UNDERGRADUATE TRAINING AT THE SOKOINE UNIVERSITY OF AGRICULTURE

Msolla, P.M.

Abstract

Over the past seventeen years, Sokoine University of Agriculture has been recognized as one of the best Agricultural training institutions not only in Africa but the world over. Through this recognition, the University has had access to membership of leading academic Associations such as the Association of Commonwealth Universities, Association of African Universities and Inter-University Council of East Africa and has forged links with 27 other academic/ research institutions.

The University's output for the past seventeen years (1984-2001) is 5568 graduates including 5001 first degrees, 528 Masters and 39 PhDs. With increased social demand for education and the need for specialized skills, University enrolments have been increasing without corresponding resources, an aspect that may ultimately undermine the quality of its graduates. Equally true, while the University has received global recognition in terms of research output, publications as well as the quality of its graduates, its expertise has not effectively reached the Tanzanian peasant farmer.

This paper highlights the performance and the challenges the University faces in terms of training, future training needs, partnership arrangements and sustainability.

1 Background

1.1 Establishment

Parliamentary Act established Sokoine University of Agriculture (SUA) on the 1st July 1984. No.6 of 1984 from the former Faculty of Agriculture, Forestry and Veterinary Science of the University of Dar es Salaam. However, its history goes back to 1965 when it started as an Agricultural College offering Diploma training in agriculture. With the dissolution of the University of East Africa and the consequent establishment of the University of Dar es Salaam, the College became a Faculty of Agriculture of the University of Dar es Salaam on 1st July 1970. In 1973, B.Sc. Forestry was introduced while Bachelor of Veterinary Science was introduced in 1976.

Currently, the University has four faculties namely, Agriculture, Forestry and Nature Conservation, Science and Veterinary Medicine. Other academic units include the Development Studies Institute, the Institute of Continuing Education, the Directorate of Research and Postgraduate Studies, the

Computer Centre, SUA Centre for Sustainable Rural Development, the Library which was elevated to the status of a National Agricultural Library effective April 1992 by Parliamentary Act No.21 of 1991 and the SUA Pest Management Centre.

SUA has four campuses:

(a) Main Campus - situated 3 km south of Morogoro municipality.

(b) Solomon Mahlangu Campus (which was until 1991 the Solomon Mahlangu Freedom College of the African National Congress of South Africa) – situated about 10 km to the north-west of Morogoro municipality.

(c) Olmotonyi Campus - in Arusha which serves as a forestry training center.

(d) Mazumbai Forest Reserve - in Lushoto, a natural forest used for teaching and research.

The University also owns three parcels of land in the Uluguru mountains (Morogoro urban) – Morning side (6.8 ha), Towelo (19.5 ha) and Luhungu (3.2 ha).

SUA Centre for Sustainable Rural Development (SCSRD)

The Centre was established in July 1999 with the support of the Japanese Government with a primary objective of improving the capacity of SUA to develop and test participatory rural development strategies for sustainable rural development. Essentially, it is a people centred development where participants have to diagnose the problem, plan and implement sustainable rural development actions and ultimately establish a methodology for carrying out sustainable rural development programmes. These activities have started in selected sites in Mbinga and Morogoro.

SUA Pest Management Centre (SPMC)

The Centre was established in July 2000 with the support of the Belgian Government. The main function of the Centre is to undertake research into the control of a variety of pests as crop destroyers and their epidemiological role in the transmission of various zoonotic and non-zoonotic disease conditions. The Centre is also training rodents for mine detecting in war torn countries.

1.2 Mission of the University

The Mission of the University includes Training, Research, Extension and/or Community service. However, at the occasion of the inauguration of the University on 26th September 1984, the late Mwalimu J.K. Nyerere, the first Chancellor and then President of United Republic of Tanzania, requested the University to undertake production activities in addition to teaching, research, extension and / or community service. In terms of training, the objects and functions of the University among other things, include:

(i) to provide facilities for University education in the fields of or connected with agricultural sciences, including technological and /or through the medium of connected schools or institutes;

(ii) to assist in the preservation, transmission, dissemination and enhancement of knowledge in the fields of agriculture, fisheries, forestry, veterinary and allied or complementary sciences;

(iii) to create a sense of public responsibility for rural development among the educated, and to promote respect for learning and pursuit of truth; and

(iv) to prepare students to work with the workers and peasants of Tanzania in the agricultural, wildlife, livestock and allied sectors for purposes of the better development and strengthening of the national economy.

2 Achievement in Training

2.1 Undergraduate training programmes

The University now offers thirteen first degree programmes (compared to four in 1984 viz: *B.Sc. Agriculture, B.Sc. Forestry, B.Sc. Agriculture Engineering and Bachelor of Veterinary Medicine)* and these include:- B.Sc. (Agriculture General), B.Sc. (Forestry), B.Sc. (Agricultural Engineering), B.Sc. (Home Economics and Human Nutrition), B.Sc. (Food Science and Technology), B.Sc. (Animal Science), B.Sc. (Horticulture), B.Sc. (Agronomy), B.Sc. (Agricultural Education & Extension), B.Sc. (Agric. Economics & Agribusiness), B.Sc. (Wildlife Management), B.Sc. (Environmental Sciences) and Bachelor of Veterinary Medicine

Postgraduate programmes

The University also offers twelve Masters programmes in the following areas:

- MSc. (Agriculture)
- MSc. (Agricultural Education and Extension)
- Msc. (Agricultural Economics)
- MSc. (Soil and Land Management)
- MSc. (Agricultural Engineering)
- MSc. (Tropical Animal Production)
- MSc. (Food Science)
- MSc. (Human Nutrition)
- MSc. (Forestry)
- MSc. (Management of Natural Resources for Sustainable Agriculture)
- Master of Veterinary Medicine (MVM)
- Master of Preventive Veterinary Medicine (MPVM)
- M.A. (Rural Development)

In addition, the University offers PhD programmes and DSc in a wide range of disciplines.

2.2 Students enrolments

Students enrolment has been increasing gradually each year primarily due to high social demand for higher education. Figure 1 shows undergraduate students enrolment at SUA from 1994/95 to 2001/2002 while Table 1 shows the annual undergraduate student intake from 1990/91 to 2001/2002 academic year.

In keeping with the Corporate Strategic Plan to the Year 2005 and beyond, the target is to have a student population, including postgraduates, of 4000 by the year 2005 and achieve a staff students ratio of 1:10. Currently the University has an academic staff strength of 240 and a student population of 2330 making a staff student ratio of 1:9.7 i.e. more or less achieving the target of 2005. This staff: student ratio has been achieved at this early stage at the expense of the few staff who work for long and hard hours, implying a shortage of academic staff across the board.

Figure 1 Undergraduate students Enrolment at SUA from 1994/95 - 2001/2002

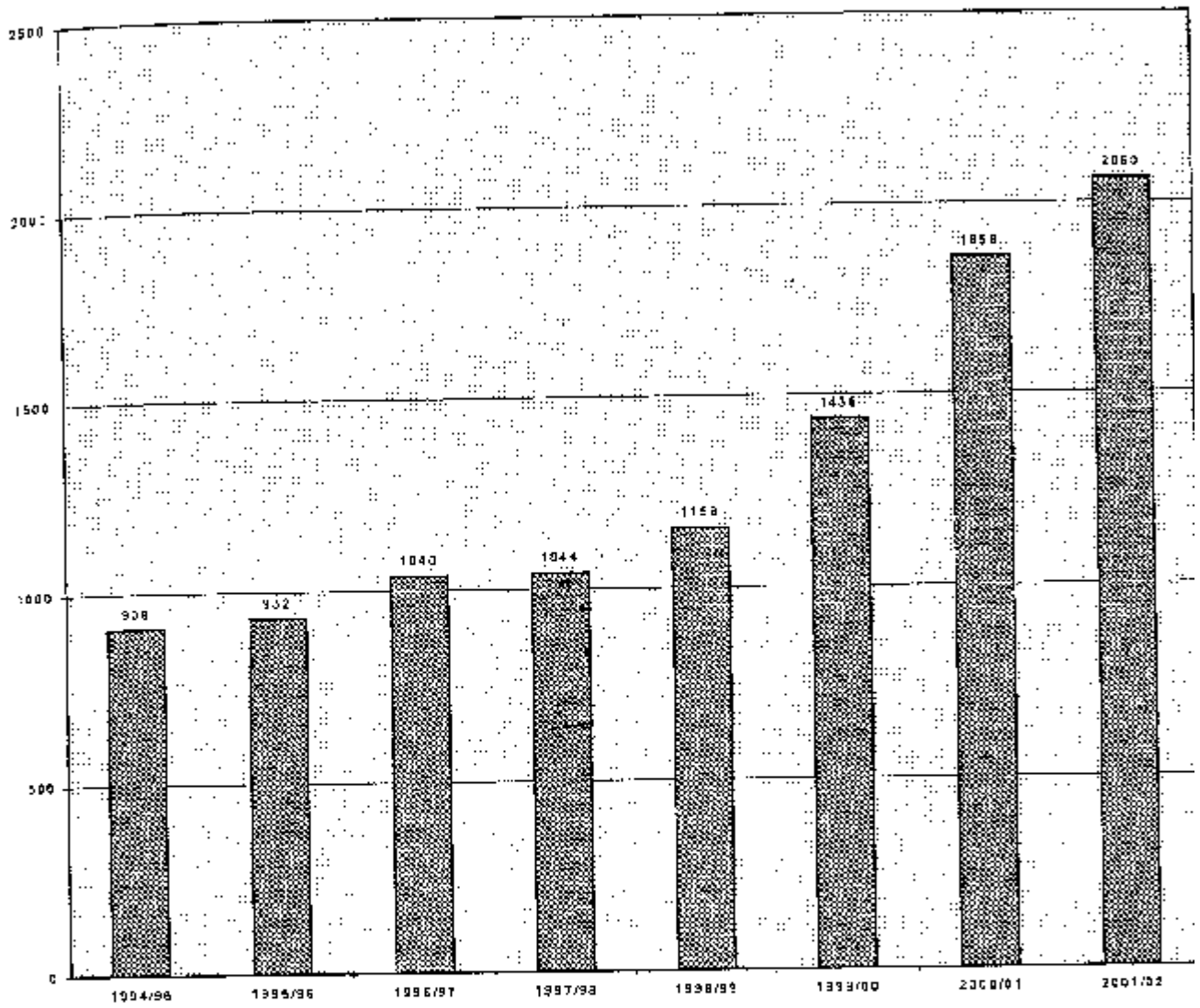


Table 1 Undergraduate Students Applications versus Enrolments 1994/95 – 2001/2002

Year	No. of Applicants			Admitted/enrolled				
	Male	Female	Total	Male	Female	%	Total	%
1990/91	108	41	449	173	34	16.4	207	46.0
1991/92	484	61	545	242	63	20.6	305	65.0
1992/93	480	62	542	240	70	22.6	310	57.0
1993/94	483	63	546	232	82	26.0	314	57.4
1994/95	480	120	600	232	83	26.0	315	52.5
1995/96	467	117	584	244	69	22.0	313	53.6
1996/97	502	126	628	288	91	24.0	379	60.0
1997/98	538	134	672	347	65	15.8	412	61.0
1998/99	822	206	1028	426	89	17.3	515	50.0
1999/2000	866	216	1082	483	129	21.0	612	56.7
2000/2001	1145	245	1390	600	219	27.0	819	59.0
2001/2002	1474	502	1976	578	279	32.4	857	43.7
Total	**8,149**	**1,893**	**10,042**	**4,086**	**1,272**		**5,358**	

2.3 Students output

Over the last seventeen years (1984-2001) a total of 5,568 students have graduated in various fields including, 5001 first degrees, 528 Masters and 39 PhDs.

Other achievements in academic programmes include review of all undergraduate curricula, the introduction of a more flexible, cost effective and demand driven semester system effective August 2001 as well as improved utilization of space and the centralized timetabling using the CELCAT software. A students record's office has also been established.

3 Trends in Financing the Sokoine University of Agriculture

The University being more or less a Government Department, receives most of its funding from the Government. The trends of financing the University from the Government in terms of recurrent budget for the past seventeen years is shown in Table 2 while the development budget for the same period is shown in Table 3.

Table 2: Recurrent budget for SUA from 1984/85 to 2000/01 (Tshs.'000)

Year	Estimates as Approved by Council	Budget approved by the government	% of the approved budget
1984/85	208,750	103,046	49.9
1985/86	125,889	136,147	73.2
1986/87	322,177	145,817	45.2
1987/88	331,924	267,282	80.5
1988/89	521,250	354,646	68.0
1989/90	847,165	491,58.0	58.0
1990/91	1,292,233	665,986	51.5
1991/92	1,507,324	961,065	63.7
1992/93	2,500,000	1,116,600	44.7
1993/94	2,507,782	1,519,920	60.6
1994/95	2,877,007	1,466,624	51.0
1995/96	3,060,930	2,690,807	87.9
1996/97	4,135,711	2,332,043	56.4
1997/98	5,135,752	3,005,733	58.5
1998/99	5980,911	4,541,015	75.9
1999/2000	9,734,184	6,797,620	69.8
2000/2001	11,262,428	8,311,743	73.8

Inadequate resources and under-funding have been the major constraints to university expansion and have brought into question the quality and relevance of present provision, and the ability to meet demand and to fund further growth.

Thus, the amount of funds approved annually by the Government has been about 63% of the recurrent budget requested. This has forced the University to suspend some of the important academic undertakings such as purchase of teaching facilities etc which otherwise would have improved the quality of the outputs. Development activities have also suffered in the same way, whereby the Government has approved on average only 29% of the requested development budget (Table 3). It is apparent from Table 2 and Table 3 that SUA has been operating under severe financial pressure.

On the other hand, SUA has received a significant financial assistance from other stakeholders as shown in table 4.

Table 3 SUA Development budget from 1984/85 to 2000/01(Tshs.'000)

Year	Estimates as approved by Council	Budget approved by the government	% of the approved budget
1984/85	na	9,384	na
1985/86	35,000	11,247	32.1
1986/87	104,861	33,368	31.8
1987/88	197,460	43,622	22.1
1988/89	340,000	66,000	19.4
1989/90	294,722	60,000	20.3
1990/91	240,000	113,500	47.3
1991/92	536,678	141,000	25.0
1992/93	558,353	230,000	41.5
1993/94	254,650	116,000	45.5
1994/95	566,970	130,000	22.9
1995/96	1,006,627	135,000	13.0
1996/97	1,071,584	135,000	12.6
1997/98	1,221,284	150,000	12.3
1998/99	666,850	350,000	52.5
1999/00	1,796,274	600,000	33.4
2000/01	3,133,165	700,000	22.3
		Average	28.9

n.a - data not available.

Table 4 Financial support from other stakeholders during 2000/01 financial Year

Donor	Amount (TAS)	(%)
NORAD (TAN 09 I)	1,361,422,608	24
NORAD (TARP II)	2,193,728,194	39
DANIDA	317,811,603	6
IDA (TARP II)	77,621,000	1
BELGIUM	238,591,059	4
USAID	61,025,930	1
EU	107,883,338	2
OTHERS	1,244,268,658	22
TOTAL	5,602,352,390	100

This support has greatly reduced the deficit the university has been experiencing. Most of this funding has been directed to research rather than training per se.

While the Government will continue funding higher education to the largest extent possible as its legitimate responsibility it is unlikely that the Government will improve higher education funding in real terms. The reasons are a combination of wide economic difficulties and other government priorities including the provision of basic social services and in particular health, water, primary education, environment and poverty alleviation. Therefore, the success of the SUA programmes will still highly depend on financial support from various Stakeholders and internal generation of income both of which are the theme of today's conference. The community, especially the private sector is expected to contribute in the form of scholarships and endowment funds, as well as shared costs of R&D. After all, it is they that will employ and make use of the graduates and their knowledge and skills.

4 Situation analysis

The developing world faces great challenges, including widespread poverty, massive external debt, environmental degradation, food insecurity, population growth, civil conflicts, disease and alarming corruption. Despite the Governments' efforts with regard to sustainable development, the reality is that the lives and conditions of much of the populations of the developing world have not significantly improved in the past few decades of post-independence and in many places they have actually deteriorated.

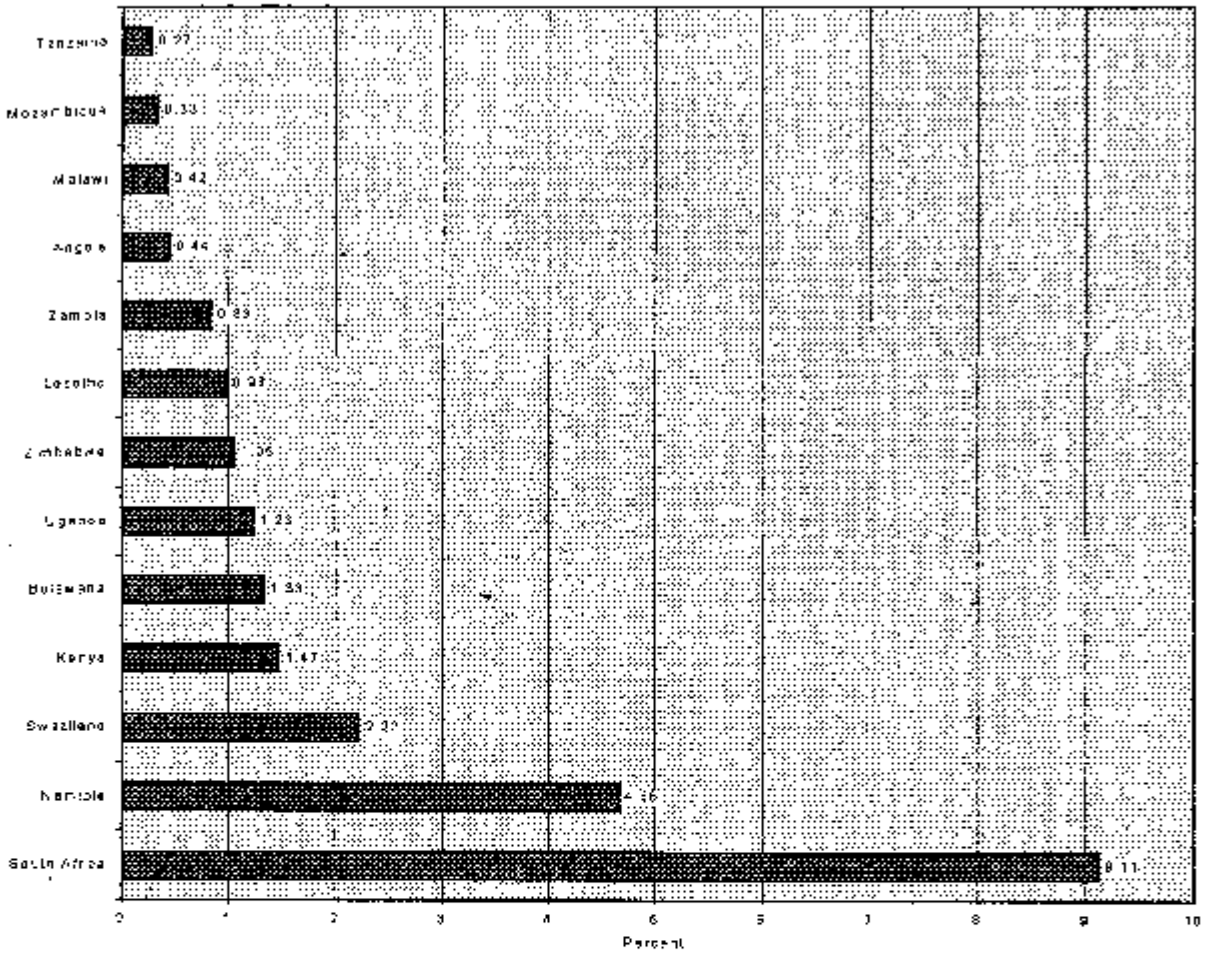
Tanzania with a current (2002) population of slightly over 30 million, has its economy growing at slightly below 5%, with a population growth rate of about 3% and an annual per capita income of USD 240. Tanzania enrolment ratios for secondary and tertiary age groups are amongst the lowest in the world today (World Bank, 1995). Only about 5% of the school age population attend secondary school or training institutions at the secondary level. This percentage is fairly low compared to 17% in the rest of Sub-Saharan Africa and 41% in the low income countries on average (BEST, 1994, World Bank 1995). The consequence of this low enrolment rates for tertiary education is an increase of unemployed Tanzanians whereby every year over 450,000 primary school leavers, deficient in any vocational training, are added to the unemployment pool.

The three public Universities in Tanzania have a total enrolment of 18,523 students with the Open University of Tanzania taking the lead with 8,752 students (32% active), SUA 2,330 and the University of Dar es Salaam 7,441 students. Enrolments for the seven private Universities are nowhere near 1000 students. The overall enrolment in the Universities in Tanzania is thus less than 20,000 compared to Kenya with a population of about 30 million (72,000) and Uganda with a population 24 million (35,000). Thus the opportunities for students who complete secondary education to join higher learning institutions and in particular the Universities and Technical Colleges are very limited. It is estimated that only 0.27% of the tertiary age group in Tanzania gets access to University education (CVCPT, 1997) compared to other African countries South of the Sahara as shown in Figure 2. It is apparent that the participation rate for Tanzania lags behind Mozambique and Angola, countries which have had civil strife for a long time!

While SUA has strived to maintain recognized training and research in a variety of programmes and in new endeavours, it has become increasingly clear that the socio-economic environment is changing fast, particularly liberalization of markets, increasing role of private sector and growing competition. At the same time resources to meet training and research needs are declining. In light of these developments, it has become necessary to review SUA's academic programmes and make the vehicle through which the programmes are delivered more efficient and cost-effective.

It is against this background that SUA Management developed a Corporate Strategic Plan (CSP) to the year 2005 and beyond. The CSP is considered to be dynamic tool through which the University will be able to capitalize on its strengths and at the same time address its weaknesses so as to become more competitive, cost-effective, generate income and establish partnerships with other institutions.

Figure 2 University age participation rates in higher education in selected African countries



Source: CVCPT (1997)

The CSP has been operationalised into a Plan of Action (PoA) for implementation, which demand substantial amount of resources. The mission and vision of the University in the 21st century act as a guide on what has to be done and how, in order to realize the objective of the University.

5 Institutional Challenges

Sokoine University of Agriculture is faced with a variety of challenges in implementing its training programmes. The challenges include:

(i) increased social demand for education and the need for specialized skills in the midst of dwindling resources;

(ii) development of demand driven curricula which, in addition to imparting necessary skills and entrepreneurship, the programmes ought to be cost-effective, demand driven and flexible;

(iii) the need for of training programmes which are sustainable; and

(iv) globalization, creativeness and international competitiveness.

The University, through NORAD, conducted a Tracer Study on Programme TAN 091 on 'continued Norwegian Support to Sokoine University of Agriculture in 1998, and a report submitted in January 1999. The study looked at SUA graduates (Faculty of Forestry, MNRSA, Departments of Soil Science and Animal Science and Production) formally employed in the government and its parastatals, those employed by the private sector or NGO's and those who were self-employed. The report, among other things established that SUA graduates do not have adequate practical skills to work in the private sector, communities or to employ themselves.

Globalization is the complex integration of capital, technology and information across national boundaries in such a way as to create an increasingly integrated world market, with the direct consequence that more countries and firms have no choice but to compete in a global economy. Globalization may NOT be a new phenomenon, but there has been an acceleration of the phenomenon in the past two decades as demonstrated by the increase in international trade and the growing independence of capital markets (World Bank 2001). Many people see this evolution as a major source of opportunities while critics see this as a risky business. But globalization is happening and is affecting all the spheres of life including University education.

Equally true there is a growing role of knowledge whereby economic development is becoming increasingly linked to a nation's ability to acquire and apply technical and socio-economic knowledge both of which are being accelerated by the process of globalization. There is now less comparative advantage in having abundant natural resources or cheaper labour rather there is more comparative advantage from technical innovations and the competitive use of knowledge (Salmi 2000). Thus, ***it is not the strongest species that survive, nor the most intelligent, but the ones most***

responsive to change. This calls for greater emphasis on continuing education needed to update knowledge and skills on a regular basis primarily due to the short shelf life of knowledge and thus the need for lifelong education.

Based on these institutional and other challenges, the university had to revisit its programmes and prepare strategies which would enable the university to remain relevant by producing high quality graduates with the necessary skills and capable of undertaking pertinent research and outreach activities and ultimately improving the quality of life of rural communities. *However, there is need to conduct further tracer studies covering more disciplines in order to come up with curricula which would produce pragmatic and problem solving graduates.*

6 Vision of the University in the 21st Century

The mission of the Sokoine University of Agriculture shall continue to be teaching, research, extension/community service and production. The vision of the University in the 21st century is to be the center of academic excellence in agricultural related fields with emphasis in imparting skills, entrepreneurship, research, integration of basic and applied knowledge in an environmentally friendly manner for the benefit of all people.

The following broad principles will guide the realization of the vision of the University.

(i) The University will strive to provide solutions that would improve the Nation's quality food supply and safety, to enhance the environment and socio-economic status of the people through teaching, research and extension.

(ii) To educate students with a view to acquiring relevant knowledge, skills and entrepreneurship but most importantly to become lifelong learners, productive citizens and leaders in society.

(iii) Basic and applied research will be undertaken to develop new knowledge to meet the contemporary and emerging needs of society. Particular emphasis will be given to management and sustainable use of natural resources taking into account ecological diversities.

(iv) Transfer of technological innovations to meet expressed and emerging needs will be emphasized.

(v) Teaching and research facilities and technologies will be improved both in quantity and quality to foster the best performance of both students and staff.

(vi) Collaboration with other Institutions through links for maximum utility of resources will be encouraged and developed/established.

(vii) High quality and motivated staff will provide leadership necessary to achieve the objectives of the University.

(viii) The University administrative structure and reporting procedures will be streamlined in order to make it more effective and efficient.

(ix) The University will increasingly strive to strengthen the existing income generating activities and explore new avenues of income generation while at the same time instituting measures of cost reduction. ***Emphasis will be given to income generation from academic related activities which SUA has a comparative advantage.***

(x) The University shall remain dynamic in keeping with the socio-economic changes in the country, in order to reduce/eradicate poverty for its people.

The overall objective of training is to improve the quality of academic programmes, educate students to become lifelong learners, productive citizens and leaders in society by, among other things, conducting regular curricula reviews, introducing courses/programmes which are demand driven, introducing core and elective courses and instilling the necessary skills by providing students with more practical training.

7 Attributes of a new type of a graduate from SUA

The daunting challenges of the 21st century require a graduate with a particular set of skills, knowledge and attitudes. There is an urgent need for the new graduates who possess strong entrepreneurial skills and spirit and

who is committed to working in rural areas generating new economic opportunities. The new graduate must also be committed to a new vision of agricultural production compatible with the natural environment and the conservation of biodiversity.
The new graduate must possess a solid grounding in the scientific and technical principles that underlie practice and the practical experience so critical in developing confidence. Graduates must also be lifelong learners capable of taking advantage of relevant information as it is generated. This is like regular servicing of a tractor to ensure it continues to serve you better. Most importantly, the training must focus on preparing graduates who will be key leaders in the rural transformation process i.e. ***change agents.***

7.1 A new approach to training

In light of the challenges enumerated above, it is apparent that a new approach to preparing graduates of tomorrow is needed. SUA's main challenge is to produce graduates with the skills and attitudes to ***hit the ground running*** upon finishing their formal training. They will need to have the theoretical background required to inform their practice in project planning and execution that will allow them to make decisions to lead. Furthermore, they will need the self-confidence that is developed through practical work while at the University. The graduates will need to understand and appreciate the actual work involved in agricultural production, processing and marketing if they are to be credible change agents.

These changes require shifting the focus from the preparation of an ***Agricultural Scientist*** to preparation of an ***Agricultural Entrepreneur*** which also implies changes in the curricula. In the new approach, hands-on experience, a focus on problem solving and communication skills will have to be emphasized so as to produce effective change agents.

In an age of shrinking public sector expenditures, privatization and growing interest in the role of the private sector in revitalizing the rural economies, the University will increasingly be required to produce graduates with the necessary skills to work in the informal sector and self-employment. Emphasis will be given to practical experiences in planning and operating productive enterprises as a means of preparing graduates to work in the informal sector. Planning and operating a productive enterprise will require knowledge on business administration, accounting, finance management and communication skills.

7.2 Blending training, entrepreneurship and sustainability

To produce the type of a graduate stated above i.e. the one equipped with the necessary skills and attitudes to hit the ground running, a lot of grounding in the scientific and technical skills including entrepreneurship has to be done while the student is at the University. The University would like to undertake training activities which at the same time provide quality service to the farming communities but also generate income which will be ploughed back to improve the teaching environment and thus producing high quality graduates who will be responsible for the modernization of agriculture.

While the blending of training, entrepreneurship and sustainability will be undertaken across the various degree programmes, emphasis will be given to those areas where the University will have a comparative advantage. The areas in which the university has a comparative advantage include:

Seed production and Quality Control

Seed is one of the most important input in any agricultural production system and forms a vital connection in the transfer of agricultural technology to farmers. Seed is also the basis and the catalyst for the agricultural industry and food security. Thus there is urgent need for trained manpower to address seed production and its quality not only for Tanzania but also for other countries in Africa. Currently, Tanzania is importing most of its crop seeds and semen without putting in place adequate quality control measures. This may ultimately lead to the introduction of crop/livestock diseases hitherto unknown in the country.

The University has already signed a Memorandum of Understanding with the Danish Government Institute for Seed Pathology (DGISP) for collaborative activities pertaining to teaching and outreach in areas of seed production, pathology, seed health and seed technology. Apart from producing seeds for staple food crops such as maize, rice, sorghum, millet, beans, plantains, horticulture crops etc., the university would also produce seeds for cash crops such as coffee, tea, pyrethrum, tobacco, as well as semen for artificial insemination. In addition the University would produce pasture and forage seeds and ensure the survival of selected valuable/medicinal plants and the maintenance of biodiversity. In other words the ***University should serve as a source of good quality germplasm to the farming community.*** Already the University is producing sorghum, pasture seeds and seedlings of

horticultural crops. However, the amount produced does not meet the demand.

Food processing and preservation training

This is an important entrepreneurial skill training for planning and operating a private enterprise as a means of preparing graduates for careers in the informal sector. This is particularly important considering the post-harvest losses especially of horticultural products (fruits and vegetables) which exceeds 40%. Other products, which could benefit from such training include oil seeds, milk, meat and rice.

The idea is to establish mobile processing plants which could be used for training purposes as well. On completion of studies, graduates could establish such processing plants in various locations in the country to process products which otherwise would take long to reach the market and thus incurring heavy post-harvest losses. Apart from value addition, longer shelf-life of the products and ensuring ready income to the farmer (poverty alleviation), the system will also act as a catalyst to increased agricultural production. The Department of Animal Science and Production has a very small dairy processing plant but it is inadequate for training purposes. The Department of Food Science and Technology had plans to install pilot processing plant for training but lacked the necessary resources to do so.

The University is already contemplating getting into agreement with the Rural Enterprise Development Initiative (REDI) project aimed at promoting agribusiness and agro-processing for poverty alleviation. The project apart from training, would also promote the supply of good quality food products to local communities and increase export from the country as long as the products are produced organically. Thus, organic farming as a training course is to be introduced along this initiative.

Mechanization and irrigation

Agriculture is the engine of the socio-economic development of Tanzania and contributes about 50% of the Gross Domestic Product (GDP), generates 60% of the export earnings and employs about 85% of the active population. The smallholder farmers with an average holding of one hectare and using primitive farm implements are the main producers contributing over 90% of the food crops and 70% of the export crops. Tanzania has an enormous agricultural potential in terms of land resource and a range of

climatic conditions. There are 40 million hectares of arable land out of which only six million (15%) cultivated. There are also approximately one million hectares suitable for irrigation but the current irrigated land is 150,000 (15%) hectares. However, the performance of the agricultural sector in the country is still poor for both cash and food crops. Likewise, livestock and fish productivity and their per capita consumptions are low despite the large national herd and the enormous water resource endowment. Paradoxically much of the abject poverty in Tanzania is rural; implying that rural households are getting lower than the expected agricultural incomes. This aspect is well realized by the Government which has drafted the Tanzania Assistance Strategy (TAS) document and the Poverty Reduction Strategy Paper (PRSP) both of which call upon the urgent need for modernizing agriculture for poverty reduction.

As part of SUA's practical training programmes, emphasis is given to farm skills in which mechanization as part of agricultural modernization is given prominence. Students are supposed to be conversant with:

(a) Animal-drawn farm implements and their use.

A draft animal power unit was established in the 1980s at the Department of Agricultural Engineering and Land Planning for training and research. This unit needs to be revitalized for the same purpose.

(b) Tractor operation and its use

The University has only two tractors to be used for training (driving, servicing, coupling of farm implements, ploughing, harrowing, weeding, harvesting, hay bailing, silage making etc.) of over 300 B.Sc. (Agricultural Engineering) and B.Sc. (Animal Science) students. These facilities are grossly inadequate for the practical training i.e one tractor being shared by 150 students.

With the availability of draft animal power, adequate tractors and the large of land acreage (2350 ha); the University while on training exercise would plough, harrow large acreage of land, grow various crop seeds which would be sold to the farming communities. Equally important, rain water harvesting within the University land is to be encouraged and should, apart from training students and irrigating the university farm, serve as demonstration to the farming community. The development of the training and commercial farms within the University as spelt out by the University Farm Policy would go a long way in improving the training environment of the graduates.

The Department of Agricultural Engineering and Land Planning should also, as part of training, be in the forefront in designing and fabricating relevant farm implements to be used by the farming communities. To be effective in this goal, the University would need to develop strong links with the industries.

Veterinary Teaching Hospital

The University has a veterinary teaching hospital, which in addition renders clinical and advisory services to the farming communities in and around Morogoro at a cost. The hospital also offers artificial insemination services using semen imported from elsewhere. Both the clinical and the artificial insemination services could be improved to render services to a wider farming community, by among other things, establishing an artificial insemination center at SUA to produce and distribute good quality semen at a cost

Practical Forestry Training

For purposes of conservation of nature and ensuring the survival of valuable and or medicinal as well as maintenance of biodiversity the University has tree seedlings nurseries from which tree seedlings for sale to local communities are made. The University also undertakes tree planting on an annual basis as part of the national campaign for environmental rehabilitation. Between 1997 and December 2001, a total of 92.49 hectares have been planted with various species of trees.

The University also promotes eco-tourism especially for the Mazumbai Forest reserve, runs a sawmill and sales wood and its product and undertakes timber preservation. Short courses are also offered at SUA Training Forest at Olmotonyi – Arusha.

The University is aware of the Government efforts to modernize agriculture for poverty reduction through the Poverty Reduction Strategy Paper (PRSP) and the Agricultural Sector Development Strategy (ASDS). Thus, SUA initiatives are in line with the Governments efforts and the objective of ASDS can be achieved by supporting SUA in its endeavors.

8 Improving the Teaching and Learning Environment at SUA

Apart from the acquisition of the Solomon Mahlangu Campus which has allowed for increased enrolment of students, there has not been

corresponding resource allocation to expand/acquire additional teaching space and facilities.

For example facilities, which were meant to cater for 40 students are now catering for 70-80 students and more. Most of the laboratory facilities are even too old to be serviced. B.Sc. Agricultural Engineering programme was fully shifted to SUA in the 2000/2001 academic year. Arrangements for their workshop and laboratory practicals have to be done at the University of Dar es Salaam and VETA Morogoro at an astronomical cost. There are two warehouses at Solomon Mahlangu Campus which are intended to be converted and equipped into workshops and laboratories for B.Sc. Agricultural Engineering students.

B.Sc. Wildlife Management which was introduced in the 1998/1999 academic year and which had its first batch of graduates in November 2001 faces problems similar to those of B.Sc. Agricultural Engineering students. They have no laboratories and have to go to the Department of Zoology – University of Dar es Salaam and Mweka Wildlife College in Moshi for practical training.

Likewise, the units at Solomon Mahlangu Campus which are being used for teaching need urgent face-lifting into lecture theatres which would cater for larger classes.

9 Future training needs

In view of the various challenges enumerated in this document and in order to achieve a student population of 4000 by the year 2005, the University will have to expand horizontally by reviewing curricula and introducing new degree programme (viz: Beekeeping, Dairy Technology, Meat Technology, Aquaculture, Meteorology etc) and non –degree (viz. laboratory Technicians course, seed technology etc) training programmes to meet the diverse training needs of a wider cross-section of the society. The introduction of short-tailored courses, Certificate and Diploma courses in areas where the University has comparative advantage will be encouraged.

In the course of developing entrepreneurial skills for students, staff and the community efforts will be made for the establishment of a Business Development Centre (BDC) within the Department of Agricultural Economics and Agribusiness. The centre would be mandated for training, consultancy and may work with other organizations such as the United

Nations Industrial Development Organization (UNIDO) to promote small-scale enterprises.

The University will also continue forging partnership arrangements with other institutions and attracting more and more private candidates.

10 Financial implications for improving the teaching and learning environment

Improving the teaching and learning environment interms of space and facilities and/or equipment in the short, medium and long term will have financial implications as shown in Appendix 1. The overall financial implication for improving the teaching and learning environment is estimated to be 7.4 billion.

11 Conclusion

It is apparent from the aforesaid that, in order to produce a graduate equipped with the necessary skills and attitudes to hit the ground running upon completing formal training major improvements of the learning environment will be required. While the curricula have been reviewed to produce graduates with solid background in the science that underlies theory as well as skills and entrepreneurial spirit, its implementation will, to a large extent, depend on the availability of resources and partnership arrangements, a theme of this conference.

In addition, the way the University conducts field practicals will also have to be reviewed so that most of the practicals are done within the vicinity of the campuses. Not only will this arrangement allow for closer practical supervision by staff, but it will also be cost-effective and will have a better impact when the resources are directed to a smaller area rather than spreading too thinly across the country. However, excursion to relevant field sites for training will be encouraged.

References

BEST (1994) Basic Education Statistics. Ministry of Education and Culture, Dar-es-Salaam

CVCPT (1997) Public Universities Remaining Competitive under Liberalised Education Environment in Tanzania. University of Dar-es-Salaam

Luhanga, M.L. and Mbwete, T.S.A. (1998) University Education in Tanzania. A Perspective for Twenty First Century, University of Dar-es-Salaam Experiences. Proceedings of the Workshop for Members of the Parliament

Salmi, J. (2000) Tertiary Education in the Twenty-First Century: Challenges and Opportunities. LCSHD Paper Series no. 62, World Bank

SUA (1997) Corporate Strategic Plan to the Year 2005 and Beyond. Sokoine University of Agriculture, Morogoro

World Bank (2000) Higher Education in Developing Countries: Peril and Promises. Washington, DC

World Bank (2001) Construction of Knowledge Societies: New Challenges for Tertiary Education. A World Bank Strategy, Washington, DC

Appendix 1: Financial Implications for Improving the Teaching and Learning Environment

A: Teaching and Learning Space

S/No	Type of Space	No.	Sq.m^2	Student capacity	Cots
1.	Lecture theatre	2	900	600	270,000,000.00
2.	Remote Sensing and GIS Laboratory	1	592.5	150	148,125,000.00
3.	Wildlife Laboratory	1	1,103	150	430,500,000.00
4.	Microbiology Laboratory	1	225	150	67,500,000.0
5.	Macro-ecology	1	592.5	150	148,125,000.00
6.	ICT Laboratory	2	640	160	246,600,000.00
7.	Engineering Workshop	5	2,800	200	700,000,000.00
8.	Extension of SMC Library	1	5,404	3,602	2,7002,000,000.00
9.	Aquaculture laboratory	2	632	160	152,000,000.00
10.	Beekeeping laboratory	1	592.5	150	148,125,000.00
	Subtotal				5,012,975,000.00

B: Strengthening the Existing Teaching and Learning Facilities

Type of Facility	Costs		
	Short-term	Long-term	Total Cost
Laboratory facility	300,000,000.00	200,000,000.00	500,000,000.00
Farm Machinery	236,000,000.00	242,000,000.00	478,000,000.00
Learning facilities	100,000,000.00	56,000,000.00	156,000,000.00
Sub-total	636,000,000.00	498,000,000.00	1,134,000,000.00

C: Teaching Facilities for New Degree Programmes

Degree	Cost of Facilities		
	Short-run	Long-run	Total Cost
BSc Aquaculture	612,000,000.00	400,000,000.00	1,012,000.00
BSc Beekeeping	9,000,000.00	6,000,000.00	15,000,000.00
Sub-total	621,000,000.00	406,000,000.00	1,027,000,000.00

D: Strengthening SUA 'TV Facilities for Outreach Programmes

Type of Facilities	Cost of Facilities		
	Short-term	Long-term	Total Cost
Improvement of broadcasting studio	15,000,000.00	0.00	15,000,000.00
Purchase of studies equipments	50,000,000.00	34,000,000.00	84,000,000.00
Studio control panel with editing facility	25,000,000.00	25,000,000.00	50,000,000.00
Transmission facility	12,000,000.00	0.00	12,000,000.00
Vehicle for news and material collection	28,000,000.00	0.00	28,000,000.00
Sub-total	130,000,000.00	59,000,000.00	189,000,000.00

E: Summary of the Total Requirements ('000)

A. Teaching and learning space	5,012,975
B. Strengthening the existing teaching and learning facilities	1,134,000
C. Teaching Facilities for new degree programmes	1,027,000
D. Strengthening SUA TV facilities for outreach programmes	189,000
Grand total	7,362,975