Status of Higher Education, Science and Technology in Malawi: A focus on Agricultural Higher Education

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ABSTRACT
Malawi’s demographic dividend remains low with a population that is young, comprising 46% below the age of 15. The majority of the population is involved in agriculture, which is the backbone of the economy; however, there has been limited investment, especially in agriculture higher education. There remains a big gap between higher education and development. A study was therefore undertaken to understand current status and identify challenges and opportunities in higher education, with special focus on agriculture. Literature was reviewed and the public, private sector and civil society were consulted using checklists. Findings show that Malawi has four public universities and sixteen private universities registered with the National Council for Higher Education. None of the universities is highly ranked in the global ranking systems for higher education institutions. This is as a result of limited research and publications, limited funding, poor infrastructure, non-industry oriented curriculum and compromised quality of education. Therefore, universities should intensify interaction with industry to improve research, curriculum design and delivery and graduate training and research quality. The National Council for Higher Education in Malawi and line ministry should develop a national qualifications framework, in reference to international standards, to guide and regulate quality of university programmes. Overall, the government and development partners should prioritize investing in the young generation to advance to higher education in order to reap a significant demographic dividend and foster development.

Key words: Agriculture, demographic dividend, investment, University ranking

RÉSUMÉ
Le dividende démographique du Malawi reste faible avec une population jeune, dont 46 % ont moins de 15 ans. La majorité de la population pratique l’agriculture, laquelle est le moteur de l’économie, cependant, il y a eu des investissements limités, spécialement dans le secteur de l'enseignement supérieur agricole. Il reste un grand écart entre l’enseignement supérieur et le développement. Une étude a donc été conduite afin de comprendre le statut actuel et d’identifier les défis et opportunités de l’enseignement supérieur, avec un accent particulier sur l’agriculture. Une revue de littérature a été faite et le secteur public, le secteur privé, et la société civile ont été consultés à l’aide des listes de contrôles. Les résultats montrent que le Malawi a quatre universités publiques et seize universités privées régulièrement enregistrées auprès du conseil National de l’enseignement supérieur. Aucune des universités n’occupe un rang élevé dans le système de classement global des institutions de l’enseignement supérieur. Ceci est le résultat des recherches et publications limitées, des financements limités, l’insuffisance d’infrastructures, des curricula non-orientés sur les demandes de l’industrie et les qualités douteuses de l’éducation. En conséquence, les universités devront intensifier l’interaction avec l’industrie afin d’améliorer la recherche, la conception des curricula et leur prestations, la formation de troisième cycle et la qualité de la recherche. Le Conseil National de l’Enseignement Supérieur au Malawi et le ministère affilié devrait développer un cadre de qualifications national, en référence aux normes internationales, de guider et de réglementer la qualité des programmes universitaires. De façon générale, le gouvernement et les partenaires au développement devraient accorder la priorité à l’investissement sur la jeune génération pour leur permettre d’accéder à l’enseignement supérieur afin de récolter un important dividende démographique et de favoriser le développement.

Mots clés : Agriculture, dividende démographique, investissement, classement des Universités

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INTRODUCTION

Malawi established its first university (University of Malawi) soon after independence, in 1965, with only 90 students enrolled. Two years later, the Institution of Public Administration, Hill College of Education and Bunda College were established as colleges affiliated to the University of Malawi (UNIMA). Mzuzu University (MZUNI) was the second public university in Malawi, established in 1999. Then the Lilongwe University of Agriculture and Natural Resources (LUANAR) was opened in 2012, followed by the Malawi University of Science and Technology (MUST) which focuses on science and technology development. As of 2009, 7,972 students were enrolled into the universities, up from 3,117 in 1990 and 3,872 in 1995 (Ng’ambi, 2010). However, till 2015, the higher education (HE) sector was still underdeveloped, with a total of 15,000 students enrolled into the accredited four public and sixteen private universities.

While higher education leads to higher productivity (Borland et al., 2000), many obstacles like insufficient material, untrained or hardly trained teachers, management at schools, teacher-learner ratio and many other issues undermine education in Malawi (Engler and Kretzer, 2004). However, the Malawi vision 2020 suggests various solutions: increasing access, quality and equity to higher education; increasing number of skilled people; improving performance; and developing effective and efficient management education system, among others (GoM, 2008).

Among the four public universities in Malawi, LUANAR is specialized in agriculture education. Chancellor College of the University of Malawi (UNIMA), and Mzuzu University (MZUNI) only offer isolated programmes in agriculture. Most private universities have little or no focus on agriculture, except a few including the Malawi Adventist University (MAU), which offers selected programs. Yet, Malawi’s economy remains agro-based with the agriculture sector accounting for over 38.6% of the GDP (US$7.645 billion as at 2005), employing about 84.5% of the labour force, and accounting for 82.5% of foreign exchange earnings (Msiska, 2006). Therefore, agricultural higher education is a particularly important investment avenue based on the priority agricultural elements of the Malawi Growth and Development Strategy (MGDS) II. The MGDS II is in line with Pillar 4 of The Comprehensive Africa Agriculture Development Program (CAADP) which focuses on improving agricultural research and systems to disseminate appropriate new technologies, and increasing adoption by farmers (Annor-Frempong, 2015).

Therefore, the study was undertaken to assess current status of higher education, with focus on agriculture, identify challenges and gaps and draw recommendations for enhancing performance.

METHODOLOGY

The study focused on the main universities that offer education in agricultural and allied disciplines, as well as science and technology. The study was undertaken through literature review and consultations with randomly sampled key stakeholders using checklists which were administered online and in person. Key policy and strategy documents, financing, enrollment, graduate and sector reports were evaluated. Documents from Ministry of Education, Science and Technology (MoEST), Ministry of Agriculture Irrigation and Water Development (MoAIWD) and the department of Treasury in the Ministry of Finance and Economic Development formed a major part of the evaluation process. The documents included strategic plans, key policies including quality assurance, assessment and credit transfer systems and policies, student attachment and internship arrangements, enrollment, research and outreach, partnership and stakeholder engagement, financing systems over the past 5-10 years, library, information and communication technology and infrastructure development plans. Key informants included university vice chancellors, deputy vice chancellors, registrars, directors of finance, deans of faculty, alumni and current students; directors and other senior personnel in relevant ministries, chief executive officers and other managers of employer organizations.

STATUS OF HIGHER EDUCATION IN MALAWI

Access to higher education

Increasing demand for higher education has compelled the Department of Higher Education to revisit some of its growth oriented policies. These include student enrolment based on classroom space rather than bed space, inclusive education, gender uniformity, and poor loan schemes (GoM, 2008). Nonetheless, the available capacity, especially infrastructure, in the current universities is not enough to absorb the majority of secondary school graduates. This has led to emergence of several private universities and expansion of public universities. However, Malawi’s tertiary education enrollment rate at less than 1 percent is among the lowest in the world and well below the average for Sub-Saharan Africa. In 2011, the country had only 80 students per 100,000 inhabitants, compared to 211 for the region, and the situation has not significantly improved to date. Socio economic and gender disparities are stark: 91 percent of those enrolled in
universities come from the richest quintile of the population while less than one percent is from the poorest quintile. Further, the average share of females was 45 percent in private institutions, but 35 percent in public institutions. Very few disabled students are enrolled because the education systems and infrastructure in most universities are not ideal (World Bank, 2014). Only 21.8% of eligible candidates are selected into public universities at the moment. Even among those that are selected, many are forced to live in sub-standard accommodation, outside of university hostels, and thereby greatly compromising the quality of learning and ultimately precipitating poor academic performance as has been the case in the recent past.

Furthermore, the majority of qualifications are awarded at the undergraduate level, mostly in sciences, especially in public universities. This distinguishes Malawi significantly from most other countries in the region where the majority of graduates are in the humanities, business management or education. However, private universities are in tandem with the region.

Overall, there was no major difference between male and female graduate output. There is a significantly lower throughput rate at masters level, where only a quarter graduates in time. Less than 10 students graduate at PhD level in any given year, in most cases. The above situation results in a net loss of potential in human capital as many Malawians, especially young people, are not in a position to realize their full potential in life. Considering that Malawi’s population is largely young, with 46% under the age of 15, there is need for affirmative action. Otherwise, the status quo implies a huge loss in demographic dividend for Malawi. No wonder, development is far from reach without deliberate action that targets and adequately engages the youth.

Various strategies could be deployed to increase access to higher education. For instance, enrollment in private institutions could ease the burden of a growing student population on Malawi’s public universities. At a policy level, the government will have to create a more favorable environment for private institutions. Limited government subsidies could be offered to private institutions willing to introduce high-priority study areas such as engineering or health sciences and agriculture.

Open and distance learning (ODL) is also an option the MoEST is exploring to reach students in rural areas and from the poorest social stratum. Recently, UNIMA, MZUNI, LUANAR, with support through the World Bank funded Skills Development Project (SDP), and few private universities are implementing ODL, which will likely improve access in the near future. However, universities need to pay adequate attention to quality management in ODL.

**Institutional policies and governance**

The Ministry of Education, Science and Technology (MoEST) is responsible for all tertiary education in Malawi. It has got a well-defined structure to ensure management of higher education institutions. The Secretary for Education, Science and Technology (SEST) is the controlling officer of all education sub-sectors. There is in place a Chief Director responsible for Higher Education who leads the ministerial arm focusing on higher/tertiary education. He/she is supported by the Director of Higher Education (DHE), Deputy Director for Higher Education (DDHE), Chief Education Officer, Chief Education Officer Planning and Management and other science departments. In addition to the MoEST Higher Education structure stated above, there are other government bodies formed in relation to the education sector in general or Higher Education in particular. These bodies include National Council for Higher Education (NCHE) for inspection, policing and monitoring for quality assurance in institutions of Higher Learning, the Malawi Universities Development Program (MUDP) to coordinate government universities development projects in establishing new institutions of Higher Learning for increased access to quality education, and Higher Education Students Loan and Grants Board (HESLGB) to scrutinize the university students loan and grants applications, among others. The National Commission for Science and Technology (NCST) also promotes science and technology at universities.

In the quest for realization of MoEST’s vision ‘To be a catalyst for socio-economic development and industrial growth’, which is supported by the policy framework and the political will, the Ministry has prioritized higher education through education reforms such as skills development as a national development agenda in realizing economic growth and development. The government has also increased funding to education. However, the increase in demand for higher education is so high and it is understandable that government within its resources has to also focus on primary and secondary education. Additionally the government in Malawi has shown high commitment by establishing the National Council for Higher Education (NCHE), whose role is, among other things, to ensure quality in higher education institutions. NCHE is under the supervision of the Director of Higher Education whose core functions are aligned to the aspiration of Malawians as spelt out in the National Education Policy. Important for higher education are five function sections: (a) Higher Education Policy and Planning, (b) Higher Education Quality Management, (c) Higher Education...
Status of Higher Education, Science and Technology in Malawi

Corporate Governance, (d) Higher Education Students Affairs Management, and (e) Higher Education Information Management. The functions of these sections are well-spelt out so that NCHE can work effectively in the existing structures while contributing to quality, relevant and equitable education. All these changes culminate from governments efforts that have enabled relevant acts and policies. Some of the policies are: Adopting a new Higher Education Act, Improving Financial Resource Mobilisation and Introducing a Comprehensive Management Information System.

However, each institution of higher learning is expected to elaborate its own strategic plan based on the Malawi Growth and Development Strategy (MGDS) II and the National Education Sector Plan (NESP) (2009 - 2017). The government’s NESP sets out three priority areas for higher education improvement. These are: governance and management, access and equality, and quality and relevance (GoM, 2009). The overall regulation of higher education is done through an accreditation committee whose membership comprises the MoEST (Education Methods and Advisory), the Office of the President and Cabinet (Department of Human Resources Development and Training) and the University of Malawi. For public universities, governance issues are regulated by Acts of Parliament.

Each public university is governed by a council, consisting mainly of members appointed by the government, and supported mostly by government grants and miscellaneous income sources. Private higher education institutions usually have independent councils and senates which are appointed by their proprietors, including religious bodies.

Higher Education regulatory framework

Student enrollment into public universities and quality assurance in higher education is managed by the National Council for Higher Education (NCHE). NCHE is a newly established higher education regulatory body in Malawi under the Malawi Parliament act No.15 of 2011 with primary purpose of providing accreditation and quality assurance services in higher education institutions in Malawi. The NCHE’s vision is “accessible, sustainable and quality higher education for all qualified Malawians” and its mission is “to promote and coordinate relevant, accessible, equitable, sustainable quality higher education in Malawi through accreditation, quality assurance, policy support and planning, and representation of Malawi’s higher education interests nationally and internationally.”

However, there are a number of policies and guideline documents which are currently in draft form but are generic in nature. These policies and guidelines are basically designed to address issues regarding registration, accreditation, capacity building, teaching, and quality assurance based on set minimum standards. Once approved, these policies would help the regulatory body to execute its functions well including to regulate, determine and maintain standards of teaching, examinations, academic qualifications, academic facilities; harmonized student selection; design and recommend an institutional quality assurance system for higher education; promote and co-ordinate education provided by higher education institutions; accredit higher education institutions both public and private; register and de-register higher education institutions; advise the minister on all matters of higher education and harmonize public university student selection.

The NCHE indicated that plans are underway for internalization of the programs, which among other things, shall facilitate credit transfer in line with the Southern Africa Development Community protocol on education and training (SADC, 1997). The NCHE is currently developing guidelines to inform the national policy on ODL.

University students enrolment and information management system

Malawian universities fail to meet the demand as they enroll less than 50% of qualifying candidates (SARUA, 2012). From 1988 onwards, a quota system ensured that an equal number of eligible students from each district of Malawi was guaranteed access. Through a High Court decision this quota selection system was overturned, until it was finally abolished (Engler and Kretzer, 2004) just briefly from 2009 till 2012. Thereafter, Universities again implemented the equitable access selection, which is one of the education pillars as stipulated in the NESP.

The NCHE, which coordinates university selection claims to have lightened the burden on students’ application fees as they do not have to pay to each and every university they opt for. However, the actual selection into various programs of study is done by the universities themselves. It was established that each university has got its own system for managing its information. However, the Council is working on a project with the World Bank called Skills Development Project in order to develop single data base for all the universities for easy access by all the stakeholders. Currently, individual universities submit their data to the Council. The Council is faced with poor public awareness and funding challenges. The study established that the Council was operating between 60%-70% capacity due to inadequate human resource. NCHE also lamented the absence of an overarching university act of Parliament that would smoothen the university selection process.
Quality and relevance of higher education

Quality and relevant university education provides skills that serve as a platform for further human development which, in turn, leads to socio-economic advancement. This explains why developed and the fast developing countries in Africa have used, and continue to use, higher education as a means to achieve great leaps in socio-economic development. On the other hand, Malawi’s higher education institutions have struggled to maintain quality as they have tried to accommodate the rapid increase in enrollment in the past few years. Shortage of qualified academic staff has left students without quality teaching and also resulted in a rise in the student/lecturer ratio. Inadequate infrastructure and equipment has constrained access and compromised quality standards, which currently go largely unchecked. Lack of funding has meant that most institutions can no longer afford objective external examiners. Further, employers are expressing concern over the relevance of the programs offered and the quality of graduates, perhaps due to limited consultations during curriculum review, and inadequate internships. Research output remains low as compared to other countries. Quality assurance policies are scanty and variable at institution level. Reports from the University of Malawi point to the need for further development of institutional quality assurance procedures. LUANAR has just instituted the directorate of quality assurance. Arrangements for the engagement of external examiners and consultants, and moderation of the quality of the academic activities (including attainment of standards of performance, outcomes and staff training) are hardly implemented.

Higher Education financing mechanisms

In the past, due to low university enrolment, funding was adequate to the extent that the university education was completely free. However, now the tertiary education sector receives limited government funds compared to the increased enrolments. As one way of addressing this low financing challenge, it has been suggested that the beneficiaries (graduate employers) should contribute too to the universities as a cost-sharing strategy. At an international level, donors have also reduced funding to universities in developing countries in general. Overall external funding for Africa averaged $103 million annually during 1990-1994, then dropped to $30.8 million a year for 1995-1999. It rose to only $36.6 million between 2000 and 2004 in contrast to much higher levels of funding for primary and secondary education. World Bank Sub-Saharan Africa funding for primary and secondary education from 1990 to 1995 was over $100 million a year and reached $216 million in 1993 (World Bank, 2009).

Regionalisation of higher education

Malawi places considerable importance on regional collaboration and integration in the higher education sector in the areas of governance, financial management and capacity-building. The SADC Protocol on Education and Training has influenced Malawi’s national higher education policy and practice. Collaboration with the SADC region is valued and given high priority by management and senior academic staff in at least Malawi’s public universities. However, underfunding prevents management from committing fully to the practical aspects involved in ensuring adequate collaboration (Kotech, 2008). Even though the absolute numbers of students from outside Malawi remains low, there has been a significant increase in students from foreign countries studying at the national higher education institutions in the past five years. However, very little language and/or cultural support is provided for them. For example, LUANAR hosts a number of regional graduate programmes and also attracts international students from more than 12 countries in Africa. Recently, remedial language courses have been staged to assist foreign students. There is also an exchange language training programme between LUANAR and a few Mozambican universities to bridge the language gap. This is commendable and should be adopted by other public as well as private universities. The University of Malawi also offers a number of language degree courses which other universities could benefit from. Twenty-three regional postgraduate programmes were identified in a recent study ranging from the African Centre for Crop Improvement at the University of KwaZulu-Natal in South Africa to a programme focusing on Research Methodology between Jomo Kenyatta University of Agriculture and Technology and the University of Malawi, and the PhD and Masters programmes in Aquaculture and Fisheries Science, and Agriculture, Applied and Resource Economics under the Regional Universities Forum for Capacity Building in Agriculture (World Bank, 2009). Strong graduate programmes provide a vital link between research and teaching and expand opportunities for graduate research. To date, however, these are supported primarily by external funding. Furthermore, inconsistencies in qualifications frameworks and credit transfer challenges still undermine internationalization.

Status of research and innovation in higher education

In looking at innovation, it is important to note the possibility of distorting the picture as we look only at formal research and development (R & D). In developed industrialized countries, this distortion may not necessarily be problematic, since we can reasonably assume that the requisite institutional context is stable and suited for the translation of science and technology (S&T) activity into economic prosperity. It is acknowledged that developing countries like Malawi have to look at a broad perspective. Generally, reports seem to suggest that the output of African scientific
publications has increased over the past 15 years, tripling across 26 African countries from 10,082 in 1996 to 33,825 in 2010 (Arencibia-Jorge, 2012) with Algeria, Egypt, Kenya, Nigeria and South Africa contributing 86 percent of the total (AU-NEPAD, 2010). Between 2004 and 2008, Botswana, the Gambia, Kenya, Malawi, Mozambique, and Uganda achieved higher than world-average citation rates (Nordling, 2009). Scientific papers for eight of the ten study countries over the 2005-2009 period revealed that agricultural, medical and natural sciences plus engineering accounted for 74 to 93 percent of all publications. For Malawi, the percent of papers in medicine was at 63% while that for agriculture was 18% in 2009. However, university research is still not well linked to industry. While universities usually have research centers, it is often observed that the research agenda is crude and not responsive to industry needs. The University of Malawi conducts research in core sciences as well as social science. It even has a dedicated center for social research. LUANAR boasts of the Center for Agriculture Research and Development (CARD), besides the programmes coordinating office (PCO) which also generates and implements large interdisciplinary research in collaboration with international universities, such as the Michigan State University (MSU), which designated LUANAR as an agricultural and food security innovations hub. However, it was established that these research personnel were also supposed to dedicate 20% of their time to teaching, which is similar to the rest of the public universities including MZUNI. The fact that the Industrial Research and Technology Development Center (MIRTDC) has become the research Centre for MUST is a big plus as it will allow the university to undertake more industry focused research. As opposed to other public universities, MUST has got more strategic policies for managing the research unit which include that if a member of staff has declared to use the university resources in his/her research, 40% administrative fees is rendered to the University such that the University bears any consequences from the research outcome. On other hand, there is provision that the University receives only 10% from research/consultancies if the member of staff conducting the research has not declared that they are going to use the university name and materials, in which case, the university is not held liable of any research consequences. In the latter case, funds realized from such research are not considered for promotion purposes.

Financing higher education
While private universities rely chiefly on tuition fees, public universities have three main sources of revenue: government subventions which constitute about 80 percent of total income, tuition fees, and self-generated resources mainly through project and research grants. Even though the share of the government’s overall education budget received by higher education institutions is relatively high (20-28 percent over the past few years), the amounts are largely inadequate to support its expansion and quality improvement needs. Several resource mobilization measures could be taken to improve financial sustainability. First, public institutions should be allowed to charge higher economic fees, and the student loan system should operate more efficiently, especially in terms of loan recovery, for those not able to afford the increased fees. Second, the government loans should also be accessible to Malawian students in private universities, as recently proposed. Third, the government could offer matching grants to encourage universities and other higher education institutions to raise additional funds through contract work and fund-raising from alumni and private sector philanthropists. Fourth, the private sector can effectively complement the public higher education sub-sector in meeting the country’s needs for quality graduates at little or no cost to the government through establishment of Public Private Partnerships (PPP). Fortunately, the government has embraced the PPP which has seen a few universities start engaging in large-scale infrastructure development projects. Fifth, the government could introduce a combination of performance-based budget allocation mechanisms to encourage higher education institutions to be more innovative, competitive and efficient.

All governments that have existed in Malawi agree that agriculture is the mainstay of the economy. While some governments, including the current one, have tried to diversify the economy, it has been an uphill road, and each discovered very early that the peak was far from reach. The Economic Recovery Plan (ERP), designed by government more than four years ago, which largely followed the Malawi Growth and Development Strategy (MGDS), therefore identified agriculture as one of the nine key areas of focus. The ERP is the Government’s blue print for recovering and restoring macroeconomic stability. However, there is undue attention given to agriculture as evident in the allocation of resources in the National Budget. This is clearly shown in the 2013/2014 budget where agriculture received 34% of the total national budget, but much of it (over 60%) was allocated to the Farm Input Subsidy Programme (FISP) (GoM, 2015). While FISP has been hailed for contributing significantly to attainment of maize (food) sufficiency in the first decade, post-millenium, others still argue that it is not sustainable enough to give Malawi a solid basis for food security and prosperity. A good case in point was the year 2009 when the country slid back into hunger as the vulnerable FISP programme was undermined by, among other things, erratic rains and prolonged dryspells (MVAC,
2015). Similarly, droughts and more importantly floods have drowned the hopes for food security resulting in Government resorting to outsourcing from neighboring countries especially Zimbabwe and Zambia. These phenomena suggest that on top of limited funding for agriculture, internally, investment is not adequately done to achieve long term and high returns to investment. Higher education has the promise of high return on investment, as high as 20-30% (Bloom et al., 2006). Therefore, Government should seriously consider increasing investment in agricultural higher education for sustainable development.

It would be expected that key line ministries would also support higher education considering that its allocation is relatively low as highlighted above. For example, the College of Medicine (COM) and the Kamuzu College of Nursing (KCN) of the University of Malawi, both benefit from the donor funding through the Health Sector Wide approach (Health SWAp). The ministry of agriculture also receives similar donor support through the Agriculture Sector Wide approach (ASWAp). The ASWAp has grown from MK4.6 billion (US$8.3 million) in 2012/2013 to MK17 billion (US$8.9 million) in 2015/2016 (GoM, 2015). However, agricultural higher education does not benefit through any significant deliberate financing initiative through the ASWAp as in the health sector. This often leaves the question as to whether the ministry and its organs view agriculture higher education institutions, such as LUANAR, as competitors or lacking capacity to adequately produce value for money through relevant research and training. The latter can easily and quickly be countered by the fact that the majority of staff including, high level policy makers, are graduates from LUANAR. Nevertheless, it remains a mystery why these alumni do not act as “ambassadors of good will” for their former university. It is also yet to be known as to what extent the public universities will benefit from the Education SWAp projected at MK28.6 billion (US$50.9 million) in 2015/2016. Only small off-budget support initiatives have been seen going to LUANAR over the past few years. A tracer study would assist to establish perceptions of the alumni and coupled by establishment of an alumni association, this would promote marketing and lobbying for support to Agricultural higher education.

While it is argued that financing of universities is in tandem with student population and academic programmes, affirmative action needs to be taken if significant change is to be realized in agriculture, science and technology. The move by Government to delink Bunda College of Agriculture UNIMA to make it a stand-alone university, LUANAR, as well as building a completely new Malawi University of Science and Technology, is commendable. Furthermore, the government funded administration and teaching complex construction project at LUANAR, is also commendable, despite the subsiding of commitment owing to current fiscal challenges. However, just like government has paid a lot of attention to the FISP in the past three years, similar investments should have been made in LUANAR and MUST. What is seen, instead, is that funding for LUANAR and MUST as new key universities is still too limited to allow them to sustain quality teaching, research and outreach. At face value, funding to MUST has increased from MK0.53 billion (US$909,000) to MK1.4 billion (US$2.5 million), while for LUANAR, it has increased from MK 3 billion to K7 billion (US$) over the past three years (Table 1). However, the increase in funding for LUANAR is largely due to a rapid increase in its intake, by over 200% in the last three years. Therefore, government funding still only covers the wage bill, recurrent costs and very limited purchase of teaching and learning materials. Thus advanced research, laboratory services, outreach and student housing continue to suffer.

The National Council for Higher Education (NCHE) also struggles to achieve its mandate due to limited funding which has already resulted in limited capacity. NCHE is currently overwhelmed with initiatives aimed at establishing quality assurance and quality control guidelines, assessment of university registration applications, and many other regulatory functions. It is almost impossible to fulfill its role because in some cases, not all the allocated resources are transmitted as planned, which also affects higher education institutions’ calendars.

**Curriculum delivery and student assessment systems**

The University of Malawi offers courses that are 2 to 5 credit hours large. There is limited modularization. The assessment system largely uses simple average with varying passing marks, which can go as low as 40 to 50%. However, there is a gradual move towards the grade point average (GPA) system. This is especially needed in health and medical sciences where the passing mark needs to be higher and cumulative or continuous performance of the students should be adequately weighted to ensure a quality graduate for the safety of the public.

It is worth noting that the private MAU uses the GPA system with minimum of 20 credit hours per semester but with special features regarding academic performance decisions. Continuous assessment (both announced and unannounced quiz) contributes 10%, class attendance contributes 10%, mid-semester exams contribute 20%, term paper contributes 10-15% and final exam contributes 60%. Courses are divided into basic-general education requirement, major-category
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Source: GoM (2015).
specialization, concentration in specialized area, cognates—addition to concentrations and electives with pass mark of 50% in the following ranges: 0%-49%=F (Fail), 50%-59%=D, 60%-64%=C-, 65%-69%=C, 70%-74%=B-, 75%-79%=B, 80%-87%=B+, 88%-91%=A-, 92%-100%=A. With D or C-in basic courses, one is allowed to progress to the next year of study but with such grades in major, concentrations or cognates, student is given supplementary examinations and if fails again, the student is put on academic probation. A third time fail puts the student on academic suspension for two semesters. Credit transfer is done with a minimum grade of B and minimum of 12 credit hours. This is possible with a limit of second year and challenge exam administered if one is to be exempted from certain credit hours beyond 299 credit hours and if they fail, the student is exposed to classroom situation. MAU uses certificate grading system of, Magna, Cum laude (GPA: 3.75-4.00), Summa (GPA: 3.50-3.74), Magna (GPA: 3.0-3.49) and pass (GPA: 2.25-2.99). LUANAR also uses the GPA assessment system, with no provision for supplementary exams. The maximum GPA is 4. A student is withdrawn if his/her annual GPA is lower than 1, but is required to repeat if his annual GPA is equal to or more than 1 but less than 2, regardless of a higher cumulative GPA. If a student is deemed to have failed core courses he/she is still required to repeat even if his/her GPA is high enough. It is now generally felt that the GPA system is applied in rather strict mode, and some of the rules should be revised, especially considering that LUANAR trains regional students, whom together with local students, need to compete favorably internationally. It is therefore unfair for an excellent student with a GPA of more than 3 to still maintain an F or D- grade on his/her transcript, yet he/she has the capacity to correct it. Furthermore, it is no close to fairness to ask a student to repeat the whole year for failing 1 or 2 courses. According to the LUANAR Students Union, the assessment system practically punishes and diminishes the students’ chances to excel.

A quick review of curriculum from most of the Malawian universities revealed that most curricula, including the agriculture programmes, were largely theoretical and lacked industry orientation. For example, one would imagine that agriculture should, to a great extent be hands-on, practical and laboratory sessions only contribute between 10 to 30% to the whole assessment. In some cases, students rarely undertake practicals and tutorials especially in subsequent years due to limited laboratory facilities, lack of seriousness and poor planning by course coordinators. Furthermore, industrial attachment is only done once, in the third year of study, and only for 4 weeks (one month) as opposed to the 8 weeks stipulated in the curriculum. This is the case due to monetary limitations associated with attachments, as students are usually paid an up-keep allowance of MK40000 (US$73) for the attachment period. And as long as curriculum remains the blue-print for course delivery, comprehensive review alongside admission criteria, will be inevitable if significant change is to be made. The recent block-release using modular approach practised in nutrition, and gender and youth development programmes, and the Open and Distance Learning (ODL) programmes at LUANAR, UNIMA and MZUNI are potential avenues for establishing models of transformed and industry responsive curriculum. Public universities have a future and therefore need more support in investment, while internally, staff need a mindset change to adapt to dynamic academic needs and industry demands so that programmes and graduates can remain or even become more competitive locally and internationally.
STATUS OF THE AGRICULTURAL HIGHER EDUCATION IN MALAWI
Lilongwe University of Agriculture and Natural Resources (LUANAR)

The Lilongwe University of Agriculture and Natural Resources (LUANAR) is the main university in Malawi which fully offers agriculture, agricultural applied sciences and natural resources sciences and management. It started as a constituent college of University of Malawi in 1964, when it was called Bunda College of Agriculture. From the humble beginnings of one Faculty of Agriculture and one Department of Animal and Crop Husbandry, the College grew to 3 faculties and 12 academic departments by 2011. By 2011, the College had expanded from initial 15 students and 3 academic staff, to 1802 students and 150 academic staff. By 2014, the student enrollment had risen to over 3000 students, with five faculties, the introduction of city campuses and the incorporation of the Natural Resources College. In 2012, the Malawi Parliament passed the Bill of Lilongwe University of Agriculture and Natural Resources (LUANAR) 2012 which saw Bunda College being weaned from the University of Malawi to become a fully independent University which focuses on agriculture and natural resources management. LUANAR is now offering more than 16 BSc, 14 MSc, 5 PhD, 3 Postgraduate diplomas and 3 undergraduate diploma programmes. An increase in programmes and student population in recent years has seen the staff: student ratio significantly decreasing beyond 1: 25, which has increased overall economic efficiency of programme delivery.

LUANAR is driven by its 5 year strategic plan, which is currently under review, with a vision: “To be a World Class University.” Its motto is: “Knowledge, Innovation, Excellence.” The strategic plan earmarked resources amounting to MK111, 937, 000,000.00 (US$ 203,521,818). It contains a set of five robust strategic pillars, which would propel the University to achieve its aspirations. These include: Pillar 1-Teaching and Learning; Pillar 2-Research, Consultancy and Outreach; Pillar 3-Infrastructure Development; Pillar 4-Staff Capacity Building; and Pillar 5-Governance, Resource Mobilization and Management.

University structure, policies and guidelines
Among both public and private universities in Malawi, LUANAR remains the leading institution offering a large number of agricultural degrees at various levels. However in the recent past others, including private universities, have also started offering some agriculture related courses. Among private universities, Malawi Adventist University (MAU) offers some degrees that include agriculture related courses.

Nature and scope of academic programmes and delivery mechanisms at LUANAR
LUANAR used to offer one generic Bachelor of Science Degree in Agriculture (with research orientation in specialized areas including engineering, nutrition, extension, crop or animal science). This had a diploma offer at third year, where only a few proceeded to BSc. This changed in the mid 1990s, when diploma was scrapped off, and candidates proceeded to BSc in Agriculture. However, the period between 1999 and 2009 saw intensive differentiation of programmes, until recently when LUANAR became a university. Several new programmes have been developed with a lot of specialization. For example, BSc in Agronomy, and BSc in Seed Systems, were split from BSc in Crop science. While LUANAR celebrates this increase in programmes, employers are lamenting. Most employers observed that those employees with the earlier general BSc in agriculture were well rounded and more versatile, compared to the recent more specialized graduates. The same applies to post-graduate programmes. For example, Masters in Aquaculture and Fisheries Science was split into Master of Science in Aquaculture and Masters in Fisheries Science, which employers as well as sponsors are not happy with. The employers recommend that LUANAR should reconsider consolidating some of the programmes back into more generic programmes that will ensure more versatile agricultural graduates. It is therefore recommended that LUANAR repackages its programmes to make them more market oriented rather than aligning them to theoretical disciplines. It may seem that the intensive differentiation is due to staff aiming at creating empires for their specialized disciplines instead of reflecting on industry needs.

For LUANAR, the increase in student enrollment for the past 7 years has been parabolic. In the reported period, the increase has been more than 200%. This increase in enrollment has been coupled with general increase in the percent of female students from 31% in 2008 to 45% in 2014. This is a clear indication of the determination that LUANAR has to increase both the number of agriculture graduates and intake of females, in line with government’s vision and gender development policy.

However, this fast increase in student numbers has not happened with corresponding improvement in infrastructure development. Perhaps LUANAR takes a retrospective approach to growth, infrastructure-wise, out of necessity rather than choice. Practically, this is a cunning way to attract sympathy and support from stakeholders, but technically it compromises quality.
Student failure rate at LUANAR is still very high, especially in the early years (first and second year). Basing on available data, an estimated annual failure rate of close to 20% has been registered over the past 5 years, but has declined in recent years, following interventions. One of the interventions is an intensified and comprehensive week long orientation for first year students. Furthermore, the office of the Director of Student Affairs (DoSA), in liaison with management, facilitated extra-lessons for challenged students or those with failure track record. With assistance from the Deputy Vice Chancellor and the Programmes Coordinating Office (PCO), academically challenged girls also received support on extra-lessons and scholarships.

LUANAR management has also taken action to increase number of staff by engaging teaching assistants, especially in the basic sciences (Mathematics, Physics, Chemistry and Biology) where student failure rate was highest. Nevertheless, inadequate teaching and laboratory space continue to affect effectiveness of teaching and learning. It is hoped that the pass rate will improve once the on-going and planned infrastructure is accomplished.

The LUANAR has got a well-defined structure in place ranging from management through academic to supporting staff. The University structure is practically led, besides the Chancellor who is the State President, by the University Vice Chancellor, then Deputy Vice Chancellor, the University Registrar, the University Librarian, the Director of Finance, assistant registrars (students’ welfare, academics, administration), Director of Quality Assurances, Director of Research, Coordinator for Open and Distance Learning and the Deans of faculties. In academic structure, there are Professors, Associate Professor, Senior Lecturers, Lecturers, Deans of the Faculties and their deputies, heads of departments and technical supporting staff. LUANAR has five faculties namely: Faculty of Agriculture, Faculty of Development Studies, Faculty of Natural Resources, Faculty of Food and Human Sciences and Faculty of Postgraduate Studies. It should be noted, however, that the faculty of post-graduate studies does not offer any programmes, but only coordinates graduate students in the four main faculties. Currently, the Faculty of Biomedical Sciences is under construction, which will house veterinary sciences. These faculties have a total of 15 departments that offer diverse programmes.

Financing agricultural higher education
It is generally felt by LUANAR and her stakeholders that the level of funding that the institution gets from the public purse does not resonate with the fact that agriculture is the mainstay of Malawi’s economy. While LUANAR has a clear strategic plan, it may not be realized due to funding constraints. The failure to match budget provision with the strategic plan has been a major issue in the education sector in Malawi (Ng’ambi, 2010). Malawi being agro-based economy, would have invested much in agricultural institutions of higher learning to increase agricultural productivity and efficiency for a better GDP. Table 2 shows the funding situation at LUANAR over the past 5 years. Clearly LUANAR has made effort to generate its own resources to supplement government funding. Nevertheless, tuition, which at the moment stands at MK250, 000 is far below the economic fees MK1,000,000 as estimated by the University of Malawi for science graduates. However, the fact that government dictates the tuition, and yet subvention is always miniscule, leaves LUANAR in an awkward situation, and sometimes financially crippled. Perhaps, government should consider either significantly increasing the fees or lessen its grip over the determination of tuition fees.

Main challenges facing agricultural higher education institutions
Agricultural higher education institutions are facing a number of challenges including the following: (i) Limited infrastructure for teaching and learning, student accommodation and staff office space. This is as a result of increasing numbers of students and the need for advanced laboratory and specialized equipment following the introduction of new programmes including Masters and PhD programmes; (ii) Limited funding from government cripples some of its activities, including teaching and learning, research and outreach, (iii) Lack of adequate and deliberate support from the end-user line ministry, Ministry of Agriculture, Irrigation and Water Development (MoAIWD), towards meaningful research collaboration and access to donor pool funds; (iv) Lack of National Qualification Framework also results into challenges to align programmes to regional and international certification requirements; and (v) limited student scholarship opportunities. Since the economic fees is very high by Malawian standards of living, potential students fail to register. It is good news that now students from private universities can also access government education loans through the newly established Higher Education Students Loan and Grants Board (HESLGB).

Agricultural, Science and Technology University Ranking, Graduate Quality and Demand in Malawi: Gaps and Opportunities

University ranking systems as a proxy measure of quality agriculture graduates
The agricultural, science and technology universities in Malawi are either among the poorly ranked or not
ranked at all, based on The World University Rankings. For example, the University of Malawi, which is the oldest, and having the most science and technology related programmes is nowhere near the ranks of the first 50 top universities of Africa according to the 2015 World University Rankings. However, the University has a contingent number of professors, with good track record. MZUNI is also poorly ranked, while MUST is not ranked at all being the youngest public university in the country. MAU, due to the limited staff and infrastructure capacity also lags far much behind, but is a promising young private university.

However, the biggest challenges that undermine LUANAR’s glory include lack of publicity of its enormous work. For example, its website does not yet reflect the high performance and research outputs of the academic and research staff. Track record is vividly missing and publications are neither featured nor retrievable. However, its Information and Communication Technology (ICT) Department has been recently revitalized with the employment of system and network engineers, and an ICT manager. A new website has been designed with new features that will improve utility. A repository is also in the of fing. It is hoped that once fully functional, the interactive website will largely improve LUANAR’s publicity and ranking.

The other challenge for LUANAR has been limited teaching, learning, research, laboratory and housing infrastructure. The university has seen a rapid increase in student enrolment from less than 500 to more than 3000 in recent years, with very little infrastructure development. This has resulted in some make-shift teaching and learning facilities, as well as substandard student accommodation infrastructure, for which the university has often been heavily criticized by the public. However, management has taken bold steps to engage government, as well as private companies through its Public-Private-Partnership (PPP) programme recently approved by Parliament, to erect an iconic administration building, teaching complexes, laboratory facilities, hostels and even water and sanitation infrastructure, to match the anticipated student population increase. These development projects are at advanced stages. LUANAR has embarked on off-campus programmes, with small campuses in the urban areas of Lilongwe attracting about 500 more students. Furthermore, the university has recently embarked on a large Open and Distance Learning (ODL) project, through which it intends to enroll an extra 800 students using three satellite centers across the country.

Industry perceptions about a good quality agricultural graduate

Strong links between universities and industry have been demonstrated to increase rate of return on
Agriculture is generally considered to be a poor man's job. Although it is generally accepted that higher education leads to higher productivity, the industry in some countries, including Malawi, has expressed reservations on the value addition from the current agriculture universities in terms of research and the relevance of its graduates. The importance of quality higher education has been highlighted by various stakeholders in Malawi and in the region (SARUA, 2009). A large section of the agricultural industry indicates that the quality of agricultural graduates is a major challenge. Specifically, most agricultural graduates were deemed as not being practical and could not match with current technology being used in the agricultural sector. This trend was mainly been attributed to curriculum delivery. It was observed earlier that most African universities suffer from a technological divide that increases the economic gap between the rich and the poor countries of the world (UNESCO, 2005). These new technologies and the need to keep up with the developments in information technology in particular, posed new costs and demands on higher education which many countries found difficult, if not impossible, to meet. Borland et al. (2000) assessed quality of graduates by simply looking at the expenditure per student. They contend that there is a positive correlation between high quality of graduates and the level of expenditure. This is supported by the observation that increased number of students has disproportionately increased teaching load for lecturers to the extent that quality or research and learning has been compromised (Mugenda, 2009). There has been increase in class size, increased course loads, elimination of tutorials in many universities and low level of qualifications of many of the new teachers (Mugenda, 2009).

Agriculture is generally considered to be a poor man’s job. Although this is the case, up to 15% of the stakeholders attributed the quality and attitude by agricultural graduates entirely to the university system. Government needs to promote agriculture from early schooling. At tertiary level government should look at improving the quality of Agriculture higher education since it has many spill-over benefits. There is evidence of extended benefits to higher education both regionally and internationally. Borland et al. (2000) argue that graduates are generally highly paid and this raises the tax collected by governments. On the other hand a university system that is known for quality has a high chance of attracting foreign students. This leads to increased exports in form of education and goods required by the foreign graduates.

**RECOMMENDATIONS**

(i) The universities should deliberately engage agro-industries in curriculum design and in training students and hold each other accountable for research and teaching, respectively.

(ii) The period of attachment should be expanded from 2 to 6 months.

(iii) The Malawian public universities should review their curricula to become more practical, relevant and produce industry ready graduates. The assessment systems need to be in tandem with principles of widening access and internationalization.

(iv) Malawian public universities should review their curricula to become more practical, relevant and produce industry ready graduates. The assessment systems need to be in tandem with principles of widening access and internationalization.

(v) LUANAR should explore more strategic partnerships with regional universities such as Makerere, on food science, and South-African Universities, through student mobility programmes, in order to allow students and staff access improved technology.

(vi) The NCHE and MoEST should put in place a National Qualifications Framework, and be more vigilant on enforcement of rules and regulations and monitoring.

(vii) Strengthen ODL and adopt modularization to widen access to higher education.

(viii) Universities should harness the Performance Management System (PMS) and put in place supporting tenets including robust student and staff accountability systems

**ACKNOWLEDGEMENTS**

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**STATEMENT OF NO CONFLICT OF INTEREST**

We the authors of this paper hereby declare that there are no competing interests in this publication.

**REFERENCES**


