
001-DNDA-002	CB for biosafety & ecological impact in EA	Edema Richard (Dr)
001-DNDA-003	DANIDA MSC PROGRAMME	Margaret Mangheni (Dr)
001-DNDA-004	Plant health systems-a novel approach to	Matsiko Franki (Dr)
001-DNDA-005	Saving a precious crop-mgt of sitagota d	Okori Patricki (Dr)
001-DNDA-006	PROGROV-Productivity &growth in organic	Kabi Fred (Dr)
001-EU-001	IWMNET -Integrated Watershed mgt in EA	Tenywa M. Moses (prof)
001-EU-002	School gardening UPE Eastern Uganda by RUFORUM	Kibwika Paul (Dr)

001-EU-003	EDULINK Strengthening Agricultural & rural Innovation systems in E	Kibwika Paul (Dr)
001-EU-004	Strengthening university capacity-SUCAPRI	Tenywa M Moses (Prof)
001-FANRPAN-001	FANRPAN	Kyamanywa Samuel (Prof)
001-FARA-001	SSA-CP (Sub saharan Africa Program)	Tenywa M. Moses (Prof)
001-FARA-002	SSA-CP (Sub saharan Africa Program)	Kyamuhangire William (Dr)
001-FINLAND-001	Finland sweet potato project	Settumba Mukasa Dr)
001-FSKPSet-001	Fredskorpset Agribusiness Exchange	Mugisha Johnny (Dr)
001-HENA-001	Hena Project	Kikafunda Joyce(Dr)
001-i@mak-001	Setting up food Tech & Business incubation	Muyonga John (Prof)
001-IAEA-001	Effect of land use practices on poll-Isotopy	Tenywa M Moses (Prof)
001-IFPRI-001	Making rural services work for the poor	Bernard Bashaasha (Dr)
001-IGF-001	CAEC -Continuing Agricultural Education Centre	Kabi Fred (Dr)
001-IMPHOS-001	IMPHOS-Development of efficient & profitable fertilizers in Ug	Ebanyat Peter (Dr)
001-IOWA-001	CRSP SOIL Project	Tenywa J.S. (Dr)
001-IRISH AID-001	Water is life	Muyanja Charlesl
001-IUCEA-001	BIO-EARN Sorghum	Okori Patrick (Dr)
001-JICA-001	Case study on Rice population expansion in Africa	Sserunkuma Dick (Dr)
001-JICA-002	Prevention of violent conflict in Africa	Sserunkuma Dick (Dr)
001-McNgt-001	Promoting production & utilization of grain amaranth	Muyonga John (Prof)
001-McNgt-002	Towards increased Agricultural productivity	Bareeba FB (Prof)
001-McNgt-003	Improving food security-Cowpea	Bisikwa Jenipher (Dr)
001-McNgt-004	McKnight	Okori Patrick (Dr)
001-Nestle-001	Potential of grain amaranth to improve nutrition	Muyonga John (Prof))
001-NORAD-001	Post Doctoral Research	Kugonza Donald Rugira(Dr)
001-NORAD-002	Determination of optimum breed crosses and feed	Mutetikka David(Dr)
001-NUFU-001	Value addition to traditional Ugandan food	Byaruhanga B. Yusufu (Dr)
001-RKFL-001	Climate Change - Rockefeller	Kyamanywa Samuel (Prof)
001-RKFL-002	Climate Change adoption	ukenya Christopher l (Dr)
001-RUFORUM-001	RU2009 CC03	Nabasirye Margaret (Dr.)
001-RUFORUM-002	RUFORUM Phd Regional program	Patrick Okori (Dr.)
001-RUFORUM-003	RUFORUM Prospects of aquaculture-poverty	Hyuha Shuwu Theodra (Dr.)
001-RUFORUM-004	Participatory management of striga in cereals in Eastern Uganda	Bisikwa Jenipher (Dr)
001-RUFORUM-005	Ruforum2009 GRG04	Mangheni Margaret (Dr.)
001-RUFORUM-006	Developing appropriate feeding and breeding strategies for PIG production.	Mutetikka D (Dr.)

001-RUFORUM-007	Understanding persistence foot & mouth diseases	Prossy Isubikalu (Dr)
001-RUFORUM-008	Integrating indigenous & scientific soil quality	Karuhanga Beraho Monica (Dr)
001-RUFORUM-009	Development, Promotion and dissemination of PIGEON Peal Leaves	Edema Richard (Dr)
001-RUFORUM-010	Adopting Soybean varieties-RU2010GRG22	Ebanyat Peter (Dr)
001-RUFORUM-011	Part'ry selection -drought tolerant Cassava	Osiru Moses (Prof)
001-RUFORUM-012	Developing a broad soyabean germ plasm base	Tukamuhabwa Phinehas (Dr)
001-RUFORUM-013	Green gram improvement	Dr Talwana Herbert (Dr)
001-RUFORUM-014	Development of improved barley varieties	Dr Richard Edema(Dr)
001-RUFORUM-015	conserve and screen premium value indi pla	Agnes Namutebi (Dr)
001-RUFORUM-016	Enhancing potato production & market access in Uganda	Johnny Mugisha (Dr)
001-RUFORUM-017	Hot pepper root rot & wilt mgt	Tusiime Geoffrey (Dr)
001-SIDA-001	Enhancing value chain systems for sustainable Agriculture	Mugisha Johny (Dr)
001-SIDA-002	Bio innovate Cassava/Sweet potato	Kyamanywa Samuel (Prof)
001-UNCST-001	MSI Dairy -MSI/WCI/1/012/07	Kabi Fred (Dr)
001-UNCST-002	MSI sorghum/maize improvement project	Okori Patrick (Dr)
001-UNCST-003	MSI cassava project	D S Osiru (Prof)
001-USAID-001	Aqua Fish CRSP project	Kasisira Levi s (Dr)
001-USAID-002	AquaFish CRSP project	Shuwu Hyuha Theodra (Dr)
001-USAID-003	IPM CRSP- Invasive species program on parthethium	Kyamanywa Samuel (Prof)
001-USAID-004	IPM Food security	Kyamanywa Samuel (Prof)
001-USAID-005	CRSP Beans	Dr Dorothy Nakimbugwel (Dr)
001-USAID-006	ISU CRSL	Kyamanya (Dr)
001-USAID-007	CAPS –Development & transfer of conservation agriculture	Bernard Bashaasha (Dr)
001-USAID-008	Peanut CRSP improving health of p in E A	Archileo N Kaaya (Dr)
001-USAID-009	Peanut CRP-Aflatoxin free peanut based	Nakimbugwe Dorothy (Dr)
001-VICRES-001	Banana Tissue culture & nutrient enhance	Muyonga Johnl (Prof)
001-VICRES-002	Trends in livestock production - Vicres	Bareeba B. Felix (Prof)
001-VICRES-003	Vicres	Nakimbugwe Dorothy (Dr)
005-BioIntl-001	Development of strategies and conservation of Prunus Africana	Eilu Gerald (Prof)
005-CARNG-001	Development of improved protocol Honey in Uganda	Mugabi Paul (Dr)
005-CARNG-002	Wild food plants consumed in Uganda	Galabuzi Charles (Mr)
005-CARNG-003	Morpho-genetic & chemical characterization of	Nakabonge Grace (Dr)

	local shea	
005-EC-001	FOREAIM Bridg restoration & multiplication of forest industry	Eilu Gerald (Prof)
005-IFS-001	Sustainability of Eucalyptus hybrid	Nakabonge Grace (Dr)
005-IIED-001	REDD for sustainable local livelihoods	Nabanoba Gorettie (Dr)
005-RUFORUM-001	Evaluation of Metartrizium – Maize & Grevillea	Nyeko Philip (Dr)
005-RUFORUM-002	RU-2010-GRG-25	Balaba Susan Tumwebaze (Prof)
005-VWF-001	Institutions role in forest resource & livelihood Management	Gombya Ssembajjwe (Prof) EA
007-ARP-001	Botanic Garden	Segawa Paul (Dr)
007-Cophgen-001	VECEA-Vegetation changes in Uganda	Kalema James (Dr)
007-IFS-001	Atmospheric deposition - L. Vic	Arinaitwe Kenneth (Mr)
007-SANBI-001	API-African Plants Initiative	Segawa Paul (Dr)
007-SIDA-001	Integrated process-Agro process waste treatment	Kyambadde Joseph (Dr)
007-VICRES-001	Ethno botany, Bioassay & Active compounds	Kakudidi Esezah (Dr) Tuberculosis Pjt
009-NORAD-001	NOMA master in urbanism QVSFOT	Nawangwe Barnabas (Dr) Tech
010-CIDA-001	Enhancing Rural livelihood in Uganda's tourism	
010-NARO-001	Enhancing survivability of Goat kids in South western Uganda	Mugisha Anthony (Dr)
013-EU-001	EU-Contrast Project	Nyakana Silvester (Dr)
013-IUCEA-001	BIO-EARN	Kansiime F. (Prof) & Kyambadde J.(Dr)
013-McArthur-001	MacArthur Project	Kansiime F. (Prof)
013-RUFORUM-001	RUFORUM MMJ	Kansiime F. (Prof) & Majaliwa M.J (Prof)
013-UNESCO-001	UNESCO-IHE, POWER Project	Kansiime Frank. (Prof)

3.4.3 Proposals for strengthening Collaboration

Knowledge generation through R&D

MUCAES shall undertake R&D along the research and development continuum that includes basic, strategic and applied R&D activities in agriculture, food technology and nutrition and environment occurs. R&D will also target critical development challenges as well as novel or emergent areas such as climate change. The R&D activities will be implemented mainly through postgraduate research activities. This research portfolio is cognizant of the gaps that need to be filled and seeks to intensify investments in critical areas for Uganda and the region.

Knowledge Management and Communication

MUCAES will maintain a close communication link with personnel involved agricultural research training and development activities such as public and private sector, government, CGIAR centres, NGOs and universities etc. Communication will also be established with the rest of the stakeholders such as farmer organizations, service providers, and the donor community. In addition, effective communication is important to ensure buy-in and ownership by a whole range of stakeholders, influence policy and technology uptake. Effective communication will be enhanced through electronic media (website, emails), print media, telephone, radio/audio visual, mass media, workshops/conferences, open days and community-based plays.

Partnership and Linkages for R&D

MUCAES will strive to build teams across schools to address different activities identified. There will be a proactive intensive approach to build or strengthen existing partnerships already developed within the University, country and in the region. Partnerships developed will include a range of stakeholders: scientists, agricultural advisory service providers, private sector, NGOs, policy makers, civil society and farmers. MUCAES will explore and harness linkages with organizations (such as advanced Universities and Laboratories) within and outside the region that would enhance implementation of the programme. MUCAES will also partner with critical stakeholder institutions and organizations to catalyse innovation that strengthens functionality of smallholder –based agriculture while conserving environment.

3.5 Physical Infrastructure plan and maintenance

Over the years the Units that form the MUCAES have under taken a number of institutional and infrastructural developments as shown in the table below:

Major infrastructural investments developed in the college over since 1996

Major Infrastructure	Capacity present	Capability	Needed capacity
Farm and Research land	700ha	Available	700 - 1000ha
Student Accommodation	200	Partially furnished	400 - 1000
Research Laboratories	8	Partially furnished	15 - 20
Training Laboratories	12	Partially furnished	15 - 20
Green Houses	6	Partially furnished	10

Speciality Laboratories	4	Partially furnished	4 - 6
Office Blocks	4	Partially furnished	Complete MUARIK

3.5.1 Challenges and proposals for strengthening research infrastructure

These investments notwithstanding still need expansion to meet the current and projected new projected student populations. There is an overall plan to shift College operations to MUARIK in the next 5 – 10 years to build enough infrastructure for teaching, research and outreach. The goal is to turn the college into a public research institute for practical training of agriculturalist and a centre for knowledge transfer in the region. The process of lobbying legislators towards this course already started. Through the president's support, the Chinese government has expressed interest to provide loans to develop the research institute at Kabanyolo.. This will require strategic investments in infrastructure development.

The College held several consultative meetings to brainstorm on the Kabanyolo Business model. A committee was formed to come up with a refined document. Below is the summary of the major components of the proposed plan and infrastructural requirements

3.5.2 Proposed plan and in infrastructure required for the relocation of MUCAES

Output	Infrastructure needed
Agro processing and value addition enterprise development	Milk and fruit processing and preservation plants, packaging and post harvest handling of stored food.
Quality planting materials for increased agricultural production	Screen house (1200m ²),Glass house (800m ²),Tissue culture Laboratory(400m ²),Culture Room(200m ²) and a generator, Automated Nursery, Mother garden(20ha) for germplasm- gene bank
Improved animal breeds including Mass rearing technologies of edible insects(Nsenene and Nswa)	Bio technology laboratory, Animal genetics conservation bank, Animal barns(1500m ²),Fencing and fish ponds(90ha), Elite herd, Nsenene and Nswa laboratory, Feedmills, silos, stores, processing and packaging and display house of 3000m ²
Conservation of indigenous endangered trees and medicinal plants	Land (8ha)
Pest and disease control diagnostic centre	National Quarantine and disease diagnostic laboratory 200m ² , Insect rearing laboratory 150m ² , Growth chambers, Green houses(150m ²),Trial sites, Diagnostic laboratory (200m ²), Entomology laboratory

	(150m2),Pathology laboratory (150m2)
Bio fertilizer production, Renewable Energy including Recycling and Reusing of bio waste eg biogas, briquettes, biodiesel and producer gas	Soil laboratory(200m2),Green house(1000m2),Production and packaging house(1500m2),Display house(1500m2)
Pulp and paper products	Paper plant building(3000m2),Parking and Log yard (7000m2)
Furniture and crafts	Carpentry workshop(3000m2)
Safe household water harvesting and storage	Water and Research Laboratory (400m2)
Lower cost irrigation	Green house and trial site(300m2)
Animal feeding materials	Feed mill, silos, feed store, Processing plant Packaging and Display rooms(3000m2)
Audio visual technology and Agribusiness Advisory dissemination centre	Building (1500m2)
Mapping and developing reliable weather forecasting site	Cartography building (1500m2)
Tourism and hospitality practical training	Well furnished guest house(To act as college guest house)

4.0 Conclusion and way forward

MUCAES has for the past six years endeavored to shift from outreach that portrays knowledge transfer to engagement and partnership with communities in Uganda to enhance agricultural development and sustainable use of natural resources. This includes farming communities for research and innovation, government and other public policy and R&D and bodies, students, private sector business and industrialists, civil society regional and global knowledge centers and development partners. MUCAES has built their capacity for mission fulfillment and engaged with them in innovation and development actions.

MUCAES is undertaking major reforms to strengthen its capacity in terms of infrastructure, human capacity and organizational management to enhance its contribution to national development by refocusing on training, research and outreach agenda to address the emerging global challenges.

4.2 College Strategic direction of the College

Being a newly established, the college evolved its 2011 – 2021 year strategic plan. The New Strategic Plan has six strategic goals, which are:

1. Develop and implement undergraduate, post-graduate and short courses responding to stakeholder needs from national to continental levels.
2. Design and deliver research products that are responsive to dynamic society needs and to build basic scientific foundation.
3. Strengthen the College structure to harness resources, assure quality, efficiency and effectiveness in the training, research and development processes
4. Develop highly professional staff in adequate numbers for innovative and adaptive training, research and practice.
5. Engage with public and private institutions in advocacy and policy formulation on the national, regional and continental scale.
6. Mobilize resources for sustainable implementation of innovative and impact oriented training, research and development.

4.3 Expected Outcomes and Performance Measures

The six strategic goals will contribute to the following outcomes which reflect the college's central role in human resource development, as well as generation of innovations and policy support needed to underpin agricultural development and economic development of Uganda while sustaining the environment. The outcomes are:

- Relevant and highly skilled human resources (graduate and undergraduate) for the agriculture and related subsectors, trained in a responsive, efficient and cost effective manner;
- Innovations, technologies and knowledge generated and promoted for improved agricultural production, increased productivity and sustainable use of the natural resource base;
- An effective and efficient Academic, Research and Outreach Institution that meets stakeholder demands and needs via strategic and economically viable and sustainable options;
- Key stakeholder information and applied knowledge needs supplied via outreach and tailor made training programmes;
- National Policy formulation and implementation strengthened through policy research and support activities.

