Agricultural Tertiary and Vocational Education and Training (ATVET) in Africa:

Overview and integration within broader agricultural knowledge and innovation systems

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Executive Summary

Agricultural production and employment opportunities in the agri-food sector in Sub-Saharan Africa are not keeping up with the demands resulting from population growth. Nor are education systems yet sufficiently developing the technical, entrepreneurial and life skills needed for an attractive, vibrant and remunerative agri-food sector.

This report looks at efforts in the region to develop and implement agricultural, technical and vocational education and training (ATVDT). It does this by reviewing TVET and ATVET policies, the institutional landscape and experience in the region and selected countries (Benin, Ethiopia, Ghana, Kenya, Nigeria and Uganda). Key policies and changes relating to the regulation of ATVET institutions and their programmes, and the introduction of competency-based education and training (CBET) are reviewed.

To complement this information, a number of case studies were commissioned from these countries to illustrate some of the challenges faced and successes achieved by individual ATVET institutes in implementing these policies and integrating practical education in agri-food systems within the broader "agricultural innovation system".

Based on this review at regional, national and local levels, a number of conclusions – or more accurately, propositions, are postulated. Based on these propositions, opportunities to support ATVET are identified, with a particular focus on ways in which countries such as the Netherlands can support indigenous efforts to promote ATVET in SSA. These propositions and opportunities include:

1. National Policies and the legal framework for (formal) TVET and ATVET are increasingly in place in many SSA countries, but the implementation of these policies is proving complex, and is yet to be effective.
    - *Support continued ATVET policy development, review and reflection, at continental, national or organizational level.*
2. Agricultural TVET is increasingly being brought under education authorities, rather than agriculture under which many traditional agricultural colleges were established to provide a cadre of public extension agents which has largely been phased out in most countries. Inter-sectoral agricultural skills councils, intended to identify skills development priorities, are yet to become operative and effective, hence the identification of key occupations and competencies needed to guide ATVET is weak.
    - *Promote national level networking by supporting and operationalizing intersectoral ATVET working groups or skills councils, etc., their terms of reference, working procedures as well as, where useful, initial operational costs.*
3. The introduction of "Competency-based education and training" (CBET), an increasing component of ATVET policy, intended to improve the development of practical competencies required, but a broad understanding of this approach and its implementation is still lacking in most ATVET institutions. The capacity of ATVET instructors to develop, deliver and assess CBET is especially limiting the introduction of the approach, as many of these instructors are graduates themselves of a more traditional and theoretical approach and have not had pedagogical training.

- *Support the development of a cadre of CBET instructors in ATVET in priority countries and selected universities/colleges, harmonizing approaches of development partners with national authorities.*

4. There is no broad international consensus to the definition of agricultural "occupations", some relating occupations to value chains, and others maintaining a broader approach.

   - *Promote international and national dialogue on how best to define agricultural occupations and support the development of occupational standards of key/priority occupations.*

5. Agriculture as a profession, and TVET as an education, are both unattractive to young people in SSA. Agricultural TVET is therefore often seen as a steppingstone to something more attractive and lucrative. Academic progression is therefore important to many ATVET students, who value university qualifications more.

   - *Promote agricultural and food-related occupations as rewarding and remunerative careers, through publicity campaigns showing the potential careers and possibilities of entrepreneurship in the agri-food sector.*

6. The overlapping activities and programmes of different types of educational institute, including ATVET colleges, polytechnics, applied science/technical universities and universities provide opportunities for collaboration, but also challenges for distinct regulatory authorities. The comparability of qualifications across vocational (CBET) and academic programmes within a single NQF framework presents potential difficulties, possibly limiting the possibilities for academic progression which remains important to many young people.

   - *Promote international and national discussions on the strategic development of integrated institutional landscapes in agricultural education, and flexible yet complementary mandates for different types of agricultural education.*

7. Although much ATVET was originally established to provide manpower for government extension, the "privatization" of these services has led to diminished linkages between education and development. Although well-meaning in theory, efforts to regulate, certify and accredit "non-formal" and "informal" ATVET – which include much activity by externally-supported value chain development projects - are ambitious and could potentially limit such activities.

   - *Support ATVETs as a component/integral activity in value chain development projects and further integrating ATVET into advisory services within such projects by, e.g. providing opportunities for practical experience by ATVET trainees, providing feedback to occupational standards, curricula and training materials, providing specific/ essential equipment at ATVETs, etc.*

8. ATVET linkages with the private sector are weak not only because of a generalized public sector culture, but also because the private sector is not well developed in SSA agriculture and financing/incentives for such collaboration are weak.

   - *Promote a wider concept of the "private sector" as potential labour market, giving more attention to the self-employed in small farms and micro-enterprises, to farmer organizations and producer groups.*

9. The Covid-19 pandemic has heavily affected ATVET residential teaching programmes and online or blended learning is being promoted as a solution, but ATVETs lack the infrastructure and equipment needed, instructors lack the skills required, and students are often not accustomed to self-directed learning.

    - *Develop African-led or bi-continental blended learning platforms to support CBET in key agricultural occupations and curricula, and ATVET instructors capable of utilizing these, while carefully integrating with national curricula development processes, and necessary accreditation procedures.*

10. Although TVET generally has received much attention in recent years from national governments and international development partners, already constrained budgets are likely to come under even more pressure in future.

    - *Provide skills development (challenge) funds in priority areas for development, on a competitive basis to private companies, NGOs, farmer organizations, etc., to encourage these actors to work more closely with ATVET organizations, including the opportunities trainees to gain practical experience.*

11. Efforts to support ATVET in SSA by both national and international agencies are generally uncoordinated, with limited mutual learning between programmes and countries.

    - *Create and/or support an international ATVET network to create a shared vision of ATVET strategy and CBET in agri-food systems and improve exchange of experience and mutual learning between countries, programmes, and projects.*

PART I OVERVIEW OF ATVET IN SUB-SAHARAN AFRICA

People, food, work and agriculture in SSA

The population of Sub-Saharan Africa has increased from 227 million in 1960 to over 1.1 billion in 2019 and is expected to double again to reach 2.2 billion by 2050, by which time it will represent almost 25% of the global population[1] .

Currently, Africa's agricultural production systems are not keeping up with this population increase. Between 2001 and 2014, the sub-continent's food import bill rose from US$ 6 billion to US$ 45 billion.

The current labour force in SSA of about 440 million is growing at about 3% or 13m per year[2], with annual increases that are not predicted to decline until after the 2050s. Even though the urban population is expected to outnumber the rural population by 2050, rural Africa is projected to have about 50% more people in 2050 than it did in 2015, and about half of Africa's new job seekers will need to find employment in rural areas, at least until 2030.

Agriculture accounts for about 15% of total GDP in SSA, but self-employed and unpaid family labour accounts for over 50% of all employment in most countries. Small farms of typically 2 hectares or less, constitute 80% of all farms in SSA[3]. Off-farm employment in agri-food systems, particularly agro-processing, is growing, but from a low base, estimated at less than 20% of total employment, compared to 24–39% of total employment in the non-farm sector[4]

While much of Africa's agricultural production increases in the past have come from increased areas under production, future increases will need to come more from improved productivity. This will require a better skilled labour force, with a range of technical, business and soft or life skills. The current educational systems in SSA will need to be considerably improved to achieve this.

According to the Africa-America Institute[5], citing UNESCO sources:

- 50% of Africans are under 15
- The number of children enrolled in primary schools more than doubled between 1990 and 2012, to 150m, although in 2012 some 38m children of primary school age were out of school.
- Secondary schools in African can only accommodate 36% of qualifying secondary students, and seven out of 10 rural youth have never attended secondary school;

[1] World's population will continue to grow and will reach nearly 10 billion by 2050.

[2] World Bank Data

[3] FAO, 2016. *OECD-FAO Agricultural Outlook: Chapter 2. Agriculture in Sub-Saharan Africa: Prospects and challenges for the next decade*. FAO, Rome.

[4] Jayne, T., Yeboah, F.K. and Henry, C. 2017 *The future of work in African agriculture: Trends and drivers of change* Research department working paper no. 25, ILO, Geneva

[5] Africa-America Institute 2015. *State of Education in Africa Report 2015: A report card on the progress, opportunities and challenges confronting the African education sector*.

- Technical and vocational education and training (TVET) has not been a top priority for many African countries and, in 2012, accounted for 6% of total secondary enrolment, a slight drop from 7% in 1999. On average, 2-6% of educational budgets are devoted to technical and vocation skills development.
- Currently, 6% of young people in sub-Saharan Africa are enrolled in higher education institutions, compared to the global average of 26 percent, although this had doubled between 2000 and 2010, from 2.3 million to 5.2 million.

Even with these figures, and as will be seen in this report, agriculture and agricultural education is not attractive relative to other occupations. Agricultural Technical Vocational Education and Training (TVET) needs to be considerably strengthened, if the food security and labour requirements of SSA are to be met.

What is "ATVET"?

TVET defined

According to the commonly quoted and current UNESCO definition[6]:

> *"Technical and vocational education and training' (TVET) is understood as comprising education, training and skills development relating to a wide range of occupational fields, production, services and livelihoods. TVET, as part of lifelong learning, can take place at secondary, post-secondary and tertiary levels and includes work-based learning and continuing training and professional development which may lead to qualifications. TVET also includes a wide range of skills development opportunities attuned to national and local contexts. Learning to learn, the development of literacy and numeracy skills, transversal skills and citizenship skills are integral components of TVET*".

Within the field of TVET and ATVET, many authors and policy documents distinguish "Formal", "Non-Formal" and "Informal" A/TVET [7] [8] [9] [10]

- "***Formal" TVET*** refers to education and training programmes which are part of the formal education system, guided by a curriculum, and recognized with a certification by the country's education authority. This is the type of activity which takes place at secondary technical schools, TVET centres, colleges and polytechnics, often resulting

[6] UNESCO (GC), 2015. *Proposal for the revision of the 2001 revised recommendation concerning technical and vocational education.* United Nations Educational, Scientific and Cultural Organization.

[7] Kirui, O. K. and Kozicka, M. 2018. *Vocational education and training for farmers and other actors in the agri-food value chain in Africa* ZEF Working Paper 164. Center for Development Research, University of Bonn.

[8] Ministry of Education and Sports, 2019. *The Technical Vocational Education and Training (TVET) Policy*. Republic of Uganda.

[9] Guy Nouatin, Rubain Bankole, Esaie Gandonou, Johanna M. Kemper, Karina Maldonado-Mariscal. 2019. *Country Case Study on Technical Vocational Education and Training (TVET) in Benin.* LELAM-TVET4Income Project Working Paper No 9, Université Abomey-Calavi (UAC) and ETH Zurich

[10] Walker, K, and Hofstetter, S. 2016. *Study on agricultural and vocational education and training (ATVET) in developing countries*. Swiss Agency for Development and Cooperation, Federal Department of Foreign Affairs, Switzerland.

in qualifications referred to as "certificates", "diplomas" or increasingly as education at "levels" 1-4.

- "***Non-formal" TVET*** refers to a class or course, guided by a curriculum, but not part of the formal education system and not recognized by the education authority. In this report, non-formal TVET is taken to include short training courses, "practical training farms", "farmer field schools" etc., typically organized or delivered by value chain development projects, training providers, companies but also TVET organizations, both for "training of trainers" (e.g. extension agents, advisors) and for farmers themselves.
- "***Informal" TVET*** is where learning is not structured in terms of objectives, time or learning support. Essentially, this is the learning gained from experience in everyday life and work. In Africa, most farmers and small businesses have gained their knowledge and skills through this type of "informal" learning; in some parts of Africa, the informal sector accounts for 80% of training skills (ILO, cited in African Union, n.d.). This type of TVET also includes informal apprenticeships, which are common in Africa but only have social, not official, recognition.

While these definitions are commonly found in the TVET literature, it does not mean that providers of "non-formal" and "informal" TVET themselves recognize or refer to their activities as such. The extension literature, for example, only rarely refers to TVET – and then often only in reference to the training of extension agents (e.g. as in Ethiopia)[11].

This report will focus more on "formal TVET" and, to a much lesser extent, "non-formal" TVET. While it will consider the linkages between "formal" and "non-formal" TVET, an exhaustive mapping of development projects and extension programmes offering non-formal training and informal TVET is beyond the scope of this report.

Academic and vocational education

African countries often offer vocational training at the secondary school level. Formal TVET therefore straddles both secondary and "higher" or "tertiary education" - if one accepts the World Bank definition: "*higher education, also known as tertiary education in some countries, refers to all post-secondary education, including both public and private universities, colleges, technical training institutes, and vocational schools*". However, in common usage and literature in Africa, "higher education" has been equated with degree-level or university education[12]. Different countries organize the education sector differently, although - and with the growing recognition of the importance of TVET to Africa's development - it seems to be increasingly common for TVET to be considered as a third sub-sector along with "basic" (primary/secondary) and university education, and with distinct TVET regulatory agencies within ministries of education.

[11] See for example: Davis, K., Babu S. C. and C. Ragasa, 2020. *Agricultural Extension: Global status and performance in selected countries*. International Food Policy Research Institute, Washington D.C.

[12] Anthony Egeru and Emmanuel Okalany (Regional Universities Forum for Capacity Building in Agriculture, RUFORUM), personal communication. The semantic situation is further confused when some (e.g. RUFORUM) consider "tertiary education" to include TVET, but not "higher education" – when many definitions consider "higher" and "tertiary" education to be synonymous.

However, the boundaries between TVET and university or "academic" education are not always well defined. In recent years, many colleges have been upgraded to universities now offering (bachelor) degrees, while at the same time continuing to offer programmes at certificate and/or diploma level[13]. This can lead to a situation where the institute is accredited by one agency within the Ministry of Education (e.g. the university council) and the programmes under another agency (e.g. TVET authority or board) – as well as possibly coming under the administration of a separate ministry (e.g. agriculture). The concept of "applied universities" - also referred to as polytechnic universities, universities of applied sciences, vocational universities, technical universities, the Dutch *hogeschool* – also put emphasis on practical knowledge to distinguish themselves from "traditional universities"[14]. Whether such applied universities can be considered "TVET" is perhaps also open to debate.

TVET is also generally acknowledged to be a distinct type of education, compared to more academic education, although there are differences in national interpretations, and the nature of TVET is evolving[15]. Vocational education is generally understood to emphasize hands-on training with workplace style experience. Students spend more time doing supervised training with equipment and less studying theory and practice. They often benefit from having instructors who still work in the field. This gives vocational education an immediacy and applicability sometimes not found from university professors and programmes[16].

Competency-based education and training (CBET)

Another aspect of TVET which distinguishes it from more academic education is the emphasis on development of competencies, rather than knowledge *per se*. Deissinger, T. and Hellwig, S. (2005)[17] , in their comprehensive description of the subject, define "competency-based education and training" or CBET, as "*an approach to VET, in which skills, knowledge and attitudes are specified in order to define, steer and help to achieve competence standards, mostly within a kind of national qualifications framework".* CBET involves establishing competence standards on the basis of industry needs and expectations, curricula which define expected skills performance levels, flexible self-paced and workplace-based learning which recognizes prior learning, assessment which measures this performance, and national qualifications which recognize this achievement. CBET is therefore a radically different approach to "traditional" (or "academic") higher education, and hence requires different educational processes, regulatory structures, instruction methods and even ways of thinking – not easy to achieve when many policy makers and instructors have themselves been trained in, and only know the more traditional approach.

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[13] Examples are Egerton University in Kenya, upgraded from farm school to agricultural college in 1950, and from college to university in 1987, and Busitema University in Uganda, which now incorporated Arapai Agricultural College in 2010.

[14] Tamrat, W. 2019. *Applied universities – a viable path to higher education.* University World News.

[15] Cedefop (2017). *The changing nature and role of vocational education and training in Europe. Volume 2: Results of a survey among European VET experts.* Luxembourg: Publications Office. Cedefop research paper; No 64

[16] Darlo, 2018. *5 Differences between vocational education and higher education.*

[17] Deissinger, T. and Hellwig, S., 2005. *Structures and Functions of Competence-based Education and Training (CBET): A Comparative Perspective.* InWEnt – Capacity Building International, Mannheim, Germany.

National Qualifications Frameworks

If TVET is considered different than "academic" education, then the qualifications gained through TVET and their compatibility with academic education also need to be defined and regulated. The development of National Qualifications Frameworks (NQF) has therefore been a key aspect of national TVET policies and strategies within most countries in Africa, as a means to articulate the qualifications and skills needed in the workplace, improve credibility of qualifications and training programmes, facilitate integration of non-formally acquired skills, and facilitate transition between secondary, post-secondary and tertiary education.

In other words, *"A qualifications framework is an instrument for…recognition of skills, knowledge and competencies along a continuum of agreed levels… [it] indicates the comparability of different qualifications and how one can progress from one level to another, within and across occupations or industrial sectors (and even across vocational and academic fields if the NQF is designed to include both vocational and academic qualifications in a single framework"* [18].

The African Union has as policy initiative The African Continental Qualifications Framework (ACQF), aimed to enhance transparency and portability of qualifications of all sub-systems and levels of education and training, to align with national and regional qualifications frameworks. This initiative, being developed during 2019-2022, is supported by the EU and GIZ and ETF (European Training Foundation). So far, a number of national reports have been published, including Kenya and Ethiopia, which map the education systems, describe legal frameworks and governance systems, the qualifications levels and descriptors used, and how prior learning is validated. A comparative report at continental level expected by end of September 2020.

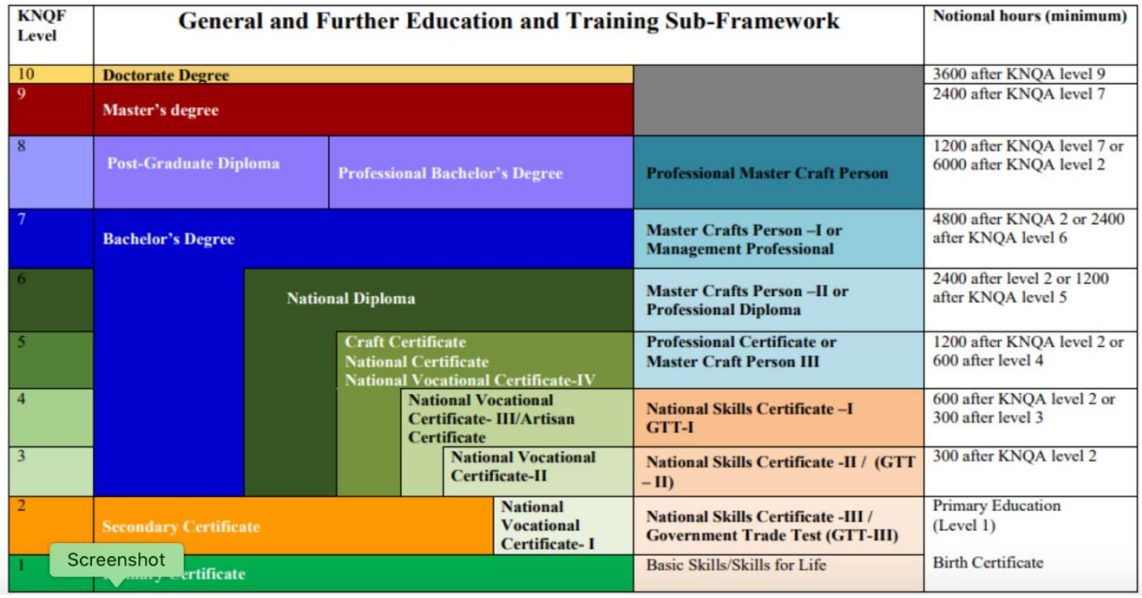

Figure 1 The National Qualification Framework, Kenya[19]

[18] Tuck, R. 2007. *An introductory guide to national qualifications frameworks: Conceptual and Practical Issues.* Skills and Employability Department, International Labour Office (ILO), Geneva.

[19] Source: *Kenya National Qualications Authority*

According to Thorsen's study of how qualifications frameworks have been adopted in East Africa[20], such frameworks are difficult to implement and achieving the goals of the policy are limited. Citing Tuck, he identified as key to improving their prospects trust building among stakeholders and choosing a middle ground approach between "tight" and "loose" frameworks.

Practical and transformative TVET

In a broader, more "theory driven", review and analysis of TVET in Africa, McGrath et al (2019)[21] argue for a fundamental rethinking of the systemic organisation of VET systems, the world of work and the ways in which they have excluded the majority. Noting that formal labour markets are small in Africa and that for most Africans, likely labour market destinations are still in the urban informal or rural subsistence economies, they stress the need to get beyond "crude technical approaches" and the "narrowness and short-termness of the employability orthodoxy", to consider what knowledge and skills are required to address the needs of sustainable land management and an African Green Economy wider human, and what individuals value - respect, active citizenship, empowerment. This transformative role of TVET will require rethinking principles, processes and practices, curricula and pedagogy, based on theory that considers history, ecology and context as well as national policy imperatives, political economy and inclusivity.

[20] Thorsen, S.M., 2014. *The spread of national qualifications frameworks: tracing and examining its prospects in the East African region.* Master Thesis, University of Oslo.

[21] McGrath, S., Ramsarup, P., Zeelen, J., Wedekind, V., Allais, S., Heila Lotz-Sisitka, H., Monk, D., Openjuru, G., & J. Russon, 2019. *Vocational education and training for African development: a literature review.* Journal of Vocational Education & Training, DOI: 10.1080/13636820.2019.1679969

Challenges and developments in the TVET/ATVET sector

There have been a number of recent reviews of TVET [22] [23] [24] and ATVET [25] [26] [27] [28] [29] [30] in Africa. Commonly identified challenges in these reviews relevant to ATVET, and the main ways in which the countries described in Part 2 of this report have responded to those challenges, are summarized below:

Underfunding of (A)TVET

Funding levels are typically cited as one of the main challenges for TVET/ATVET in Africa, leading to poor institutional and human resources. A typical comment is '*that while TVET has been recognised as the "hinges and bolts of the economy", TVET is underfunded, TVET policy is divorced from practice, and TVET outcomes have fallen far behind expectations in Nigeria*'[31], and '*Following on from colonial systems, formal education through elite colleges and universities was emphasized, and ATVET especially was neglected by governments in the 1980s-90s*'[32].

Between 1995 and 2010, Africa maintained its public investment in education at around 4% of GDP[33]. Of this, some 20%, or less than 1% of GDP, was allocated to higher education. During the same time, the number of students in higher education tripled, from 2.7m in 1991 to 9.3m in 2006. Africa was the only region in the world that has experienced a

[22] Eicker, F., Haseloff, G and B Lennartz (eds), 2017. *Vocational Education and Training in Sub-Saharan Africa: Current Situation and Development*. Volkswagen Stiftung, Germany.

[23] African Union (n.d.) *Continental Strategy for Technical and Vocational Education and Training (TVET).* African Union, Addis Ababa.

[24] Mukhwana, E.J. 2019. *Reforming the TVET sector for improved productivity in Africa*. Presentation at the 15th RUFORUM Annual General Meeting, RUFORUM, Kampala.

[25] Walker, K, and Hofstetter, S. 2016. *Study on agricultural and vocational education and training (ATVET) in developing countries*. Swiss Agency for Development and Cooperation, Federal Department of Foreign Affairs, Switzerland.

[26] Kirui, O. K. and Kozicka, M. 2018. *Vocational education and training for farmers and other actors in the agri-food value chain in Africa* ZEF Working Paper 164. Center for Development Research, University of Bonn.

[27] African Union (n.d). ATVET best practices. African Union Development Agency, NEPAD, Midrand, South Africa.

[28] Schulleri, F. 2013. *Promotion of Technical Vocational Education and Training (TVET) for the Agricultural Sector (ATVET) in Africa: A Review of best Practises on ATVET in Africa; Case Studies of Ethiopia, Benin, Namibia and Sierra Leone Final Report*. NEPAD Planning and Coordinating Agency, NEPAD, Midrand, South Africa.

[29] Brown, T., & Majumdar, S. 2020. *Agricultural TVET in developing economies: Challenges and possibilities.* UNEVOC Network Discussion Paper.

[30] Acquaye, D. n.d. *Technical and vocational education and training (TVET) scoping study.* Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), Kampala, Uganda.

[31] Okorafor, A. O. and Nnajiofo, F. N. 2017. *TVET policies and practices in Nigeria: why the gap?* European Journal of Education Studies: Vol 3; p 612-623.

[32] Walker and Hofstetter, 2016. *Ibid.*

[33] More recent figures from "Our world in data" show total government expenditure on education in 2016 remained at about 4% of GDP in Sub-Saharan Africa, compared to about 5% in the European Union. As a percentage of government expenditure, education accounted for between 10 and 15% in Europe, and between 15 and 25% in African countries. As a percentage of the public education budget, primary education ranges from e.g 12% (Germany) to 33% (UK) in Europe, compared to e.g. 36% (Kenya) to 50% (Benin) in Africa.

decrease in the volume of current public expenditure per student, with a correspondingly adverse effect on education quality – even though annual public expenditure per student was relatively high at 3 times GDP per capita, compared to 1.2 times globally. Increasing higher education budgets further was considered difficult when the tax base was low, secondary education was also underfunded, and universal primary education was still not achieved in several countries[34] [35].

Economic returns to TVET in comparison to basic and higher education has also proved difficult to quantify. Psacharopoulos (1981, 1985, cited in McGrath et al, 2019) in turn cited a larger literature that showed lower returns from TVET than from primary or academic secondary education. Perhaps influenced by these figures, by 1990, the World Bank was prioritizing primary education, a trend reinforced by Education for All campaign and the Millennium Development Goals.

Whether to dedicate resources to basic education, higher education or TVET or remains a dilemma for African governments[36]. TVET financing as a percentage of public education expenditure in Africa is difficult to quantify, but estimates range from 1-12% in about 1998/99, to 2-15% by 2005-9[37].

In Ghana, for example, the Education Strategic Plan 2018-2023 showed that the proportion of the education budget allocated to TVET has been less than 3%. In Nigeria, the education budget was 6% of Federal government expenditure, and 8% of this education budget was allocated to TVET in 2012. In Ethiopia – which has a target of 80% of secondary students that should be absorbed into TVET - less than 10% of education budget is allocated to TVET. These figures compare to the 14% of the Netherlands education budget which goes to TVET[38].

In recent years however, national policies in several of the countries studied in Part 2 have reiterated the importance of TVET and pledged to increase budget allocations to the sector. Examples include Kenya, which increased TVET funding in the 2018/19 financial year by 30% to USD 160m, and introduced tax rebates to companies that take on interns.

Unattractiveness of (A)TVET

TVET is often regarded as second-class, both at secondary and higher education levels, the destiny of those who are not intellectually capable of studying at university. In Africa, as in the industrialized world, parents, students, and even schools themselves often see TVET as a "failure", with university education much preferred. In Ethiopia, for example, reports show that less than 4% of young people aspired to vocational education, compared to 75%

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[34] World Bank, 2010. *Financing higher education in Africa.* World Bank, Washington.

[35] Interestingly, the 2010 World Bank report on higher education does not mention the term "TVET", and it is difficult to see to what extent TVET is included in the figures and statistics for "higher education".

[36] Oketch, M. 2007. *To vocationalise or not to vocationalise? Perspectives on current trends and issues in technical and vocational education and training (TVET) in Africa*. International Journal of Educational Development 27: 220-234.

[37] Lolwana, P., in Eiker *et al*, 2017 (*ibid.)*

[38] Van der Zalm, J. and L. Akkermans, 2017. Keynote address in *Hands on the future National TVET Conference & Kenya Skills Show 2017*. Proceedings and Recommendations

aspiring to go to university[39]. It is the "dunces" of general education that end up in TVET[40], the "last resort" for students wanting to pursue post-secondary education[41].

Although the human resources needed by African economies are mainly at the intermediate level and in agriculture (a sector often disregarded by the universities), only 8 percent of secondary education students in 2004/05 were registered in technical and vocational areas[42]. In Ghana, for example, only 2% of students opt for Senior High Technical Schools, which are seen as an option for under-performing students. In Nigeria, only 3% of senior secondary school students enrolled in TVET in 2007, against a target of 20%, with low esteem for TVET generally. In Ethiopia, less than 2% of TVET aged youth enroll in TVET education, although enrolment is growing about 7% annually. In Benin, according to the 2003 Education Act, the majority pathway after primary education should be TVET, but only about 3% of secondary students are actually enrolled in the TVET pathway.

ATVET is doubly unattractive. Few African school children want a career in agriculture, and few parents want their children to follow them on the farm. Agriculture is often regarded as a dirty[43] or a lower-class occupation, and even a "punishment" activity at school. Average earnings in the informal sector in non-agricultural work are double those in agriculture[44] Access to land is a commonly cited constraint to those young people who do want to establish agricultural businesses. In Nigeria, by one account, the current ATVET system does not provide specialized public training in agriculture at a grassroots level, although about 4m youths could potentially and usefully be mobilised to take up occupations in the agriculture sector[45].

Recognising that in the past TVET has been an unattractive option for youth, the reforms introduced by the Kenyan Government are intended to grow the sector ten-fold from the current 330,000 students. The Government now sees TVET as "the preferable and rewarding choice for Kenyans" (and is increasing funding). In Ethiopia, the government has set a target for 80% of secondary school students should go into TVET. In Uganda, the recently published TVET strategy includes marketing campaigns as a key component to promote TVET.

Poor development of agricultural skills

A common complaint from employers in the private and non-government sectors, including many development projects sponsored by national governments and development partners, is that graduates (of both TVETs and universities) lack the skills required to function in the workplace. When prospective employers in agriculture are surveyed to identify the skills

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[39] Le Mat, M., 2020. *Nexus skills/jobs Assessment of youth skills development/jobs Nexus in Ethiopia.* Netherlands Enterprise Agency, the Netherlands.

[40] African Union, n.d.

[41] Tamrat, W. 2019. *Universities vs TVET – Are attitudes the problem?* University World News

[42] World Bank, 2010. *Ibid.*

[43] According to admissions of the Ministry of Agriculture, Livestock and Fisheries (MoALF) – see Part 2.

[44] Adams et al, cited in Walker and Hofstetter, 2016. *Ibid.*

[45] Akinde, S and Vitung, A. E. (2020). Analysis of Agricultural Technical and Vocational Education and Training (ATVET) System in Nigeria: Report of a pre-feasibility study conducted from 23rd February to 4th March, 2020. Reseau International formation Agricole et Rural (FAR), Montpellier SUPAgro, France.

desirable in their employees, they typically identify the need personal and interpersonal skills such as communication and teamwork, as well as practical (technical and ICT) and entrepreneurial skills.

(A)TVET curricula are thus commonly considered to be unaligned and unresponsive with the needs of the labour force. Following on from a colonial tradition, the focus of much ATVET in Africa has been on developing generalist extension workers with an emphasis on production-oriented technology, as opposed to entrepreneurial/business-oriented skills and attitudes. Because (A)TVET formal education has often followed a theory-based or academic curriculum, and prior learning or informally acquired skills have been undervalued and unrecognized. The lack of appropriate facilities, machinery and equipment exacerbates the difficulty of arranging practical classes, and the lack of linkages with industry limits the opportunity to gain these skills in attachments or internships.

A focus on agricultural industry related skills (processing, distribution, marketing) in ATVET is therefore often mentioned as necessary to make agriculture more attractive as a business. However, while the agriculture sector typically accounts for 50-70% of the labour force in Sub-Saharan Africa, in some countries such as Ethiopia this is mostly unpaid family labour or self-employed farming, only 4% of the labour force in agriculture is actually in paid employment – which raises the question of how relevant is the "private sector" as the main demand side of TVET. If mainly subsistence farming is regarded as "industry", then perhaps a different approach is needed: in one survey in Ethiopia, at least, farmers considered that (formal) training is not useful for their profession (see Part 2).

The main TVET policy response to align skills development with industry needs is to define the skills needed as "occupational standards" (OS) at the different levels of attainment as described in a "national qualifications framework" (NQF), and develop approved CBET curricula to develop these skills to be delivered by accredited TVET institutions. In general, skills defined at level 2 are those appropriate for workers under supervision, those at level 3 for workers without supervision, and those at level 4 for (farm or plant) managers.

TVET authorities in the counties studied in Part 2 of this report have therefore been active in developing OS across a range of sectors - although progress has perhaps been slower in agriculture than other sectors.

In Ethiopia, for example, more than 600 occupational standards have been developed, including 8 recognized fields of study in ATVET: animal production and management, crop production and management, natural resources management, agricultural cooperatives business management, sugar crops production and management, farm machinery and equipment maintenance, farm machinery and equipment operation, and agricultural processing. Within these fields of study exist various "domains": agricultural processing, for example, includes 8 domains, including dairy processing, meat processing, poultry processing, fruit and vegetable processing, honey processing etc., each of which has its own occupational standards and curricula.

In Kenya, 375 approved curricula including units of competence at levels 3-6 have been published, including roughly 80 in agriculture, forestry, fishery, and food related occupations; but this list still does not yet cover all the occupations implied by the programmes offered by the ATVETs in the country.

In Nigeria, the NBTE currently lists 15 National Diploma programmes under agriculture and related technology, and although these curricula have been developed with consultants and sector stakeholders to comply with "benchmark minimum academic standards" (BMAS), they are as yet not generally based on OS and CBET. However, the NBTE is moving in this direction, with support from outside agencies such as GIZ, with OS having been developed in e.g. rice milling.

The application of the concept and practice of OS to the agriculture sector raises the question of how to define an agricultural "occupation". There does not seem to be a consistent approach to this across the countries studied in Part 2.

The traditional practice in most of the countries, which have until now offered diploma programmes (i.e. to level 4), is for these to focus on general agriculture, with specialization in crops, or livestock, or in some cases natural resource management. In these "general" programmes, level 1 curricula typically focus on basic agriculture operations; level 2 offers specialization in e.g. animal or crop production; level 3 offers more specialization in specific commodities; level 4 in production and marketing management. Each of these levels is broken down into 12-36 specific units of competence. Different parts of the value chain, such as production and processing, tend to be offered as different "occupations", with distinct OS (as in Ethiopia).

At different approach is that promoted taken by the AUDA-NEPAD project, which advocates a value chain approach to the development of OS. In 6 pilot countries, supported by the "Promotion of Technical Vocational Education and Training for the Agricultural Sector in Africa (CAADP ATVET)" Project, OS and CBET curricula have been developed for specific value chains. These include dairy, horticulture and aquaculture (Kenya), mango, pineapple and aquaculture (Malawi), pineapple and citrus (Ghana), rice and chicken/pork/sheep meat (Benin), rice, sesame and cashew (Burkina Faso), and rice and aquaculture (Togo).

Poorly qualified ATVET instructors

With lecturer training mainly taking place at universities, only a few lecturers combine pedagogical competencies with technical qualifications and industry experience[46]. TVET instructors have a lower status than general schoolteachers and are poorly remunerated. Teacher education is generally directed at primary and secondary school teachers. TVET instructors are educated mainly in universities, in an academic, not competency-based education approach. Career pathways for TVET instructors are undefined and confusing (an exception is South Africa where TVET teacher qualifications are more defined)[47]. As one author noted, competency-based training will require substantive changes in the "mindsets, belief systems, values, intentions and theories" of trainers to match these new roles and tasks[48].

Institutions in Africa which are dedicated to producing TVET instructors include the Federal TVET Institute in Ethiopia, which offers a Bachelor's degree in 5 occupational sectors (see

[46] Lowana P., 2016. Technical and Vocational Education and Training in Sub-Saharan Africa: the missing middle in post-school education. In Eicker, et al, 2016. *Ibid*

[47] Papier, J., 2016., *Ibid.*

[48] Boahin, P. 2018. *Policy innovations in the VET sector. The role of instructors in competency-based training in Ghanaian TVET institutions*. International Journal of Education, Learning and Development 6: 1-14.

part 3); the Kenya Technical Trainers College in Kenya, which offers 3 month certificate and 15 month diploma programmes for instructors; and the Faculty of Vocational Studies at the University of Kyambogo and associated National Instructors College Abilonino in Uganda. In Ghana, the College of Technology Education at Kumasi (COLTEK) has been identified as an "apex institution" for TVET training.

D'Oliveira Singo[49] also describes the Vocational Education Training Network (VETNET), which encompasses three universities in Sub-Saharan countries: Jimma University in Ethiopia, Witwatersrand University in South Africa and the Pedagogical University in Mozambique. The central idea of the VETNET programme is to conduct a master training of trainers whose task is to train TVET instructors on vocational competencies and open avenues for shared use of laboratories among the TVET institutions.

Proliferation of TVET institutes with little quality control

A comprehensive mapping of TVET institutions in general, and ATVET in particular, is extremely difficult in Africa. Along with universities, both public and especially private TVET (mostly NGO, foundation or faith-based) institutions have proliferated enormously in recent years. Public TVET institutions come under the responsibility of a variety of ministries and governance levels (national, federal, state, regional, county). In many countries, what can be considered to be ATVET (certificate and diploma) programmes are offered by universities, which usually come under a different regulatory regime[50]. National efforts by TVET authorities in each country to register these institutions, programmes offered and qualifications awarded have been challenging, and government websites are frequently updated with fresh lists of accredited institutions as the sector develops, new policies and regulations are put in place. As noted by the Ministry of Agriculture, Livestock and Fisheries in Kenya, "the proliferation of public, private, NGO, faith-based organizations, and efforts by various development partners has been poorly coordinated, unregulated and not standardized" (see Part 2).

In Ethiopia, for example, the total number of TVET institutions is estimated at almost 1,800, of which more than 50% are private, with a total of 350,000 students (compared to 750,000 in universities); with some estimating that over 50% of these offer agriculture related subjects.

In Kenya, some estimates put the number of TVETs at over 1000, although only 86 are currently listed on MoE webpages. The "Study in Kenya" webpage lists 33 "certificate" and 72 "diploma" programmes in agriculture, agribusiness and related subjects, across 22 different public and private universities, 6 universities of science and technology, 2 technical training institutes, plus specialised institutes and schools of theology. According to Mukhwana, (2018)[51], over 300 qualifications and awarding bodies exist in Kenya, and 30-40% of all qualifications in the country are "fake".

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[49] D'Oliveira Singo, B., 2016. Ibid.

[50] A recent policy to prohibit universities from offering TVET programmes in Kenya was legally challenged by universities and has apparently failed.

[51] Mukhwana, E.J. 2018. *Untangling the Complex Training and Qualifications System in Kenya.* RUFORUM Working Document Series No 16, 19-32.

In Nigeria the National Board for Technical Education listed, in March, 2020, 557 TVETs, including 33 Colleges of Agriculture (19 Federal, and 14 State); 134 Federal, State and Private Polytechnics (7 with agricultural programmes); 31 Specialized Institutions; 158 mostly Private Innovation Enterprise Institutions (IEIs), 78 mostly Private Vocational Enterprise Institutions, and 123 (mostly public) Technical Colleges.

In Uganda, the MoE website lists 154 public TVET providers, of which 18 are registered as offering agriculture, and the Uganda Association of Private Vocational Institutions (UGAPRIVI) lists 587 registered institutions (19 of which offer agriculture).

Similarly, in Ghana, the Council for TVET (COTVET) lists 348 providers, scattered across ministries. Although agricultural TVETs (colleges and farm institutes) have previously been under the Ministry of Food and Agriculture, measures are now being taken to bring these under the purview of COTVET.

Poor inter-ministerial and industry linkages

Typically, responsibilities for TVET cut across many ministries (e.g. over 15, reportedly, in the case of Ghana). The main ATVET colleges in many countries have developed under ministries of agriculture, rather than the ministries of education and/or TVET departments within those ministries, resulting in a disconnect with other types of TVET (e.g. in policy, strategies, reporting programmes, etc.). Examples are the colleges of agriculture in Ghana, Kenya, Ethiopia and Nigeria, which were largely established to develop the manpower needed for the government extension programmes. An exception is Benin, where ATVET – the *Lycées Techniques Agricoles* (LTAs) and previous *Centre d'Enseignement Technique Agricole* (CETA), have come under the Ministry of Secondary, Technical and Vocational Education. In Ethiopia and Nigeria, the situation is further complicated by the delegation of both agriculture and ATVET responsibilities – in differing ways - to regional and state levels.

Policy reforms in countries such as Ghana include measures to bring all TVET related activities – including those in agriculture –under strengthened organizational capacity in ministries of education (Departments of TVET), to provide better regulation and quality control, promote coordination with donors, facilitate collaboration with industry, operationalize NQFs, and institutionalize use of CBET.

But this centralization brings its own challenges of ensuring ATVET linkages with both public and private stakeholders. The general response to this challenge is to establish sectoral skills councils, which have been proposed in a number of the countries reviewed in Part 2. In Ghana, for example, one of the proposed skills councils is for agriculture, agribusiness and agro-processing. The recent Kenyan National Skills Development Policy of 2020 also describes policies to establish a National Skills Development Council (NSDC) and Sector Skills Councils (SSDCs) to improve linkages between the labour market and skills development and lead the development of national occupational standards and curricula, with agriculture one of the ten key sectors identified.

In Benin, the Agricultural Science and Technology Sub-Committee is one of the 7 technical committees of the CNCP-EFTP (*Cadre National de Concertation pour la Promotion de l'Enseignement et la Formation Technique et Professionnelle*). In Uganda the new TVET policy reiterates the intention to construct an employer led tripartite TVET system governed by employers and the private sector, represented on the TVET Council through Sector Skills Councils (SSCs).

Nevertheless, from a review of the existing literature, at least, it seems that most of the skills councils mentioned are still at the planning stage – or have yet to be fully operationalized.

Slow progress in implementing TVET policies and strategies

Summarizing from the above sections, (A)TVET reviews, and the country reviews in Part 2 of this report, the main policy areas implemented by African governments can be summarized as follows:

- Emphasize TVET as a viable pathway to further education, with increased allocation of budget to TVET and requested support from development partners;
- Legislate to establish the governance structures, regulation, and accreditation of training institutes and training programmes;
- Develop national qualifications frameworks, to define levels of achievement and provide a route between different educational pathways;
- Introduce of Occupational Standards (OS) and competency based (CBET) curricula, to better align the skills needed with industry and labour market needs;
- Develop skills councils, as a means for the labour market to identify skills needed, oversee the development of OS and curricula;
- Improve training of TVET instructors to deliver CBET curricula, along with development of appropriate training materials;
- Encourage the private sector to offer practical experience placements (internships, attachments), through skills development funds and co-funding mechanisms;
- Bring ATVET under more general TVET authorities and regulation, to align ATVET regulation and practice with other sectors.

While different countries have implemented these different strategic elements in different timescales and levels of intensity, their integration has been necessary to achieve the desired visions of a better prepared workforce, improved employment and increased contributions to national economies. The difficulty of advancing on all these fronts simultaneously has, in some cases at least, proved more challenging and slower than anticipated.

One example is Uganda. The first 5-year Business, Technical, Vocational Education and Training (BTVET) strategic plan was produced in 2002, with extensive consultations and German support via GIZ. The BTVET act of 2008 aimed to promote BTVET, establish the principles, the institutional and financing framework, the scope and levels of BTVET programmes, from certificate to diploma levels according to the Uganda Vocational Qualifications Framework (UVQF) also established under the Act. The recent (2019-20) BTVET policy document acknowledges that the provisions of the 2008 Act were not fully operationalized, and that building a new TVET system has been slow and challenging. In particular, the paradigm shift from the current theory-based system of education emphasizing academic certificates instead of skills and competencies, overlapping institutional mandates, establishing the institutional framework in coherence with other educational acts, the procedures for BTVET institutions, building the competencies of instructors in competence-based education and training (CBET), and general negative

perceptions of TVET in general have all proved challenging factors. The Budget Monitoring and Accountability Unit of the Ministry of Finance (BMAU) confirmed, in June 2019, that "while there have been many positive changes and advancements, the [BTVET] sub-sector is still failing to achieve its planned targets"[52].

ATVET integration within the broader AIS

ATVET forms one part of what can be considered as an "agricultural innovation system" (AIS). An AIS can be described as:

> *"A network of actors or organizations, and individuals, together with supporting institutions and policies in the agricultural and related sectors, that brings existing or new products, processes, and forms of organization into social and economic use. Policies and institutions (formal and informal) shape the way that these actors interact, generate, share and use knowledge, as well as jointly learn"[53].*

A full discussion of the characteristics and advantages of the AIS concept is beyond the scope of this report, but the key point here is that ATVET – as one element of a broader system for agricultural innovation – will be more effective if it is well linked with other elements of the system[54].

In this section, linkages between ATVET and other education sectors (secondary education, universities), agricultural advisory services (extension), and the private sector will be briefly considered. Much of the information in this section is based on the individual ATVET case studies presented in Part 3 of this report.

ATVET and Secondary Education

Most countries described in this report follow 6-8 years of compulsory primary education with 2-3 years of junior secondary education. Following that, there is usually a choice whether to follow a 2-3 years of more academic pathway in senior secondary, giving the possibility of university entrance, or opt for a technical route[55].

This means that students can enter a form of ATVET anywhere from about 12 onwards. However, as noted earlier, the technical route in secondary education is usually considered as inferior or for those who are academic failures and limiting entrance to university and a higher paid career. Hence take up is low. Even when government policies explicitly state that most students should go into a technical education, the percentage that actually do so

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[52] BMAU, 2019. *Business, technical and vocational training: Are objectives being met*? BMAU Briefing Paper 26/19.

[53] Tropical Agriculture Platform (2016) *Common Framework on Capacity Development for Agricultural Innovation Systems: Conceptual Background.* CAB International, Wallingford, UK

[54] A more exhaustive discussion of the AIS concept can be found in, for example: World Bank, 2007. *Enhancing Agricultural Innovation: How to go beyond the strengthening of research systems*. Agriculture and Rural Development Department, World Bank, Washington, DC.; World Bank, 2012 Rajalahtl, R., Hansen, W. and E. Pehu, 2008. *Agricultural Innovation Systems: From diagnostics toward operational practices*. Agriculture and Rural Development Department, World Bank, Washington, DC.; World Bank, 2012. *Agricultural Innovation Systems: An Investment Sourcebook,* The World Bank, Washington DC;

[55] A useful overview of the education systems and resulting qualifications of different countries is provided by Nuffic

remains in the order of 2-3% (e.g. Ghana, Benin). And – in spite of agriculture accounting for most of the workforce – agricultural TVET remains especially unattractive.

According to a report by the Mastercard Foundation[56], the dominant type of curriculum reform in SSA secondary education systems are "big ideas" reforms, based on principles of Competency-Based Education (CBE), and of the 25 countries reviewed, 13 adopted had adopted CBE reforms. The report states that there is "not much evidence" that curricula in the 21st century are promoting skills like creativity, critical thinking, emotional intelligence, employability and entrepreneurial skills – as opposed to memorization of facts, and questions to what extent the secondary school technical, vocational, occupational and trade subjects actually align with the needs of newly emerging economic sectors. Moreover, from the perspective of the education sector, the high unit cost and difficulty securing the scarce human resources to teach these technical subjects places limits on the capacity of education systems to expand these offerings beyond a small subset of schools.

ATVET and Universities

As noted earlier in this report, the distinction between the TVET and university sectors is blurred. Many TVET colleges have become or aspire to becoming universities. Some universities offer what can be considered as TVET programmes. A "3rd track" of polytechnic colleges or technical universities also provides an intermediate route between the traditional and more "academic", research-based university and the practical TVET college, although this distinction is perhaps not so strong as in the Netherlands, for example.

The potential benefits of university – TVET collaboration have often been outlined (e.g. by Ezekoye, 2017 [57]). Acquaye (n.d.)[58] described a number of cases of partnerships between universities and ATVETs. He noted in particular the successful partnership between Egerton University and a number of ATVETs in Kenya: The Dairy Training Institute (DTI), the Animal Health and Industrial Training Institute (AHITI) and Bukura College of Agriculture. This partnership strengthened collaboration between education and training in the Kenyan dairy sector, with Egerton training ATVET staff and alumni, supporting curriculum development, gender policies and quality assurance at the ATVETs, providing resource persons and external examiners and conducting joint research. Egerton's partnerships with ATVETs was probably made easier by the fact that the university itself had evolved from an agricultural college, and still maintains a very practical and applied approach in its own teaching programmes. The partnership between Egerton and the ATVETs was also largely due to the encouragement and financial support from several Nuffic NICHE projects over a number of years.

Nevertheless, TVET policy in most of the countries studied has been to distinguish between TVET and university education, establishing separate regulatory mechanisms for assessing and certifying institutions and the programmes offered. In particular, TVET curricula are increasingly becoming competency based (CBET), which implies a substantially different

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[56] Fleisch, B., Gultig, J., Allais, S., and F. Maringe, 2019. *Background Paper on Secondary Education in Africa: Curriculum Reform, Assessment and National Qualifications Frameworks.* Mastercard Foundation

[57] In Eicker et al, 2017. *Ibid.*

[58] Acquaye, D. (n.d.) *Ibid*

approach to the more academic university programmes in terms of needs analysis, curriculum development and delivery, assessment and even the "mind-set" of instructors/trainers.

These differences may well make it more difficult for universities and ATVETs to collaborate closely in future. In Ghana, for example, the diploma programmed offered by the Colleges of Agriculture at Kwadaso and Ohawu have been based on curricula designed and overseen by the University of Cape Coast and accredited by the National Accreditation Board. The intention, however, is to introduce CBET curricula at the colleges, with which the University and other stakeholders are not yet fully familiar, leading to revised curricula which are somewhat intermediate between the previous "theory-based" and desired "competency-based" versions.

In addition, a CBET curriculum, especially one based on value chains as has been promoted by GIZ and the NEPAD-CAADP ATVET Project, makes it difficult for students to progress from this type of programme to a university programme, limiting onward educational progression, which is undoubtedly prized by many ATVET graduates.

A particularly close partnership, or even integration, of university and ATVET is the model of the Ahmadu Bello University and the "Division of Agricultural Colleges" (see Part III). In this rather complex arrangement, resulting largely from a historical evolution, the 3 ATVETs which collectively go up to make the DAC come under the administration of Ahmadu Bello University, and are located/ integrated with research centres in the "Agricultural and Veterinary Complex" in Zaria, Nigeria. This arrangement offers many benefits, including the prestige or "brand" of a renowned university, the sharing of physical facilities, technical and administrative staff. As well as increased staff mobility, it also provides easy student progression from diploma programmes to BSc. In particular, the integration promotes excellent networking with private national and international companies, national extension agencies, international NGOs and funding agencies, etc.). Interestingly, the colleges have separate quality assurance committees to the university, and their programmes come under a different regulatory regime than the university (i.e. the National Board for Technical Education, NBTE, and the National Universities Commission, NUC, respectively). However, CBET curricula are only now being introduced into Nigeria – it remains to be seen if this more distinct approach will affect the current close integration of the 3 colleges and the university.

Specialized education universities also represent a group with potentially close links to (A)TVETs. A good example is the Federal Technical and Vocational Education and Training Institute (FTVETI) in Ethiopia, which has the specific mandate of training future TVET instructors, and with Agriculture as one of its 7 faculties. FTVETI has recently developed new programmes for training instructors capable of delivering CBET programmes to level 4 in a range of agricultural processing topics, using the facilities at "satellites" - collaborating ATVETs. These instructors, who receive BSc level degrees, are trained in 3 main areas: technical competency, pedagogical, and general (mathematics, English, ethics, entrepreneurship) (see Part III).

Faculties focusing on TVET education and training instructors include the Faculty of Technical Education at Kyambogo University in Uganda (with related Instructors College at Abolonino), and the Faculty of Technology Education at the College of Technology Education at Kumasi (COLTEK) campus of the University of Education, Winneba, Ghana. With support

from the African Development Bank, COLTEK has introduced a programme to train instructors with a CBET approach[59]. In Kenya, the Technical Trainers College specializes in training of TVET instructors, but at diploma level (i.e. the College is not a university).

ATVET and Research

Although about half of all agricultural researches in SSA are from higher education[60], most of this is conducted by the university, rather than the ATVET sector. In the country and institutional cases described in Parts II and III, few described significant research activity by ATVETs. Most research is conducted or led by staff with postgraduate (PhD, MSc.) qualifications, of which there are fewer in most agricultural colleges, compared to universities, although there will be more in polytechnics and universities of applied sciences.

Most of the agricultural colleges of Nigeria, which are organized along commodity lines, come under the direct administration of the corresponding commodity-based research institutes (and hence under the Agricultural Research Council of Nigeria). Presumably, this results in a quicker translation of research results and new innovations into training curricula, but a better evaluation of this linkage is beyond the scope of this report.

Many research organizations in SSA also carry out their own (mostly "informal") training activities as a means of disseminating research results. But again, it is difficult to easily evaluate the degree to which this is integrated with the more formal ATVET sector. As many agricultural research organizations in SSA come under agricultural ministries, the general trend of moving ATVETs from agriculture to education may affect future research-ATVET linkages.

ATVET and Advisory Services/Extension

The two traditional ways in which ATVETs are linked to extension are through the provision of manpower for extension services, and through providing advisory services/extension themselves as an "outreach" activity.

One of the main functions of colleges of agriculture in the past was the training of mid-level manpower for the national extension system and/or staff ministries of agriculture. Examples include the 4 agricultural colleges in Ghana; Bukura Agricultural College in Kenya; Bukalasa Agricultural Training Institute in Uganda. The system of (currently) 19 ATVETs in Ethiopia was established 15-20 years ago to develop a cadre of "development agents" (DAs) to staff some 11,000 Farmer Training Centres (FTCs) at local level. Many of these colleges were thus dependencies of ministries of agriculture.

With the privatization of extension services in most countries, the need for constantly replenishing the extension cadre has diminished. Even in Ethiopia, where some 70,000 DAs are now in place, the output of the ATVETs now exceeds the annual demand of about 7,000 persons needed by the extension system. Graduates are now increasingly expected to go into self-employment or the private sector, rather than just to the public sector.

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[59] See "*College of Technology runs competency programme for students*" . The University of Education in Ghana also has agricultural programmes at the College of Agricultural Education at Asante Mampong, although it is not clear to what extent the programmes offered there specifically prepare ATVET instructors. COLTEK itself is more focussed on hospitality and tourism, fashion and textiles.

[60] Data on agricultural researchers is available from the ASTI data base.

Nevertheless, many colleges maintain close links with extension and may provide advisory services themselves. A good example is that of the Leventis Schools of Agriculture in Nigeria, which integrate extension activities with training (see Part III). The schools maintain extension teams, which provide continued support and mentoring to their alumni, as well as a loan facility, after the 1-year training programme. Staff at the private Latia Entrepreneurship Institute, as well as the public Holeta Polytechnic in Ethiopia, also provide advisory services.

Cases where advisory services support ATVETs are, surprisingly, perhaps less common. One good example is that of the support to 10 ATVETs in Ethiopia by the Horti-LIFE project (see Part III). The project, funded by the Dutch government and implemented by SNV and the Ethiopian Ministry of Agriculture, provides equipment, advice, training materials to enable the ATVETs to establish "student plots". These commercial-sized plots allow students to gain knowledge of horticultural enterprises from input supply, site selection, through production and to marketing. Students also visit and learn from more conventional farmer-field schools organized by the project. The longer-term benefits in terms of a well-trained future workforce, either as self-employed horticultural entrepreneurs or extension advisors, would seem to be obvious. The reasons that more development projects do not provide similar support to ATVETs, often preferring to establish their group of trainers and/or practical training farms seems to be due mainly to the shorter-term outlook of many development projects, as well as an aversion to the bureaucracy of more formal technical training systems.

ATVET and the Private Sector

In theory, close linkages between the private sector and the (A)TVET sector should a fundamental aspect of (A)TVET. There are potential benefits to each partner: the acquisition by students of practical skills needed for future employment in a "real life" learning environment; the access by industry to a better trained workforce. But in practice, and as we have seen in regard to challenges of (A)TVET – linkages with industry are seen as a major problem in ATVET in Africa, and the obvious expected benefits are not fully realized.

In TVET policy, there is an emphasis on practical, rather than classroom instruction. For example, Ethiopian policy is that 70% of student time in ATVET is spent in practical instruction. In practice, ATVET colleges struggle to achieve this goal. When budgets are limited, it is difficult to procure and maintain the range of equipment and production/processing systems needed to replicate conditions in commercial agriculture and agribusiness. Collaboration with the private sector, and for learning to take place on farm or in the factory is realistically the only way in which students can gain relevant practical experience. Such placements are also valuable to develop the work, "life" or "soft" skills which are often seen by employers as even more important than technical skills.

The German "dual system" whereby TVET students spend about 50% of their time in college to gain the theoretical knowledge needed, and 50% as apprentice in a company, is not common in ATVET teaching in Africa. Typically, ATVETs locate students with private sector and/or public organizations for practical studies for shorter internships (1-3 months), known as "cooperative training" in countries such as Ethiopia. Some countries, such as Nigeria, also require (A)TVET graduates to experience a 1yr period of work experience between Ordinary National Diploma and Higher National Diploma, and after graduating with HND.

Work placements or internships present several challenges for ATVETs. These include the cost (mainly for student transport, board and lodging, although a few organizations, such as the public sector collaborators mentioned in the Ghana case in Part III, may request additional finance to receive trainees). Other challenges include assuring the quality of the learning during the placement (establishing expected learning outcomes and assessing these) and organizing adequate supervision from both college and company. Without such measures, the practical internship can just represent an obligatory period of labour provision, often appreciated by the company, but without much learning by the student (as was noted in the Benin case described in Part III).

Measures to improve the quality of trainee internships, as described in several of the cases presented in Part III, include more careful screening and selection of suitable organizations, defining expectations of each of the 3 main parties involved (college, company and student) through formal agreements/memoranda of understandings and training (e.g. by the college) of company staff to enable them to fulfill their role better as instructors. Cost sharing between the 3 parties needs to be defined, and, in practice, it is often the support from external projects which makes good placements more feasible, as government budgets for this aspect are rarely sufficient.

College instructors themselves are often criticized for not having practical skills to pass on to their students (as many instructors are graduates of more theoretical university courses). External support has also therefore allowed a period of practical training and skills updating for these instructors with external partners in cases such as that of the colleges of agriculture in Ghana colleges (in this case, with support from the Nuffic OKP).

In practice, not all internships can or do take place in commercial, private sector companies or businesses. Typically, there a mix of private and public sector organizations provide opportunities for internships. In agricultural systems in Sub-Saharan Africa, the private sector is often not well developed - or even present to the degree often assumed. While employment in agriculture in Ethiopia accounts for 66% of the workforce, one recent publication puts the number of employed workers in this sector at only 4%, with the majority working as unpaid family workers and another 40% self-employed[61]. Realistically, many, if not most, ATVET graduates are not going to be employed in the private sector.

The recent Covid-19 pandemic has also affected the possibilities for internships in the private sector, as companies are reluctant to take on trainees at a time when they are laying off their own staff (see Ghana case in Part III).

Another principal area where the private sector is expected to work closely with ATVETs is in curriculum development. Part III give examples of this process, from the Federal TVET Institute in Ethiopia, the Dairy Training Institute in Kenya, and the *Lycées Techniques Agricoles* (LTAs), in Benin. In each of these 3 cases, the private sector was engaged, along with other actors to define occupational standards and the competencies needed in new curricula, which were organized along the lines of specific value chains. Ideally, all ATVETs would have a good understanding of the "labour market" for their graduates, as well as "tracer studies" to ascertain their subsequent career paths and degree to which they, and

[61] Le Mat, M., 2020. *Nexus skills/jobs Assessment of youth skills development/jobs Nexus in Ethiopia.* Netherlands Enterprise Agency, the Netherlands.

their employers where appropriate, are satisfied with the education and training received. The Bure Agricultural Polytechnic College case in Part III describes how its "college market tracer study committee" monitors the needs of government and non-government actors, to determine the needs for different professions.

Of course, many ATVETs are themselves "private" or at least non-public. From currently and easily available national registration systems (which have by no means registered all organizations offering technical and vocational training, especially those not in the public sector), it is not easy to quantify exactly how many TVET organizations offering programmes in agriculture are not in the public sector, but a rough estimate would be about half (see country overviews in Part II). Many of these have been established by non-profit groups (often faith-based) or foundations. An example is the Agricultural Schools in Nigeria, established by the Leventis Foundation (see Part III). There are fewer examples of agricultural schools or colleges established as for-profit enterprises, although the Latia Agriprenuership Institute (LAI) in Kenya is one such college (see Part III; the LAI has, however, received considerable support from external development agencies). Examples of colleges established by commercial actors within a particular value chain, to develop labour specifically to support that sector, are not (yet) known to this author, although plans for such do exist.

Latia Agriprenuership Institute, managed by its parent company Latia Agribusiness Solutions, asserts that being part of a private company, and having a private sector "culture", makes it easier to develop linkages with private sector companies in the agricultural sector. Other activities of LAS and the related, non-profit, Latia Resource Foundation, such as commercial agricultural advisory and "incubation" services provide a more entrepreneurial context for training programmes, as well as opportunities for practical placements, etc. LAI is accredited with the TVET Authority of Kenya (TVETA) and also the National Industrial Training Centre (NITA) as provider of formal and informal or short-term trainings, respectively, and is also licensed by TVETA as a CBET assessment centre. However, many other private (NGO, foundation or faith-based) colleges can find it more difficult to gain accreditation of their institute and/or programmes, both because of the bureaucracy and costs involved, and also because of fitting their own - often specific and targeted – training activities within national qualifications frameworks and approved curricula.

A further way in which ATVETs develop agriprenuership in their trainees, and supplement their own finances, is to manage their own activities as commercial enterprises. In the Ghana colleges, for example, aquaculture, poultry and agro-processing are being developed in college "entrepreneurial centres", which serve as sources of inspiration, sites for practical work, and also provide income for the colleges. The recently established dairy processing plant at Bukura Agricultural College in Kenya, has capacity for more milk than is produced on the College Farm, and will also take in milk from surrounding farmers. However, such arrangements depend on a degree of autonomy – if a college is wholly administered under a Ministry department, any income may be returned to the government. To enable its activities to be run on more commercial lines is a major reason for a college such as the Dairy Training Institute in Kenya to seek "semi-autonomous government agency" status.

Finally, in selecting the case studies for this report an effort was made to identify those where the Dutch private sector was active in collaboration with the ATVET sector. That few could be identified again probably reflects that companies find it easier and quicker to train

their own extension agents working within their own supply chains, rather than engage in the less targeted and longer-term route of working with formal ATVET organizations.

Initiatives in TVET and ATVET development in Africa

At SSA level

The Comprehensive Africa Agriculture Development Programme (CAADP), a continent-wide initiative of the African Union and the New Partnership for Africa's Development (NEPAD), launched the project "Promotion of Technical Vocational Education and Training for the Agricultural Sector in Africa (CAADP ATVET)" in 2012, implemented by the African Union Development Agency (AUDA-NEPAD) with the support of the German Government through GIZ.

The goal of the project was to develop and implement market-oriented qualification measures, as well as coherent concepts to incorporate agricultural technical vocational training components into the national education systems. The project focused on three support areas, namely:

- Knowledge management and survey of approaches, sharing of information and best practices of ATVET in Africa;
- Anchoring of ATVET in the African Union (AU) structures and in the CAADP country processes (National Agricultural Investment Plans);
- Developing and implementing of pilot qualification measures for farmers, the youth, employed persons and service providers at a national level.

An overview of the main results of the Project from 2012-2017 shows that in the pilot countries of Kenya, Ghana, Malawi; Benin, Burkina Faso, and Togo, over 6,200 students trained and 250 training modules developed in 10 agricultural value chains: dairy, horticulture and aquaculture (Kenya); mango, pineapple and aquaculture (Malawi); pineapple and citrus (Ghana); rice and meat (Benin); rice, sesame and cashew (Burkina Faso); rice and aquaculture (Togo)[62].

A second phase of the project, from 2017 to 2019, commissioned by the German Federal Ministry for Economic Cooperation and Development with an additional EUR 13m support, extended activities to include Tunisia, Sierra Leone, Rwanda, Uganda, Namibia, South Africa[63]. A sister project – ATVET for Women – was established in 2016 to further build the capacity of women in the agri-food sector[64].

[62] NEPAD, n.d. *Transforming Agriculture and Promoting Employability through Skills Development CAADP ATVET Results (2012 – 2017).* NEPAD-CAADP-GIZ.

[63] GIZ, 2017. *African Union: Transforming agriculture through skills development.* Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany.

[64] ATVET for Women Project2019. *Gender-Transformative Change in ATVET: Agricultural Technical Vocational Education and Training for Women (ATVET4W).* African Union Development Agency (AUDA-NEPAD), Midrand, South Africa.

The ATVET project published a series of recommendations for ATVET in Africa and review of best practices from 4 project countries Benin, Ethiopia, Sierra Leone and Uganda[65] [66]. Among these recommendations were: develop new models to incorporate ATVET into existing TVET systems, adapt models from other countries (e.g. the German dual system), recognize agriculture within national NQFs, install incentives for the participation of the private sector and farmer organizations, support linkages between ATVETs and research based universities, transform training into "agri-business" or entrepreneurial training, and address women and youth issues.

The AUDA-NEPAD ATVET project published 2 "toolkits" on ATVET for Africa, capitalizing the experiences and examples of the project implementation in the 6 countries, with the intention of rolling out good practice to other countries in Africa. Toolkit "Series 1" covers stakeholder engagement and curriculum development, including aspects of policy reform, steps to improve stakeholder engagement, understanding and developing CBET systems and OS[67]. Series 2 covers the challenges and institutional change processed needed in ATVET institutions (colleges) themselves; improving teaching, accreditation systems, also linkages with e.g. universities and private sector, governance and management, and strategic planning. The example is given of Adidome Training Institute in Ghana[68].

The Project also published the "Agricultural education and skills improvement framework" (AESIF) 2015-2025[69], or road map, as a direct response to the lack of a "credible and overarching continental-level framework, with a realistic and achievable strategic plan, to effectively address the core problem of human capacity deficit within the African agricultural systems".

AESIF intends to address the many of the constraints noted in this report through three strategic areas: 1) reforms in governance and management policies; 2) reform and updating of curricula and teaching methods, and 3) mobilization of public and private partnerships. For each of these strategic areas, a series of activities is proposed, along with operational modalities and responsibilities at continental (African Union Council and NEPAD Partnership Coordinating Agency - NPCA), regional (Regional Economic Communities or RECs) and country level. An advisory board, consisting of AUC, NPCA, RECs, AAU, FARA, AFAAS and Development Partners (1 representative), was also proposed.

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[65] African Union (n.d). *ATVET best practices*. African Union Development Agency, NEPAD, Midrand, South Africa.

[66] African Union (n.d.) *Review of Agricultural Technical Vocational Education and Training (ATVET) in Africa - Best Practices from Benin, Ethiopia, Namibia and Sierra Leone*. African Union Development Agency, NEPAD, Midrand, South Africa.

[67] African Union Development Agency – NEPAD, 2019. *Toolkit on Agricultural Technical Vocational Education and Training (ATVET) - Series 1: Stakeholder Engagement & Curriculum Development*, NPCA, Midrand, South Africa.

[68] African Union Development Agency – NEPAD, 2019. *Toolkit on Agricultural Technical Vocational Education and Training (ATVET) - Series 2: Roles and Responsibilities of Agricultural Training Centers (ATCs)* NPCA, Midrand, South Africa.

[69] NEPAD, n.d. *Agricultural Education and Skills Improvement Framework (AESIF) 2015-2025*. African Union Development Agency (AUDA-NEPAD), Midrand, South Africa. (See also brochure version of the AESIF)

At Sub-Regional, National level

Other donors have focused efforts on specific priority countries and or sub-regions.

The Netherlands Nuffic (Dutch organization for internationalization in education) has provided support to ATVET under a number of programmes to support higher education in SSA, including Tailor-Made Training (TMT); the Netherlands Programme for Institutional Strengthening (NPT) , Netherlands Initiative for Capacity Development in Higher Education (NICHE) and more recently the Orange Knowledge Programme (OKP). These projects have covered a range of sometimes inter-related themes (Food and Nutrition Security, Water, Private Sector Development), as and have supported a range of organizations (universities, TVET colleges, TVET authorities, research organizations, often working in collaboration) in priority countries for Dutch assistance. It is difficult to be precise, but the NICHE and OKP institutional strengthening projects with a focus mostly on specific ATVETs in SSA[70] have provided something approaching about EUR 70m over the last 10 years or so, with individual grants in the general range of EUR 0.5-3m[71]. These projects, in the range of have typically supported infrastructure and staff development, curriculum development, and development of linkages with the private sector and/or universities and have involved integrated technical support from a range of Dutch higher education or knowledge institutes in the agri-food sector and management sectors.

Development agencies or governments who have supported TVET generally, often including ATVET as one sector, or as a major component in a broader development project include (as a non-exhaustive list) the World Bank, DANIDA, Canada, SDC, AFD (France), KfW (Germany), DFID (UK), the European Union, Islamic Korea, Japan, and Netherlands (through, e.g. embassy programmes, the Netherlands Africa Business Council).

What is less apparent, regarding this very brief inventory of different programmes supporting ATVET, is coordination between them or joint efforts to reflect on what has been effective, or not.

ATVET and COVID

The COVID-19 pandemic has dramatically affected the delivery of education and TVET in Africa in 2020. The longer-term impact is difficult to predict, both in terms possible changes of agricultural skills needed, and TVET delivery, but these are likely to be significant, especially in terms of equality of access to (A)TVET. The resources for online learning (computer and internet access, electricity) are problematic in much of Africa, and even more so in the poorer socio-economic groups – which tend to be more represented in TVET. Online learning also poses problems for the type of practice-based learning and competency-based learning emphasized in (A)TVET policy as described in this report.

[70] Countries with Nuffic NICHE and OKP institutional projects supporting ATVET include: Benin, Burundi, Ethiopia, Ghana, Kenya, Mali, Mozambique, Rwanda, South Africa, Southern Sudan and Uganda.

[71] Estimated from the project listings: overview of NICHE projects and granted OKP Institutional Projects.

As elsewhere, measures to suppress and control the spread of the virus in Africa included closing schools, universities and training institutions. According to one survey[72], by 15 May 2020, around 90% of respondents reported complete closure of TVET centres in their countries as a response to the spread of the pandemic; in 114 of 126 countries there was complete closure. By September, some schools, universities and TVET colleges have returned, although anecdotal evidence suggests that many remain closed to students. When colleges are opened, some students may be reluctant to return (ATVET dormitories are often highly overcrowded), have decreased resources after a period of lower family earnings, or face government restrictions in e.g. use of public transport.

The main response to the pandemic has been to advocate an accelerated switch to online learning - and even "reimagine" education – while at the same time acknowledging the challenges of doing so[73] [74] [75] [76] [77] [78]. It has become easier to obtain knowledge and skills with minimum monitoring through online classes, correspondence courses, and video and audio clips. Young people are increasingly independent and self-taught owing to these tools. Asynchronous online learning has the potential to allow learners to proceed at their own pace and online resources can be made widely accessible.

However, the use of online/distance learning before the outbreak was already much lower in Africa than other regions (35% respondents of the ILO-UNESCO survey cited mentioned using online learning often or occasionally, compared to 65% in Asia and the Pacific, and over 70% Americas). In TVET in particular, online learning was almost unknown.

There are notable efforts to provide infrastructure, such as plans to provide all TVETs in Kenya with fibre optic connections, and IBM collaboration in Nigeria to develop online learning platforms. Cote d'Ivoire[79] and Senegal[80], at least have implemented, online TVET platforms and distance learning[81].

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[72] ILO-UNESCO-WBG, 2020 *Joint Survey on Technical and Vocational Education and Training (TVET) and Skills Development during the time of COVID-19*. Inter-American Centre for Knowledge Development in Vocational Training CINTEFOR, International Labour Organization.

[73] ILO-UNESCO-WBG, 2020. *Ibid.*

[74] SIFA, 2020. *COVID-19 and its implications for skills development.* Newsletter Special Edition 02-2020. Skills Initiative for Africa, AUDA-NEPAD.

[75] ILO, 2020. Technical Note – *Survey with TVET providers, policy makers and social partners on addressing the COVID-19 pandemic in West Africa.*

[76] World Bank, 2020. *TVET Systems' response to COVID-19: challenges and opportunities.* World Bank, Washington.

[77] United Nations, 2020. *Policy Brief: Education during COVID-19 and beyond*. United Nations.

[78] EdTech and eLearning Africa, 2020. *The effect of Covid-19 on education in Africa and its implications for the use of technology: a survey of the experience and opinions of educators and technology specialists*. UKAid.

[79] Kamaté, A. and Siahoué, A., 2020. *Africa: how can technical and vocational education contribute to the response to future pandemics?* Global Partnership for Education.

[80] As reported in World Bank, 2020 *Ibid*

[81] Educational measures taken in Africa to respond to the pandemic are shared on the African Union COVID-19 Knowledge Portal.

Nevertheless, access to computers, internet and even electricity remains highly problematic in many rural ATVETs in Africa. In assessing such resources available to students at 9 ATVETs in Ethiopia, Kenya and Uganda, in preparation for moving a planned residential course online for ATVET instructors in one Nuffic project in which this author is involved, the number of students per computer at each TVET was estimated at between 10 and 50. Less than 2% of students were estimated to have their own computer, and 5-65% their own smart phone. In Ethiopia, electricity was estimated to be unavailable 25-50% of the time at the participating ATVETs. In Zambia, only 3% of the rural population has access to the national grid for electricity[82]. Students from poorer socio-economic backgrounds are less likely to have access to such ICT facilities and are likely to be disadvantaged in the move to online education[83] [84].

As well as improved infrastructure and facilities, moving to online education also requires significant changes in the training of instructors, preparation of learning materials, assessment procedures and regulation of training programmes. In other words, a radical "paradigm shift" in ATVET delivery is required[85]. Distance learning systems require different teaching skills than classroom teaching, and place different demands on students[86]. According to a survey of universities in the region, only 55% have e-learning policies in place[87] - and it can be assumed that the percentage is far lower for ATVETs.

It has also been argued that TVET and skills programs which require practical tasks do not easily migrate to distance and online learning, and distance learning, either online or offline, is not a long-term substitute for face-to-face teaching and practical skills training[88].

The resources needed to improve digital infrastructure for TVET students will also likely compete with those needed for more basic education. Early in 2020, and before COVID 19, the 2020 estimated financing gap to meet SD Goal 4 in lower and middle-income countries had increased to US$ 148 billion annually, and that that COVID-19 will increase this by up to one third[89]. African governments are likely to face difficult choices about allocations to basic, higher and TVET education.

In conclusion, the COVID-19 pandemic will inevitably accelerate a move toward online and blended learning. In that regard, the experience of Netherlands supported initiatives, such as the introduction of blended learning in horticulture in Northern Nigeria (implemented by Wageningen University Research), and the introduction of blended learning in dairy in ATVETs in East Africa (funded by Nuffic and implemented by a consortium led by Aeres), will prove valuable. At the same time, the need to accompany the focus on learning methods

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[82] EdTech and eLearning Africa, 2020. *Ibid.*

[83] Sherrard, D. 2020. *The COVID-19 crisis and the future of education*. RUFORUM, thought piece series, Kampala, Uganda.

[84] EdTech and eLearning Africa, 2020 *Ibid.*

[85] SIFA, 2020 *Ibid.*

[86] EdTech and eLearning Africa, 2020 *Ibid.*

[87] RUFORUM, 2020. *Status analysis of eLearning in African Universities.*

[88] Comyn, P. *TVET and skills development in the time of COVID-19.* World Education Blog.

[89] UNESCO, 2020. *Act now: reduce the impact of COVID-19 on the cost of achieving SDG 4.* Policy Paper 42, UNESCO.

and construction of learning platforms with investment in ICT facilities (and reliable electricity supplies) and implement this within a broader framework of training instructors, assessment and accreditation procedures, should not be underestimated.

Conclusions and recommendations

ATVET in SSA: Propositions

From the overview of ATVET in Sub-Saharan Africa in the preceding sections, the following conclusions – or more accurately, propositions[90] – are summarized here.

12. **National Policies and the legal framework for (formal) TVET and ATVET are increasingly in place in many SSA countries, but the broad implementation of these policies is yet to be effective.** In the last 20 years or so, most countries have passed TVET laws, established TVET departments or authorities within ministries of education, as well as inter-sectoral skills councils, etc., but effective regulation of the increasing number and diversity of organizations (public, private, foundation, faith-based) and their programmes is yet to be achieved; even 2 decades on, in some cases.
13. **Agricultural TVET is increasingly being brought under education authorities, rather than agriculture**. Many of the more renowned and traditional agricultural colleges were established by ministries of agriculture to achieve "in-house" staff capacity development, especially of agricultural extension staff. With the increase in legal and policy structure of TVET, agricultural TVET is increasingly being brought the TVET authorities and hence under education.
14. **As yet, inter-sectoral skills councils, as a means to identify labour needs and skills development priorities, are largely inoperative.** The move of ATVET from agricultural to education ministries provides opportunities to better regulate, standardize and even improve the practical focus of ATVET, but also presents potentially increased challenges to link skills development with the needs of the agricultural sector. Agricultural skills councils have often been identified as the principal mechanism to identify labour needs and skills needed, but funding issues, identifying the right representatives from public and private sectors, perceived benefits, incentives etc., appears to be limiting the operability and effectiveness of these skills councils.
15. **The introduction of "Competency-based education and training" (CBET) is a key part of (A)TVET policy, but its widespread introduction faces many challenges.** CBET, based on defined occupational standards (OS) and defined competencies needed in those occupations, is seen as the principal strategy to improve development of skills, rather than just impart theoretical knowledge. However, an understanding of CBET and its implications for labour needs analysis, curriculum development, delivery and assessment is not yet sufficiently assimilated in ATVETs.
16. **The capacity of ATVET instructors to develop, deliver and assess CBET curricula is especially limiting the introduction of the approach, and practical skills development**. Although several countries are rolling out the introduction of CBET in the ATVET sector,

[90] These "propositions" are those of the author, and based on the information gathered for this report, which is from a limited number of countries and cases. As such, they should be considered as propositions to promote further discussion, rather than definitive and authoritative conclusions.

the capacity – and "mindset" - of ATVET instructors to effectively apply the approach is limiting the implementation of the policy. Most ATVET instructors are graduates themselves of a different (more "traditional" or "theoretical") approach and have little training as TVET instructors. As yet, there are few universities or colleges with dedicated programmes to teach ATVET instructors (with notable exceptions such as the Federal TVET Institute in Ethiopia, or Kyambogo University in Uganda).

17. **The definition of "occupations" under a CBET approach lacks clarity: differences in approach are used.** The application of CBET is based on the definition of "occupations" and "occupational standards", but there is no broad consensus on the basis to define agricultural "occupations". Some (e.g. GIZ and the CAADP-NEPAD ATVET project) have related occupations to value chains, whereas others prefer to maintain a broader approach (e.g. based on general agriculture, crop or livestock production, or processing). The demand for specialists in specific value chains has been questioned.
18. **National Qualifications Frameworks (NQFs) and assessment systems are a key element to most national education policies but raise issues for integration of ATVET**. NQFs are seen as means to articulate the qualifications and skills needed in the workplace, improve credibility of qualifications and training programmes, facilitate integration of non-formally acquired skills, and facilitate transition between secondary, post-secondary and tertiary education. The comparability of qualifications across vocational (CBET) and academic within a single framework presents potential difficulties, possibly limiting the possibilities for academic progression.
19. **ATVET is doubly unattractive to youth.** TVET is less prestigious, less valuable than university higher education, and option only for those who do not get good academic grades. Agriculture as an occupation is seen as low paid, manual drudgery. Few small-scale farmers aspire for their children to follow them on the farm. Agricultural TVET is therefore often seen as a steppingstone to something more attractive and lucrative. Academic progression is therefore important to many ATVET students, who value university qualifications more.
20. **The respective roles of ATVETs and Universities in agricultural education is not as clear cut as often assumed**. Universities and ATVETs are typically regulated by different agencies within ministries of agriculture and are seen by policy makers, and some development partners, as being distinct types of education (BSc/academic/theoretical and level 2-4/CBET/practical, respectively). Some countries have policies discouraging or preventing universities from offering vocational programmes (diploma, certificate, short courses), which is seen as the mandate of TVETs, although many do so. Quite a number of previous (A)TVETs universities have now been upgraded into universities or aspire to do so in future. Educational authorities need to be flexible and creative in how they regulate universities and ATVETs, and their respective programmes.
21. "**Formal", "non-formal" and "informal" ATVET are poorly integrated.** ATVET is often considered to include "non-formal" and "informal" training. "Non-formal" training is considered that which does not lead to formal certification recognized within a NQF; this includes not only short courses offered by many "formal" ATVET organizations, but also courses organized by other advisory service providers such as NGOs and extension services, etc. Efforts to certify and accredit all such training seem ambitious and may well limit such activities. "Informal" ATVET, considered as non-structured "learning by

doing" is rarely considered by ATVET authorities, although CBET programmes should in theory recognize prior learning.

22. **ATVET is not well integrated with broader development and extension activities.** Many agricultural colleges were established largely to provide manpower for agricultural extension, and still do so in countries such as Ethiopia which still have extensive public extension systems. However, and with "privatization" of such systems, much of the function of agricultural advisory services is now undertaken by NGOs, farmer organizations, the private sector, etc., and the linkage with ATVETs, and their direct participation in extension, has been diminished. This reduces the feedback from other development actors on the skills needed in the sector and consequent improvement of training programmes.
23. **ATVET linkages with the private sector are almost universally recognized as weak; this is not only because of a public sector culture, but also because the private sector is not well developed and financing/incentives for such collaboration are weak.** Policy makers and especially development partners assume that ATVETs should produce skilled manpower needed for employment in the private sector and or self-employment. However, "formal" (paid) employment in the agricultural public sector often accounts for only a small proportion of those considered as employed in the agricultural sector. This limits the scope for extended practical internships or apprenticeships with companies.
24. **The Covid-19 pandemic has heavily affected ATVET residential teaching programmes, but these ATVETs lack the infrastructure, equipment and skills needed for online training.** The need to "move training online" has been a common response to the Covid-19 pandemic. Many ATVETs lack the ICT equipment, internet access and even reliable electricity to participate in or implement online learning. Few instructors have the skills for online instruction, and many students are not accustomed to more self-directed learning. Effective skills development through online training (including "blended learning") is more difficult than simpler "knowledge transfer".
25. **Within overall education budgets, (A)TVET has been emphasized in recent years but is likely to be under considerable pressure in future.** The ATVET sector is under resourced, given the importance of agriculture to SSA economies and the proportion of the population engaged in agriculture and food systems. Even before the Covid-19 pandemic, the estimated "financing gap" to achieve SDG 4 was growing considerably. African governments are likely to face difficult choices about allocations to basic, higher and TVET education.
26. **Efforts to support ATVET in SSA is generally uncoordinated; there is only limited mutual learning between programmes and countries.** The continental ATVET programme, by NEPAD-CAADP and with support from GIZ, is now less active than during the main project phases of 2012-2019. Other donor-funded projects are mainly aimed at specific countries or training institutes, and do not usually include significant networking or mutual learning activities. While there are some initiatives to network TVET activities on the continent, there is no specific network to support ATVET, as there is with RUFORUM in the university sector.

Future opportunities to support ATVET in Africa

Based on the above propositions, a number of opportunities to support ATVET are identified here, with a particular focus on ways in which countries such as the Netherlands can support ATVET in SSA.

1. **Support to ATVET policy development, at continental, national or organizational level,** where this is lacking. In countries or organizations where policies and strategies are in place, and when such development is not an explicit project or project component, all projects should be cognizant and supportive of national policies regarding regulation, accreditation, introduction of CBET, etc.

1. **The creation of, and/or support to, an international ATVET network to create a shared vision of ATVET strategy and improve exchange of experience and mutual learning** between countries, programmes, and projects. Inclusion of support to, or at least interaction with, such a network or networks as an activity or output in all externally funded projects would be useful.

   Existing networks which could play a role in ATVET networking at the SSA level, or be further supported and/or encouraged to do so include, for example:

   - The African Union Development Agency (AUDA-NEPAD) community of practice on ATVET;
   - RUFORUM – the Regional Universities Forum for Capacity Building in Africa (although this is currently focused on the university sector, it has taken steps to look into the possibilities of incorporating ATVET into its activities);
   - *Le Réseau International FAR* (The International Network for Agricultural and Rural Training), currently coordinated from Montpellier SupAGRO, and focused on francophone West Africa);

   Existing and broad TVET networks which could be encouraged or supported to develop a dedicated agricultural (ATVET) group include:

   - The UNESCO UNEVOC network (coordinated from the International Centre for Technical and Vocational Education and Training, Germany)
   - IVETA (International Vocational Education and Training Association), an NGO consisting of global network of vocational educators, although not specifically focused on Africa or agriculture;
   - The European Research Network in Vocational Education and Training (VETNET).

2. **Promote national level networking by supporting and operationalizing Intersectoral ATVET working groups or skills councils, etc.** While inter-ministerial and multi-stakeholder agricultural skills councils exist on paper in many countries, often these have yet to be operationalized. Support to the development of their terms of reference, working procedures as well as, in some cases, initial operational costs would enable a more coherent approach to identifying skills needed in the modern agricultural sector and labour market.

3. **Support the development of a cadre of CBET instructors in ATVET in priority countries.** As a key element to such support, the concepts of CBET and its practical implementation

should be harmonized with other donors (e.g. through international networking suggested above), to avoid duplication of effort and potential conflicting messages. This support could be directed at selected key universities or instructors' colleges with the mandate to develop CBET qualified instructors in ATVET (e.g. FTVETI in Ethiopia; Kyambogo University in Uganda; COLEK in Ghana, etc.). Close collaboration with national TVET authorities will be required to assure appropriate quality control and compliance with national regulations and accreditation, etc.

4. **Develop African-led or bi-continental blended learning platforms to support CBET in key agricultural occupations and curricula, and ATVET instructors capable of utilizing these.** The development of adaptable (pick and mix?) online blended learning modules in key occupations has the potential to offer wide and cost-effective support to ATVET curricula across the continent. Adaptation to local conditions and languages, as well as the careful integration with national curricula development processes, and any necessary accreditation of curricula and training material with relevant national authorities will be key to the uptake of any such materials developed by external agencies such as Dutch providers. However, the introduction of such blended learning materials is unlikely to be successful without complementary training of instructors in online/ blended learning delivery, and the provision of ICT equipment where necessary. Digital learning programmes should also consider linking up with continental initiatives such as the proposed African Digital Agriculture Programme (AfriDAP) coordinated by RUFORUM.
5. **Promote international and national dialogue on how best to define agricultural occupations.** The development of CBET curricula is dependent on prior identification of occupations and occupational standards – and yet there appears to be little consensus in SSA on what "occupations" exist, which is the best way to define these, which are priority for development, and the scope for sharing and/or harmonization across borders. Some initiatives have proposed to organize occupations along value chain lines – others have found this approach to be too restrictive or too specific to be attractive to prospective students. Promoting a more general debate and agreement between different donors and country ATVET authorities/ agricultural skills councils would enable a more cohesive strategy for CBET development.
6. **Support ATVETs as a component/integral activity in value chain development projects and further integrating ATVET into advisory services within such projects.** A good model here is the support given to Ethiopian ATVETs through the HortiLIFE project designed to improve horticultural value chains in Ethiopia. Such projects a can support (with technical input as well as finance) practical experience by ATVET trainees, help develop, update and provide feedback to occupational standards, curricula and training materials, provide specific/ essential equipment at ATVETs, enable ATVET staff and students to interact with other actors in the value chain, etc. The potential longer-term benefits and longer term sustainability of such an approach should be considered against the short-term costs of working with the public sector and engaging with bureaucracy (which often discourage development projects from engaging with the public educational sector).
7. **Promote a wider concept of the "private sector", in terms of its integration with ATVET.** Given that the "private sector" – as understood in more advanced economies, in the form of a source of paid employment in agricultural and food value chains – has still

a relatively limited development in some SSA agricultural economies, emphasis in developing ATVETS should also focus on developing trainees skilled for self-employment and or community development.

8. **Support skills development (challenge) funds in priority countries**. As supported by some external agencies, skills development funds made available nationally and on a competitive basis to private companies, NGOs, farmer organizations, can be used to support specific development priorities. Such funds could be used, for example, to encourage private companies and or other actors to work more closely with ATVET organizations, including the acceptance of trainees for practical work or during internships, etc.
9. **The promotion of agricultural and food-related occupations as rewarding and remunerative careers.** Publicity campaigns to show the potential careers and possibilities of entrepreneurship in the agri-food sector could address the general reluctance of many youth to take up careers in the agriculture and food sector. While the benefits of such a campaign might be far-reaching, however, it may be difficult to evaluate the benefits of these in terms of measurable impact required by many development partners.

PART II TVET/ATVET IN SELECTED COUNTRIES

Benin

Country overview

Benin currently has a population of 12 m people, increasing annually by 2,7%, and a land area of 114,763 km2 divided into 12 administrative Departments. Some 52% of the population is rural. Young people, ages 10-24 account for about 32% of the population, and adult literacy is about 50%. Agriculture accounts for about half of all employment, about a third of the GDP, and three-quarters of export earnings. Most farms are small (1-2 hectares), with mixed crop-livestock production systems (livestock consisting mostly of small animals such as poultry, rabbits, small ruminants). While unemployment levels are officially low, over 90% of employment is considered to be in the informal sector, and hence considered to be in vulnerable employment (FAR, 2020; Nouatin et al, 2019[91]).

Education and TVET

The education system in Benin consists of kindergarten or nursery education for children from ages 3 to 5 years, and mandatory free primary education from 6-11 years. Nevertheless only 69% of boys and 57% of girls complete primary education and obtain the *Certificat d'Etude Primaire Elémentaire* (CEP).

Formal secondary education, from ages 12-18, includes two pathways:

- The general route comprising a four-year program at junior secondary schools, resulting in the Brevet d'Etudes du Premier Cycle (BEPC) or "O-levels", and a three-year programme at senior secondary schools, resulting in the Baccalauréat (BAC) or "A-levels". This is the normal route to enter higher education. Junior secondary school is not compulsory, and free for girls only.
- The technical or vocational route at one of the Lycées Techniques (technical and vocational schools), comprising two three-year cycles; the first cycle resulting in a Certificat d'Aptitudes Professionnelles (CAP), and the second cycle and resulting in the Baccalauréat Technique. The Lycées Techniques offer programmes in 7 different occupational fields, one of which is agricultural science and technology (AS&T). The AS&T programmes, offered at the Lycées Techniques Agricoles (LTAs), consist of a 4-year junior programme leading to Brevet d'Etudes Agricoles Tropicales (BEAT), and a 4-year senior programme which leads to a Diplôme d'Etudes Agricoles Tropicales (DEAT).

Only 39% of boys and 23% of girls complete secondary education. After either secondary education route, students are eligible for tertiary education, which is attained by 15% of boys and 6% of girls. (KOF, 2017, cited in Nouatin, 2019). With a BAC (A-levels) qualification, a student can go on to higher education under two main routes: a) the 3-year programme resulting in the *Diplôme de Technicien Supérieur* (DTS); or b) the 3-year *Licence*

[91] Nouatin, G., Bankole, R., Gandonou, E., Kemper, J.M., and K. Maldonado-Mariscal. 2019. *Country Case Study on Technical Vocational Education and Training (TVET) in Benin.* LELAM-TVET4Income Project Working Paper No 9, Université Abomey-Calavi (UAC) and ETH Zurich

Professionnelle degree programme (considered to be equivalent to BSc), and, following the *Licence*, a 1-year Master's degree.

The Education Act of 2003 (modified in 2005) set two main priorities. First, every child in Benin should complete primary education, without charge. Second, the majority pathway should be TVET. However, and according to KOF 2017, cited in Nouatin et al, 2019, only about 3% of secondary students (some 30,000) were enrolled in the TVET pathway. The Act also emphasized that schools must train for self-employment as well as to meet the needs of the public service and the private sector.

An alternative, less formal and growing TVET pathway open to primary school graduates is the three-year dual apprenticeship programme leading to a *Certificat de Qualification Professionnelle (*CQP). The CQP however, does not qualify as entry to further formal education or training. Those who did not complete primary can also access the CQP through a remedial apprenticeship of three to five years. The CQP is a relatively new program established as part of recent reform efforts with the mission of adding an education component to traditional apprenticeships. Some 5,000 students are enrolled in CQP, approximately 10% of the total TVET enrolment. (KOF, 2017). CQP is available in 13 artisan occupations (non-agricultural), and lasts for 3 years, with students spending one day a week in the classroom, and four or five in their workplaces under contract to a master artisan. Training providers include some 51 public and 60 vocational training centres (in 2015), as well as artisans in informal-sector workshops. The program is regularly oversubscribed, with more applicants than places. The government and external donors provide about 90-95% of the costs through the Fund for the Development of Continuing Vocational Training and Learning (FODEFCA), with trainees paying 5-10%.

TVET Governance

TVET education comes under the Ministry of Secondary, Technical and Vocational Education (*Ministère des Enseignements Secondaire, Technique et de la Formation Professionnelle* - MESTFP). Under this Ministry are:

- DETFP - The *Direction de l'Enseignement Technique et de la Formation Professionnelle,* which has the responsibility to design, implement and monitor national policy on technical and vocational training. The DETFP is currently formulating a national TVET strategy. The 10 LTA come under DETFP.
- DPP - The Direction de la Programmation et de la Prospective, which accredits private training providers.
- DIPIQ - The Direction de l'Inspection Pédagogique, de l'Innovation et de la Qualité, which controls and inspects technical high schools.
- DEC - The *Direction des Examens et Concours* (DEC), which organises the examinations.
- INIFRCF - The Institut National de l'Ingénierie de la Formation et du Renforcement des Capacités des Formateurs, which develops the curricula for the technical high schools
- FODEFCA - *Fonds de Développement de la Formation Professionnelle Continue et de l'Apprentissage*, which works with private organizations to receive and manage

financial resources to fund the CQP, accredit training centres and control training workshops.

Higher education in Benin comes under the Ministry of Higher Education and Scientific Research (*Ministère de l'Enseignement Supérieur et de la Recherche* Scientifique – MESRS). According to Wikipedia, MESRS accredits the 4 public universities (Abomey-Calavi, Parakou, Porto-Novo, and Abomey), and 37 private institutes of higher education (Universities, *Ecoles Supérieures, Hautes Ecoles, Instituts Supérieurs*). The Universities of Abomey-Calavi and Parakou are also important actors in agricultural research.

The Ministry of Agriculture, Livestock and Fisheries (*Ministère de l'Agriculture, de l'Elevage et de la Pêche,* MAEP) has had relatively little to do with agricultural education and training, and the ATVET programmes. *L'Institut National des Recherches Agricoles du Bénin* (National Institute of Agricultural Research of Benin or INRAB), the major actor in agricultural research in Benin, comes under MAEP. Recent attempts to promote linkages between MESTFP and MAEP, led by the "Education and Professional Training in Agriculture Project (PEFTPA) supported by NEPAD and GIZ have yet to result in effective mechanisms, although the Agricultural Science and Technology Sub-Committee (SCCSTA) is the most active of the 7 technical committees of the CNCP-EFTP (*Cadre National de Concertation pour la Promotion de l'Enseignement et la Formation Technique et Professionnelle*), which has evolved from the CNETFP (*Conseil National de l'Enseignement Technique et de la Formation Professionnelle*) established by the MESTFP to review issues of TVET (Rengard, 2018).

ATVET

Secondary technical education in agriculture

Following the conversion of the previous *Centre d'Enseignement Technique Agricole* (CETA) into *Lycées Techniques Agricoles* (LTAs), there are now 10 LTAs or public agricultural technical high schools in Benin.

Three of these LTAs - Natitingou, Ina, Adja Ouèrè - offer the 4-year junior agricultural secondary technical programme, leading to the BEAT qualification. The programme consists of basic skills and competences. Students can join this programme with a certificate of primary education (CEP). With a BEAT qualification, one can enter the world of work, or carry on to study for a DEAT.

All ten LTAs offer the 4-year DEAT programme. These include the LTAs Bankikoara, Sékou, Kika, Akodéha, Savalou-Kpataba, Adjahonmey, and Djougou. Students can enrol for the DEAT programme either with a BEAT qualification, or with a BEPC qualification (after general junior secondary school) and submitting a file or passing an entrance exam. The first 2 years of the programme are common, but in the final 2 years of the DEAT programme, 6 six specializations are possible: (crop production, animal production, fishing and aquaculture, forestry, food processing and nutrition, and rural equipment and management). The fourth year also includes an internship period with company or agricultural organization. With a DEAT qualification, one can go on to university to study for a BSc.

Of LTA graduates, it is estimated that 40-45% systematically pursue higher education, 25-30% are employed, 8-12% create their own business, and 2-13% go into non-agricultural occupations[92]

Higher Education in Agriculture

The main Higher Education Institutes of agriculture, which come under Ministry of Higher Education and Scientific Research (MESRS), include:

The National Agricultural University of Benin (Université Nationale d'Agriculture or UNA), established in 2013 and headquartered in Porto-Novo. UNA was established by merging the former *Université d'Agriculture de Kétou* (UAK) and various thematic schools such as the *Ecole Nationale Supérieure des Sciences et Techniques Agronomiques de Kétou* (ENSTA-Kétou). The UNA now offers License, Master and Doctorate programmes at its 9 thematic schools located in different regions of the country.

The University of Abomey-Calavi, Faculty of Agronomic Sciences (FSA-UAC), created in 1970, offers License, Masters and PhD degrees at its 5 Schools: Crop Production; Animal Production; Economy, Sociology, Anthropology and Communication for Development; Environmental Development and Management; Nutrition, Food Science and Technology) and the Institute of Food Security.

The University of Parakou, established in 2001 and is the 2nd largest university in Benin after UAC. The Faculty of Agriculture (*Faculté d'Agronomie*) offers programmes to License, Master, and – in *Ecoles Doctorale Des Sciences Agronomiques et de l'Eau* – PhD. The previous *Ecole Nationale Supérieure des Sciences et Techniques Agronomiques de Djougou* (ENSTA-Djougou), was recently merged with the Faculty of Agriculture at the University of Parakou.

L'Ecole Polytechnique d'Abomey Calavi (EPAC), which has a Dept. of Food Technology, offering License and Masters degrees.

Private training centres

In addition to the public funded organizations described above, there are about 30 private centres providing agricultural training of training facilities in agriculture managed by national or international NGOs, associations, faith structures or individuals (Rengard, 2018[93])

One of the most renowned and well described private initiative regarding AVET in Benin is the Songhaï Training Centre, an NGO founded in 1985 by Godfrey Nzamujo, a Dominican priest, originally from Nigeria, who was a university professor from the USA. Named after the West African empire of the 15th century, the original model in Porto Novo has now been replicated in other regions of Benin, Nigeria, Liberia and Sierra Leone.

The Songhaï Training Centre carries out training, production and research. It provides technical training and material support to farmers and community dwellers. The centre

[92] National Survey, 2015, cited in Natitingou et al (Ibid).

[93] Rengard, F. 2018. *Rapport de mission pre-diagnostic du dispositif de formation agricole du Benin: Mission effectuée du 9 au 12 Juillet 2018 au Bénin*. Réseau International FAR, SupAgro, Montpellier.

collaborates with a wide array of private and public partners, associations, universities and national and international groups.

Songhaï's training is open to anyone who wishes to receive or to deepen his/her knowledge in the field of agricultural entrepreneurship. The duration and the cost vary depending on the selected option (internship or full training). Special preference is given to Benin nationals in full-time training: they are exempted from training fees and are offered accommodations and food. A framework also has been created to monitor and support some trainees after program completion, particularly young women, who can benefit from micro-credit to culture. set up their farms.

The pedagogical model of Songhaï is based on learning through doing and entrepreneurship. It integrates learning from the technological and industrial parks, using and integrating micro-enterprises, training modules, research projects, micro-development projects and mentoring from seniors[94].

Other private training centres include:

CPETAKI College The first private training centre in Benin, founded by a Veterinary Doctor, Teddy Kossougbeto, who also went on to establish the Koberside Agricultural Cooperative. The college offers a variety of courses in crop production, animal production, agroforestry, rural development, fish farming, food processing and nutrition. Students can take short courses, or the 4+4 year courses leading to the DEAT qualification.

Bouge NGO - founded by a Swiss National (Irmgard Meier) in 2006, with Headquarters in Abomey Calavi and Education and Skills Development Centre in Sékou, which offers informal training on value chain development and entrepreneurship and accommodation for about 60 students per year.

SAiN (Solidarités Agricoles Integrées) Farm School which offers long-term (18 month) and short-term training, using a "formative action research" approach, and aims to be an incubator for new sustainable local development projects. Training and accommodation costs are partly covered by the income from farm produce sales, and from ecotourism activities.

A common feature of these private training centres is the emphasis on personal development, rural entrepreneurship, practical internships and/or post training incubation schemes, and creating agricultural business opportunities. Some of the centres (e.g. Bouge Centre) also offer opportunities for practical periods of students from universities such as Abomey Calavi (Rengard, 2018).

Continuing (informal) education and training

Informal education and training take place mainly in the context of agricultural extension, development projects, producers' associations and cooperatives, etc. These include (but are not limited to):

[94] Loretta de Luca, Hélène Sahy, Saba Joshi, Mayra Cortés, 2013. *Learning from catalysts of rural transformation*. Chapter 8 – Songai, Benin. International Labour Office, Geneva.

- Producers associations such as FUPRO – the Federation of Producers' Unions, which is an umbrella organization of territorial, sector (commodity) and social organizations (women, youth). FUPRO organizes training of producers on a number of themes.
- Private consulting companies such as AGEFIC – the *Agence de Gestion de la Formation & Ingénierie des Compétences*, which provides expertise and consulting services, and specializes also in professional training for managers and executives, and developing training plans for organizations, including TVET organizations.
- International programmes such as those of Enabel (pineapple and cashew value chains), GIZ (supporting, structuring and training in cashew, rice, soya and shea value chains), etc.
- International NGOs such as Technoserve (training in cashew, agricultural SMEs), Oxfam (vocational training in agriculture of youth and women, particularly), SNV (promoting agribusiness, youth entrepreneurship, inclusive business, Agriprofocus Benin (promoting agricultural partnerships, sharing best practice and mutual learning), etc.

External Support to ATVET in Benin

A variety of national and international governmental and NGOs have provided support for the education sector in Benin in the last 20 years. These include the Danish Development Cooperation (DANIDA), which helped finance the TVET system; the Islamic Development Bank, which supports Benin's TVET system by material provision; the Swiss Development Corporation (SDC); the World Bank, and the French Development Cooperation (which financed the study on ATVET by Rengard, 2018).

The "Support to Technical, Vocational and Agricultural Education and Training" Project (*EFTPA*, in French), under the CAADP/NEPAD mechanism and supported by GIZ from 2017-2019, was active in Benin as well as 5 other countries. The Project worked at the strategic national level as well as in supporting ATVET at different LTAs through developing occupational standards, curricula and training materials in specific value chains. In Benin, training programmes were developed around four value chains: paddy/steamed rice; poultry; mutton and pork.

Nuffic NICHE projects have supported ENSTA-Djougou (to professionalise agricultural training programmes, with CINOP as Dutch lead partner), ENSTA-Ketou (to strengthen academic programmes and the institution, with Hanse University of Applied Sciences) the University of Parakou (to strengthen women's and young people's entrepreneurship, with CINOP).

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Ethiopia

Country overview

With about 109 million people (2018), Ethiopia is the second most populous nation in Africa after Nigeria, and the fastest growing economy in the region. However, it is also one of the poorest, with a per capita income of US$790. The population is growing fast, 2.5% annually, 21% is between 15 and 24 years old, with another 40% less than 15.

Ethiopia's economy experienced strong, broad-based growth averaging 9.9% a year from 2007/08 to 2017/18, compared to a regional average of 5.4%. Ethiopia's real gross domestic product (GDP) growth decelerated to 7.7% in 2017/18[95]. Current employment in agriculture occupies 66% of the workforce, and more than half of this (55%) is as unpaid family work, with a further 40% as self-employed; only 4% of the workers in the sector are paid employees[96]. Le Mat (2020) also cites reports showing that less than 4% of young people aspired to vocational education – compared to 75% aspiring to go to university, and that agriculture was considered unattractive, backward, demanding and less lucrative – while at the same time recognising that it may turn out to be the only option.

TVET in Ethiopia

Ethiopia has a well-established TVET sector, with its current legal basis provided by the "Technical and Vocational Education and Training Proclamation No. 954/2016. TVET policy and strategy development falls under the Federal Technical and Vocational Education and Training Agency, (FTVETA), headed by the State Minister for TVET, Ministry of Science and Higher Education (MoSHE). FTVETA is tasked with implementing the National outcome based TVET Strategy, initiating labour market demand analysis, developing occupational standards in line with the national TVET qualification framework, implementing an occupational assessment and certification system, supporting private TVET institutions, etc.

The National TVET Strategy of 2008 outlined the main policies and status of TVET at that time, focussing on stakeholder involvement, development of occupational standards and a competence-based system, developing a flexible delivery system and strengthening and accrediting both public and private TVET institutions, training instructors and financing TVET[97]. Subsequent reviews of TVET have been published by Shaorshadze and Krishan (2012)[98], the Edukans Foundation (2012)[99] and others. More recently, the Ethiopian Education Development Roadmap (2018-2030) reviewed the achievements of the TVET sector, noting the a 100-fold increase 2000 to 2015 in enrolment in TVET (with 50%

[95] https://www.worldbank.org/en/country/ethiopia/overview

[96] Le Mat, M., 2020. *Nexus skills/jobs Assessment of youth skills development/jobs Nexus in Ethiopia.* Netherlands Enterprise Agency, the Netherlands.

[97] Ministry of Education, 2008. *National Technical and Vocational Education and Training (TVET) Strategy.* Government of Ethiopia.

[98] Krishnan, P. and I. Shaorshadze (2013) *Technical and Vocational Education and Training in Ethiopia.* International Growth Centre, Working paper

[99] Edukans Foundation 2012 *Technical and Vocational Education and Training Mapping in Ethiopia Final Report*. The Edukans Foundation, The Netherlands.

participation of women), although this still falls short of the target that 80% of secondary students should be absorbed into TVET (in fact, according to Le Mat, 2020, less than 2% of TVET aged-youth enrol in TVET education, although enrolment is growing about 7% annually). The Education Roadmap report also notes that more than 600 occupational standards have been developed, while at the same time acknowledging continuing problems in finance (with less than 10% of the education budget allocated to TVET), quality of institutions and curricula, and the involvement of employers in developing the OS and assessment, among others[100].

A Wageningen PhD study by (2016), focuses on the introduction of competence-based TVET In Ethiopia, concluding that despite commendable efforts, implementation has faced challenges mainly from inadequately prepared teachers, frequent changes in curricula, and lack of cooperation from employers in training, and that increased teacher involvement in TVET strategy and curriculum development is crucial[101].

Individual governance of TVET institutes is decentralized to Regional TVET Bureau, and sometimes line ministries such as the Ministry of Agriculture. The regional state governments[102] are largely responsible for investment to build TVET institutions, purchase facilities and recruit trainers, accredit providers and issue Certificates of Competence (CoC).

The Federal TVET Institute of Ethiopia (FTVETI), established in 2011, functions as a university, but its focus is on teaching TVET instructors. In addition to the main campus in Addis Ababa, it has now also developed a series of 8 "satellites" (at TVET colleges) where instructors are also trained. It uses 50% theory and 50% practice in its own teaching. TVETI is mandated to train TVET instructors (BSc, MSc and short term) across 15 sectors (of which agro-processing is one).

According to informal communication with FTVETA[103] there are 685 public TVETs in Ethiopia: 255 TVET "Centres", with instruction at levels 1 and 2; 338 Colleges, with instruction at levels 1-4; 80 Polytechnics, covering levels 1-5, and 12 specialized ATVETs (but see below). Le Mat (2020) states that 51% of all TVET institutions in Ethiopia are private, and the total number of TVET institutions (government, non-government and private altogether) in Ethiopia was estimated to reach 1,778 in 2019/20, with a current enrolment of 350,00 students, compared to more than 750,000 at universities[104]. Many TVETS – more than half – by some estimates, offer some programmes in agricultural subjects. Nevertheless, much discussion of agricultural TVET focusses on a more limited number "ATVETs" as described below.

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[100] Teferra, T. Asgedom, A., Oumer, J., W/hanna T., Dalelo, A, and Assefa, B. 2018. *Ethiopian Education Development Roadmap (2018-2030), Draft for Discussion.* Ministry of Education.

[101] Getachew Habtamu Solomon, 2016. *Towards Competence-Based Technical-Vocational Education and Training in Ethiopia.* PhD Thesis, Wageningen University, The Netherlands

[102] Ethiopia is a federation of 9 regional states, delineated by ethnicity, as well as two cities (Addis Ababa and Dire Dawa) designated as separate Administrative Units.

[103] Dr Biagelign Ademe; July 2020

[104] Numbers of TVETs, and students at both TVET and universities, are taken from the Nuffic Country Implementation Plan for Ethiopia, 2019.

ATVET in Ethiopia

A recent overview of the current situation of practical agricultural education in Ethiopia was undertaken by Marijs (2018)[105]. The current system of 19 ATVETs was established 15-20 years ago, to develop a cadre of extension agents across the country. These extension agents, or "Development Agents" (DAs), are located at over 11,000 Farmer Training Centres (FTCs) in each *Kebele* (village) of the country. In principle, each FTC is staffed with one DA for natural resources, one for crops, one for livestock, and - in a few *Kebele* - also cooperative development. More specialist extension staff (subject matter specialists) are found at zonal or *woreda* (District) administrative levels.

These ATVETs therefore had similar curricula, focused on these areas of competence. Students at these ATVETs were guaranteed a government job and received subsidized tuition – unlike students at other polytechnics and colleges who may have also studied agricultural topics. Mulugeta and Mekonen, 2016, concluded from their study that ATVET graduates were generally not interested in agriculture or the rural life, were ill-equipped and unlikely to start agricultural businesses. Furthermore, they added, most farmers were dissatisfied with DAs, viewed it as a waste of time to train a person who ends up in farming and did not want to see their educated children come back to farming[106].

The full complement of some 70,000 DAs is now in place (with a turnover of approx. 7,000 per year), and the future of the ATVETs has been the subject of some discussion. While external projects such as ATTSVE (see below) have advocated that individual ATVETs should develop more in-depth competencies in particular commodities or disciplines, others argue that for travel and language reasons (even though English is the official language of instruction in higher education, some ATVETS teach in local language), ATVETs should remain general, to maintain in each region the full complement of study areas[107].

The current 19 ATVETs in Ethiopia come under both Federal and Regional governments. There are currently 5 Federal ATVET Colleges: Ardaita, Alage, Agarfa in Oromia, Mizan Teferi in the Southern Nations and Nationalities People's Region (SNNPR) and Gewane in the Afar Region. There are an additional 14 Regional ATVETs: 5 in Oromia Region (Holeta, Nejo, Kembolcha, Bako and Yabello); 3 in Amhara (Woreta, Kombolcha and Mertule Mariam), 3 in Tigray (Malchew, Wukro and Shire), and 2 in SNNPR (Wolaita Sodo and Dilla), and 1 in the Benishangul-Gumuz Region (Assosa). Within the different Regions, the governance of the ATVETS varies: in Oromia and Tigray, governance of the ATVETs comes under the Regional TVET Bureau and hence under the Federal TVET Agency and the Ministry of Education; in Amhara and the SNNRP it falls under the Regional Agricultural Bureau and hence under the

[105] Marijs, P. 2018. *Together towards effective practical agricultural education*", RVO (*Rijksdienst voor Ondernemend Nederland*), 2019. Unpublished.

[106] Mulugeta, M. and Mekonen, T. 2016. *Implementation of Technical and Vocational Training Strategy in Agricultural Sector in Ethiopia: Practices, Challenges and the Way Forward.* Ethiopian Journal of the Social Sciences and Humanities, Vol 12, p 57-80.

[107] Hawkins, R., Gross, M. and H. Holleman, 2018. *Scoping study to strengthen the Technical Vocational Education and Training in the Dairy Sector in East Africa*. Food and Knowledge Business Platform, the Netherlands.

MoA. Governance and supervision of institutes and curricula of the overall ATVET "system" therefore remains confusing at times.

In recent years, there have been initiatives to establish Practical Training Centres with the interest of e.g. Dutch companies and educational institutes. One such initiative was the National Poultry Training Centre opened in 2015; however, this closed soon afterwards due to conflicts of interests between the main partners[108].

ATVET Programmes

The Ethiopian education system involves six years of primary education (grades 1-6), 2 years of junior secondary (grades 7-8), and four years of senior secondary (grades 9-12). After completing grade 12, students are streamed either to university or to TVET, based on their achievement in the grade 12 national examination. Students who successfully pass the national examination join a university.

TVET in Ethiopia began implementing a competency-based education and training curricula at TVETs in 2008. Occupational standards (OS) have been developed by FTVETA for many occupations, including agricultural occupations. In developing agricultural occupations, the Ministry of Agriculture, ATVETS, universities and the private sector have been involved, with the Ministry of Agriculture having its own TVET department in charge of implementing the OS in the curricula of the ATVETs.

However, and as with other countries, it is debatable whether there has been sufficient input from the agricultural professions to develop relevant occupational standards and related CBET curricula. FTVETA is ultimately responsible for certification of OS, although some leeway is given to regional TVET Bureau to allow adjustment of competencies and curricula at individual ATVETs.

There are 8 recognized fields of study in agricultural TVET: Animal Production and Management, Crop Production and Management, Natural Resources Management, Agricultural Cooperatives Business Management, Sugar Crops Production and Management, Farm Machinery and Equipment Maintenance, Farm Machinery and Equipment Operation, and Agricultural Processing. Within these fields of study exist various "domains": agricultural processing, for example, includes 8 domains, including dairy processing, meat processing, poultry processing, fruit and vegetable processing, honey processing etc. – each of which has its own occupational standards and curricula.

Typically, at the ATVETS, level 1 curricula focuses on basic agriculture operations; level 2 offers specialization in e.g. animal or crop production; level 3 offers more specialization in specific commodities; level 4 in production and marketing management; and level 5 in advanced production and marketing management. Each of these levels is broken down into 12-36 units of competence. Short courses can be developed from modules at all levels.

In principle, TVET policy requires that curricula consist of 70% practical instruction, and 30% theory. In practice, however, the lack of facilities and resources often make these targets difficult to achieve at ATVETS. Many ATVETS have collaborative agreements with local farms, firms or other organizations to facilitate this practice.

[108] Marijs, P. 2018. *Ibid.*

Although FTVETI exists to train TVET instructors, currently, most ATVET instructors are drawn from (other) universities[109], and have not usually experienced CBET themselves in their own education, and hence do not have the skills needed for practical instruction (as opposed to theory). Marijs (2018) recommended the establishment of a specialized agricultural teacher training institute, as well as more attention by NGOs and service providers to capacity building in the existing education system[110].

Recently, FTVETI has prepared 8 curricula in agro-processing, and trained instructors in their delivery at the Holeta and Wukro ATVET. "satellites"; the private sector contributed to some of the costs of this curriculum development and validation.

Certificates of Competence (CoC) levels 1 and 2 provide entry to an industry or occupation. CoC level 3 is a trade level and CoC levels 4 and 5 are for supervisors, middle management or people with special technical skills. A CoC can be awarded to anyone passing the occupational assessment for each level, regardless of the way the skill was obtained. This includes both formal training and informal training at work or in the family.

Curricula and instruction are formally in English, although in practice not all instructors and especially students are completely proficient, and hence classes are also given in local languages, and trainees may be disadvantaged by poor communication .

External support to ATVET

The German Development Bank, KfW, has supported TVET development in Ethiopia for some 20 years, supporting the Federal TVET Agency and FTVETI, providing training for teachers, developing materials, and assisting with equipment and infrastructure. The current phase 4 of the Vocational Education and Agricultural Training Programme, for €38,000,000, is being implemented from 2017 to 2021. This programme has helped align agricultural vocational education with TVET in other sectors, supported four ATVET colleges (Assosa ATVET, Bure APTC, Holeta APTC and Shire ATVETC), and has also introduced the "Satellite concept", whereby training of TVET instructors is being decentralised to a series of TVET colleges, including in agricultural processing at Wukro and Holeta ATVETs.

The Netherlands Nuffic has supported higher education in Ethiopia through its programmes NPT, NICHE, and now OKP. In the NICHE programme, some 19 projects were implemented in Ethiopia, 4 of which focussed on specific ATVETs (Ardaita, Mizan, Holeta and Agarfa), for a total of EUR 4.3m. According to a report undertaken for RVO, these NICHE projects faced challenges of sustainability (due to limited project implementation periods), and difficulties in applying the western knowledge, skills and knowledge, but they did enable curriculum development, train instructors, and establish linkages with Dutch educational institutes, who willing shared their experience and knowledge[111]. Under the current OKP programme, the "Bright Future for Agriculture" Project, led by Maastricht School of Management in collaboration with FTVETI, is focussed on the dairy and horticulture sub-sectors. The OKP

[109] There are now over 40 universities in Ethiopia, mostly public. The main universities with strong agriculture programmes include Haramaya, Jimma, Hawassa and Mekelle.

[110] Marijs, P. 2018. *Ibid*.

[111] Marijs, P. 2018. *Ibid*

EARNED project is also working with FTVETI to introduce the use of blended learning in dairy in Ethiopia, as well as Kenya, Uganda.

Holeta ATVET (now Polytechnic) is also one of 6 Ethiopian TVET colleges (and the only ATVET), proposed as a Centre of Excellence under the "East African Skills Transformation Investment Project" (EASTIP), funded by the World Bank, with an expected budget of some USD 10-15m.

Dalhousie University, in collaboration with the MoANR and Jimma University, and with funds from the government of Canada, implemented the Agricultural Transformation Through Stronger Vocational Education (ATTSVE) Project. This CAD 20m project, implemented from 2014-2019, supported institutional development and instructor training at 4 ATVET colleges, including Maichew (dairy production) in Tigray region; Woreta in Amhara (rice); Nejo in Oromia (coffee, tea and spices) and Wolaita Sodo in SNNPR (vegetables, roots and tubers).

The PROSEAD project (Promotion of Sustainable Ethiopian Agro-Industrial Development), with EUR 45m finance from the EU, the African Development Bank, UNIDO and GIZ (which is implementing the TVET component) is helping to build environmentally friendly agro-industrial parks in 4 regions of Ethiopia. As part of this project, it will train unemployed women and youth in related jobs, and support the training of TVET teachers.

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Ghana

Country overview

Ghana covers some 238,535 km^2 and has a current estimated population of over 31m[112]. According to the government figures in 2018, growth declined from 14% in 2011 to 3.5% in 2016, with an average agricultural sector growth rate of 3.7% (compared to the CAADP target of 6%). Employment in the agricultural sector was about 45% of the total, and the agricultural share of GDP declined from 30% in 2010 to 18% in 2017, with the services sector growing fastest, and agricultural spending averaged 8.2% of total government spending over the period of 2001-2015 (compared to the CAADP target of 10%) Nineteen percent of children under 5 are stunted, and 11% underweight[113]. Adult literacy has increased from about 58% in 2000 to 79% in 2018, although a large proportion of the illiterate population is located in the northern part of the country[114].

According to Ghana's 2015 Labour Force Report, cited by Dadzie et al (2020), 60% of youth are employed, 12% are unemployed, and the rest are not in the labour force. The public sector employs 8% of youth. Those with a secondary school education have the highest rate of unemployment (24%), while those with a postsecondary education have the lowest at 13%. The 2015 Labour Force report also estimates that 40% of Ghanaian youth have no education, and only 4% have tertiary education qualifications, and the government has recently extended compulsory and free education from junior high to now cover senior secondary schools[115]. The Ministry of Education (n.d.) reports that that 25% of employees have never been to school and only 18% of employees in the workforce have secondary school, TVET or higher education qualifications[116].

TVET in Ghana

The Education Strategic Plan 2018-2023 also shows that TVET has attracted a low proportion of the overall education budget – at less than 3%. Senior High Technical Schools are seen as an option for under-performing students, and only 2% of students opted for these institutions. Training facilities are insufficient, and only 52% of technical and vocational institute teaching staff possess technical qualifications themselves, and only 30% of students pass Technician 1 examinations. The challenges facing TVET in Ghana, including the limited number of technical institutes and teacher training institutions, were described by Amedorme and Fiagbe in 2013[117].

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[112] Population estimate from www.worldometers.info

[113] MoFA (2018*). Investing for food and jobs (IFJ): An agenda for transforming Ghana's agriculture (2018-2021)*. Ministry of Food and Agriculture, Ghana.

[114] Estimated literacy rates in Ghana from the World Bank Data

[115] Dadzie, C. E., Fumey, M., and Namara, S. 2020. *Youth Employment Programs in Ghana: Options for Effective Policy Making and Implementation*. International Development in Focus. Washington, DC: World Bank

[116] MoE (n.d.) *Education Strategic Plan,* 2018-2030. Ministry of Education, Ghana

[117] Admedorme, S.K. and Y.A.K. Fiagbe, 2013. *Challenges facing technical and vocational training in Ghana.* International Journal of Scientific and Technology Research Vol 2: 253-255.

The TVET policy under the plan aims to increase access and improve relevance of TVET under a realigned sub-sector. New, competency based, TVET curricula will be developed in close cooperation with industrial, commercial and business sectors. Polytechnics will be upgraded to technical universities and instruction at TVET institutions should be free of charge. The College of Technology Education at Kumasi (COLTEK) will become the apex institution for TVET training. As Boahin (2018) noted in his thorough review of the subject, competency-based training will require substantive changes in the "mindsets, belief systems, values, intentions and theories" of trainers to match these new roles and tasks[118].

A key part of the TVET policy is to reduce the current fragmentation of responsibilities, with the subsector distributed across more than 15 ministries in the past. A number of skills councils are proposed, including one for agriculture, agribusiness and agro-processing. All TVET providers will be brought under the MoE, to achieve greater coordination between providers and a more streamlined National TVET Qualifications Framework under the Council for Technical and Vocational Education and Training (COTVET).

The Council for Technical and Vocational Education and Training (COTVET), was established by Act of Parliament in 2006, to formulate national policies on skills in both the formal and informal sectors of the economy. COTVET also coordinates, harmonizes and supervises TVET providers, to ensure quality in delivery, equity in access to TVET, promote co-operation with development partners and facilitate collaboration between training providers and industry. COTVET is now tasked to implement the current 2018-2030 strategic plan, operationalize the establishment of the National TVET Qualifications Framework (NTVETQF) and mechanisms for recognizing prior learning, and expand the use of CBET.

COTVET lists 348 accredited TVET providers in Ghana, scattered across various ministries.

Public universities with significant agriculture schools include the University of Cape Coast (UCC), University for Development Studies (UDS) in Tamale, the University of Ghana in Accra, and Kwame Nkrumah University for Science and Technology (KNUST) in Kumasi as well as University of Energy and Renewable Natural Resources (UENR) and University of Education, Mampong campus (CAGRIC) – College of Agriculture. Some 10 polytechnics/universities of technology are listed, a few of which (e.g. Ho Technical University, Wa Polytechnic, Kumasi Technical University, Sunyani Technical Univesity), offer HND programmes in e.g. Agro-Enterprise Development, Agricultural Engineering, Food Technology etc. from different departments/faculties.

ATVET

Among the many and integrated challenges facing the agricultural sector as identified in the MoFA Agenda for Transforming Ghana's agriculture are "inappropriate curricula of agricultural training institutions to address challenges in the agricultural sector", and the "lack of an enabling framework for Agricultural Technical and Vocational Education and Training". The agenda also includes measures to promote agribusiness as viable business among youth, and enterprise-based, inclusive value chains.[119]

[118] Boahin, P. 2018. *Policy innovations in the VET sector. The role of instructors in competency-based training in Ghanaian TVET institutions*. International Journal of Education, Learning and Development 6: 1-14.

[119] MoFA, 2018, ibid.

As in other countries, many different ministries in Ghana have been directly or indirectly involved in the implementation of ATVET policies, including the ministries of Food and Agriculture (MoFA); Education (MoE); Local Government and Rural Development; Fisheries and Aquaculture Development; Trade and Industries; Lands and Natural Resources; Gender, Children and Social Protection; Finance; Environment, Science, Technology and Innovation; Employment and Labour Relations; and Youth and Sports as well as Ministry of Business Development. As noted above, the ATVET policy intends to coordinate this in the future through the MoE.

The ATVET system currently consists mainly of a system including a public system of 5 Agricultural Colleges and 3 Farm Institutes, under the Department of Human Resource Development and Management Directorate (HRDMD) of the MoFA, and a number of private colleges.

The 5 Public ATVET Colleges – Kwadaso, Ejura, Damango, Ohawu and the Animal Health and Production College – were established to train public extension agents. They now graduate a total of about 800 students per year (10-20% of which women, in spite of positive discrimination). However, the Ministry now recognizes that future graduates should be equipped with the knowledge skills and attitudes to be employed in the private sector or establish their own agro-enterprises, in line with Government policy to support `private sector-led pro-poor agricultural value chain development` that is inclusive for both men and women. The diploma-awarding colleges (Kwadaso and Ohawu) have governing Boards (as this is an accreditation requirement) including mostly public sector and college representatives, with relatively less representation of the private sector/labour market. Certificate awarding colleges (Ejura, Damango) do not have functioning governing Boards.

The 3 Farm Institutes – Asuansi, Wenchi and Adidome - are more oriented towards farmer – and more practical – training. Students undertaking the Certificate in General Agriculture programme at the 4 colleges also spend 1 semester (6 months) year at one of the Farm Institutes, for more practical sessions and experience. The 3 Farm Institutes are listed by COTVET, which also lists CBET specialized programmes, including a number of agricultural value-chain based programmes (cashew, mango, oil palm), which have been developed at the institutes.

Public finances to support the colleges and farm institutes are limited. Students are expected to pay living costs themselves, although accommodation (in student hostels) and tuition (in terms of tutor salaries) is still in principle covered by the government. In the past, financial disbursement by government to the colleges has often been less than budgeted, making it difficult for colleges to cover recurrent operational costs, much less needed investments.

Notable private ATVET institutions include:

- The KITA College of Tropical Agriculture – part of the broader non-profit Institute of Tropical Agriculture, Kumasi, which also includes community outreach, agro-processing, and organic farming. The KITA College was registered in 2010, and its Board of Trustees includes MoFA, MoE, National Vocational Training Inst, universities, research institutions and community leaders. KITA offers a 3-year HND, 2-year diploma and 1-year certificate programmes in General Tropical Agriculture. HND specialisations include horticulture, animal science, agribusiness and farm management, agricultural mechanization and

post-harvest. The College also offers weekend/distance learning and enterprise based short courses.

- The Leventis Foundation Farmers Training Programme, which represents a collaboration with the School of Agriculture of the University of Ghana, and its Livestock and Poultry Research Centre (LIPREC, Legon), Forest and Horticulture Research Centre (FOHREC, Kade) and Soil and Irrigation Research Centre (SIREC, Karpong). Under this programme the centres offer a 10-month, hands on, training programmes in Livestock and Poultry, Cereals and Irrigation, and Forest and Horticultural Crops at the respective schools.
- The Okaufo Pa Project for agriculture training, sponsored by the Italian energy company Eni. Consisting of a 40-hectare campus for agro-industrial activities and professional training of future entrepreneurs, located in Dormaa East, Bono Region and opened in 2019, this project is a pilot initiative of Eni's Africa Program to support economic diversification in the agricultural sector. It is intended to provide theoretical and practical training to 800 students per year in agri-business, developed in collaboration with local universities.

ATVET Curricula

Currently the 4 Agricultural Colleges offer 2-year Certificate programmes in general agriculture, and 3-year Diploma (Kwadaso and Ohawu). The Diploma programmes were traditionally more science-based and less practical than the Certificate programmes but have recently been revised with the support of the Nuffic NICHE GHA270 Project to be more CBET based. The programmes at each College include General Agriculture with courses that cover various sectors of agriculture such as crops, animals, mechanization, agribusiness and extension and home economics as well as non-traditional agriculture. The courses are wide-ranging and offer little possibility for specialization, or in-depth acquisition of knowledge skills in any one particular crop, value chain, or technical area.

The Farm Institute programmes are accredited/overseen by COTVET. The certificate programmes at the Colleges are supervised directly by MoFA. The diploma programmes at the Colleges are based on curricula designed, overseen by the University Cape Coast (UCC), and now accredited by the National Accreditation Board (NAB). The linkage with the UCC has not always been seen as helpful (HRDMD, personal communication, 2016), as some actors do not want the colleges to compete with university graduates. In order to align the curricula with the Ghana's National Qualification Framework (NQF), the diploma curricula will eventually have to be recognised by COTVET, and be CBET based, rather than "academic" as at present.

The CBET curricula at the Farm Institutes are specifically designed to equip trainees to venture into agriculture as a business and to encourage them to become involved in agricultural enterprises along the value chain. Therefore, all steps from production, through processing, to marketing are included. So far, CBET curricula and training materials have been designed for specific value chains including citrus, pineapple, mango and oil palm.

Support to ATVET development

The Ghana Skills and Technology Project (GSTDP), implemented by COTVET from 2011-2016 with US$ 50m of World Bank IDA facility and US$ 10m grant from DANIDA supported Ghana to improve skills and technology-based development in key sectors, although the focus was

on sectors other than agriculture. The subsequent DANIDA Skills Development Fund, with EUR 2.3m support has been implemented over 2016-2020, offering support to businesses needing to upgrade the skills of their employees. The Ghana Skills Development Initiative (GSDI), with EUR 5.5m from the German government and implemented by COTVET, has had a focus on improving TVET policy coordination, modernizing apprenticeships and strengthening trade associations; it has also expanded CBET approaches, and developed training programmes for cashew, mango and oil palm value chains. .

From 2012 – 2019, the Farm Institutes were supported by GIZ as part of the broader Supporting ATVET in Africa programme in collaboration with NEPAD/CAADP. GIZ support helped introduce Competency Based Education and Training (CBET), improve facilities at Farm Institutes, train Farm Institute staff in CBET approaches and methods, and develop value chain organizational standards and modules in pineapple and citrus in collaboration with public and private stakeholders (providing a basis for similar development of other value chain training packages, and implement the new training material at four institutions (three public and one private). GIZ also supported the Adidome Farm Institute to develop a role as a "Green Innovation Centre", with particular focus on rice, maize and pineapple value chains, aligned with GIZ's broader Market-oriented Agriculture Programme (MOAP) in Ghana.

The Netherlands Nuffic NICHE GHA270 project, with financing of EUR 2.1m, and implemented by a consortium led by CINOP Global during 2017-2021, has worked with the 4 Colleges of Agriculture to revise the Diploma curriculum from theory-based to CBET, to train instructors in CBET delivery, and to enable staff to undergo practical placements with private agribusiness companies, research institutes and MOFA (mechanization and Veterinary). A follow-on OKP project, "Institutional strengthening of national bodies for technical and vocational education in Ghana" led by MSM, with CINOP, AERES, InHolland, Graafschap College, Q-Point, KNUST, Sunyani Technical University, Kwadaso Agricutural College and Asuansi Farm Institute, is building on the previous NICHE project to strengthen COTVET to integrate ATVET into the overall TVET system, develop ATVET curricula in line with the NQF, and integrate the Farm Institutes, Agricultural Colleges and Universities into the wider agricultural education system, thereby enabling greater mobility of graduates within the system.

Engineers Without Boarders Canada supported public agricultural training institutes from 2009-2014, introducing student agribusiness and entrepreneurship projects and a new type of attachment programme. The more recent Canadian-supported programme Modernizing Agriculture in Ghana, includes a component on value chain development and agricultural services component which is intended to update and reorient the standardized curricula at the agricultural colleges and farm Institutes to be more market-focused, gender sensitive and climate smart, as well as reorient extension. This activity - TEDMAG (Technical Education Development for Modernized Agriculture in Ghana), with a budget of CAD 15m – is being implemented by the University of Saskatchewan and partners.

Kenya

Country Overview

Kenya covers an area of 569,000 square kilometers and has an estimated current population approaching 54 million[120]. According to UNESCO figures, the adult literacy rate in 2018 was 81.5%, with that of males at 85% and females at 78%[121]

In 2019, Kenya's economic growth averaged 5.7%, placing Kenya as one of the fastest growing economies in Sub-Saharan Africa, although real gross domestic product (GDP) growth is projected to decelerate from an annual average of 5.7% (2015-2019) to 1.5% in 2020 (locusts, corona)[122]

The agricultural sector in Kenya directly contributes to about 26% of the country's GDP, and indirectly a further 27% through related sectors. It accounts for 65% of the total export earnings, employs 80% of Kenya's workforce and provides more than 18% of the formal employment[123].

Kenya has about 15m young adults (ages 15-24), and more than 1.3 m of these youth enter the labour market annually in Kenya. Secondary school net enrolment rate was 47% in 2017, implying most of the youth are unskilled[124]. Some 10% of those entering the labour market go into agriculture, which directly and indirectly contributes about one half of the annual GDP. Of the 1.3 m, about 150,000 have completed TVET or University, of which about 12,000 from agricultural institutions. While the average age of farmers in the country is above 60 years, the Kenyan unemployment rate is about 40%, and 60% of these are youth. Agriculture is perceived as "dirty", and a career of last resort (MoALF, 2017a)[125].

TVET in Kenya

The State Department of Vocational Training is currently one of four State Departments under the Ministry of Education (MoE). This Department is responsible for policy, curriculum development, registration and supervision of TVET institutions in the country. Village polytechnics, craft centres, farmers training centres and similar institutions are now decentralised to the 47 County Governments, along with extension and other operations of the relevant line ministry.

The Technical and Vocational Education and Training (TVET) Act of 2013[126] established the TVET Authority (TVETA) as a State Corporation, within the Vocational and Technical Training Department of the Ministry of Education. TVETA accredits programmes and courses,

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[120] https://www.worldometers.info/world-population/kenya-population/

[121] https://countryeconomy.com/demography/literacy-rate/kenya

[122] The World Bank in Kenya, Overview.

[123] MoALF, 2017a *Capacity Building Strategy for Agriculture Sector.* Republic of Kenya, Nairobi, Kenya

[124] Ministry of Public Service, Youth and Gender, 2019. *Kenya youth development policy 2019.* Republic of Kenya.

[125] MoALF, 2017b. *Kenya Youth Agribusiness Strategy 2017-2021: Positioning the youth at the forefront of agricultural growth and transformation.* Ministry of Agriculture, Livestock and Fisheries, Nairobi, Kenya.

[126] Republic of Kenya, 2013. *Technical and Vocational Education and Training Act.* National Council for Law Reporting, Nairobi, Kenya.

determines training objectives, and assures quality. The goals, structure and functioning of TVET in Kenya is described in the 2018 national Competency Based Education and Training Policy Framework[127].

The Kenya National Qualifications Framework (KNQF), established by the 2014 Act and now implemented by the Kenya National Qualifications Authority (KNQA) is intended to be a central register of institutions that have been accredited to award qualifications and the qualifications awarded. It intends to establish a system that meets the needs of employers, provides for qualifications that are compatible nationally and internationally, and recognizes prior learning. The KNQF has created 10 levels, in line with the East African Qualifications Framework (EAQF) and comparable with the 8-level system of the International Standard Classification of Education proposed by UNESCO. The 10 levels cut across basic, TVET and University levels, with levels 3-6 falling in the TVET sector (National Vocational Certificates II-IV, and National Diploma). At the time of writing (September 2020), the KNQA was about to launch its strategic plan 2020-2025.

The recent National Skills Development Policy (NSDP)[128] recognizes the hitherto "incoherent and uncoordinated" skills development systems in Kenya, and the weak linkages between training providers and the skills users (labour market). It sets out a number of measures to enhance governance, coordination and planning of skills development, provide a framework to strengthen labour market information systems, provide an avenue for lifelong learning, and institutionalize recognition and qualification of prior learning. Among many other measures, the NSDP also describes policies to establish a National Skills Development Council (NSDC) and Sector Skills Councils (SSDCs) to improve linkages between the labour market and skills development and lead the development of national occupational standards and curricula. Agriculture is one of the ten key sectors identified.

The Curriculum Development Assessment and Certificate Council (CDAAC) falls under the KNQA along with the Commission for University Education (CUE) and regulation of basic education. CDAAC is responsible for the development of competency-based curriculum, assessment and certification. It also trains trainers who want to be accredited as assessors in TVET institutions. CDAAC's role is therefore to award qualifications, and ensure that TVET curricula are developed and approved in line with occupational standards, and which provide for practical skills through courses in line with the national Competency Based Education and Training Framework[129]. While there are challenges to rolling out this system - mainly lack of training infrastructure, lack of competent and qualified CBET instructors, the system is gradually being extended to include the ATVET sector. CDAAC currently lists 375 approved curricula and occupational standards, at levels 3-6, including roughly 80 in agriculture, forestry, fishery, and food related occupations, but this list does not yet cover all the occupations implied by the programmes offered by the ATVETs.

[127] Ministry of Education, State Department for Vocational and Technical Training, 2018. *Competency Based Education and Training Policy Framework*. MoE, Nairobi, Kenya.

[128] Ministry of Education and Ministry of Labour and Social Protection, 2020. *National Skills Development Policy (NSDP) 2020*. Ministry of Education, State Department for Post Training & Skills Development, and Ministry of Labour & Social Protection State Depart for Labour, Nairobi.

[129] Ministry of Education, 2018 ibid.

The number of higher education institutes in Kenya is difficult to track with any precision, with new ones – especially in the private sector – appearing (and disappearing) frequently. A number of colleges have recently been "upgraded" to universities. By some estimates the number of universities has expanded by a factor or more than 6 in the past 20 years. The Directorate of University Education states that "currently we have 31 chartered public universities, 6 constituent colleges, 18 chartered private universities, 6 private constituent colleges and 13 public/private Universities with letters of interim authority. This number is expected to increase with time". UniRank ranks 62 Kenyan universities, with a total number of students of some 250,000.

The MoE currently (July 2020) lists 86 public TVET institutions, including 10 national polytechnics, and the rest being mainly technical training institutes. The Education Newshub website lists 106 TVETA approved Technical Training Institutes , and the Kenyanote website lists 153. The Coursebook website states that there are more than 1000 TVET institutions in Kenya, including both Technical and Vocational Centres (TVCs)[130], which are postsecondary technical schools or colleges offering technical courses up to diploma level, and Vocational Training Centres (VTCs), which offer technical courses to craft certificate levels. National polytechnics train to diploma level and offer their own certificates (similar to universities); technical and vocational centres, and vocational training centres need to use other awarding institutions, such as universities, national polytechnics or examination bodies such as the Kenya National Examinations Council, the National Industrial Training Authority, etc.

As in other countries in this report, universities and TVET institutions are now accredited by separate authorities, In this case the Commission for University Education (CUE) and FTVETA, respectively.

Recognising that in the past TVET has been an unattractive option for youth, the reforms introduced by the Kenyan Government are intended to grow the sector ten-fold from the current 330,000 students. The Government sees TVET as "the preferable and rewarding choice for Kenyans", and increased TVET funding in the 2018/19 financial year by 30% to USD 160m, and introduced tax rebates to companies that take on interns[131]. Policy recommendations developed at the TVET Conference in 2017, convened by the Permanent Working Group on TVET in Kenya, emphasised the institutionalization of industry involvement in TVET, and also the need to make TVET more relevant for youth through career counselling and media campaigns, as well as making TVET more accessible through loans, grants and scholarships[132].

ATVET

As in many countries in Africa, agriculture at school in Kenya is often seen as a chore or even punishment. As part of the national effort to give agriculture a more positive image, and given the importance of the sector in the national economy, the new national curriculum framework for primary and secondary education includes agriculture as one of 10 listed subjects for upper primary (9-11 yrs) and one of 12 subjects In lower secondary (12-13

[130] Other sources in Kenya refer to 3 types of TVET institution: national polytechnics, technical training institutions (TTIs) and vocational training centres (VTCs).

[131] Nganga, G. 2018. *Government promotes TVET sector as "preferable" option.* University World News.

[132] Permanent Working Group on Technical and Vocational Training and Education and TVET Authority, 2017. *Hands on The Future National TVET Conference & Kenya Skills Show 2017, Proceedings and Recommendations*

years) In upper secondary, further specialization is possible. This implies that agriculture is also a key subject at teacher training colleges[133].

The post-school development of manpower in Kenya was decentralized to line ministries for coordination and implementation. The (now) MoALF established several technical tertiary institutions at certificate, diploma and degree levels, and a system of Agricultural Training Centres (ATCs) for skilling farmers. By 2017, there were 3 Animal Health and Industry Training Institutes (AHITIs), the Dairy Training Institute (DTI), 3 Colleges of Agriculture and 6 fisheries/wildlife training institutes. In addition, there were 10 Agriculture Technology and Development Centres (ATDCs), 24 Agricultural Mechanization Stations (AMSs), a number of private institutions, and over 700 youth polytechnics and technical training institutes under other government agencies which sometimes have agricultural training activities. Perhaps understandably, the Ministry says that "the proliferation of public, private, NGO, faith-based organizations, and efforts by various development partners has been poorly coordinated, unregulated and not standardized" (MoALF, 2017b)

The webpage of "Study in Kenya" lists some 33 "certificate" and 72 "diploma" programmes in agriculture, agribusiness and related subjects, across some 22 different public and private universities, 6 universities of science and technology, 2 technical training institutes, plus specialised institutes and schools of theology, etc. It is therefore clear that a range of what can be called ATVET programmes are offered by universities: a recent policy to prohibit universities from offering TVET programmes was legally challenged by universities and ultimately failed.

The website "SoftKenya" lists 51 "agricultural colleges" in Kenya, including institutes of science and technology, technical training institutes, teacher training colleges, agricultural colleges, a national polytechnic (Eldoret NP) and others.

Nevertheless, and among this plethora of institutions, perhaps the best known and most reputable of ATVET institutions in Kenya are the government colleges currently falling under the MoALD: The Dairy Training Institute at Naivasha (the only dedicated dairy TVET in East Africa), and Bukura Agricultural College, (which has "semi-autonomous government agency" status"), and the Kenya School of Agriculture, whose main mandate is to train extension agents, and the Animal Health and Industry Training Institute, (AHITI) with main campus at Kabete, and others at Nyahururu and Ndomba.

Of the polytechnics under the MoE, the most notable in agriculture is Eldoret National Polytechnic, which has diploma programmes in general agriculture, food science technology and entrepreneurial agriculture.

Most prominent of the private, non-profit are the Baraka Agricultural College (established by the Catholic Church), Manor House Agricultural Centre in Kitale, the Latia Resource Center (a social enterprise started in 2008, now with for profit subsidiary company, registered as a technical vocational college training farmers and entrepreneurs) and the Kenya YMCA College of Agriculture and Technology (KYCAT).

[133] Kenya Institute of Curriculum Development, 2017. *Basic Education Curriculum Framework.* Republic of Kenya,

ATVET Curricula

Most tertiary agricultural education, especially in the public sector and ATVET is tilted towards theory and not practical skills. Given the above variety of TVET and ATVET institutions, under public administrations of different ministries, and an array of private arrangements, it is not surprising that the agricultural sector has lacked comprehensive and recognized standards for training, and curricula were individually developed by training institutions with no standardization. The "certificate" and "diploma" programmes being offered by the ATVET institutes noted above often seem to vary considerably in duration, for example. According to Mukhwana, (2018)[134], over 300 qualifications and awarding bodies existed in Kenya, and 30-40% of all qualifications in the country are "fake". However, coordination mechanisms involving different ministries and stakeholders are now gradually being established.

The Capacity Building Strategy for the Agricultural Sector (MoALF, 2017a), includes a number of objectives to regularize this sector, including alignment with the TVET Act, enforcement of certification of CB providers, promoting centres of excellence, ring-fencing agricultural training institutions to avoid change of legal mandate, harmonization of curricula and development of standards aligned with the national qualifications framework[135].

Non-formal ATVET

In addition to the above "formal" TVET institutions (which in many cases also offer unaccredited, practical short courses) there are a range of public, private and/or project-based providers of short, focussed, practical training. A thorough mapping of these is beyond the scope of this review, but examples include:

- Thirty-three Agricultural Training Centres under the MoALF, which provide trainings mostly of up to 3 days duration (see Njine[136] for review);
- the Thika Horticultural Practical Training Centre, opened in 2013, which represents a public-private partnership between the Fresh Produce Exporters Association of Kenya (FPEAK) and the Kenya Agricultural Research Institute (KARI). It seeks to provide practical skills in production, value addition and marketing to the entire horticultural sector.
- Perfometer, a private dairy advisory company, organizes 3-4 day practical on-farm dairy training for dairy managers, and 6-day course for investors in dairy farming.
- Prodairy, another company which offers 5-day training for farmers, in collaboration with Practical Dairy Training Centres, commercial farms where the owners also provide facilities for training.

[134] Mukhwana, E.J. 2018. *Untangling the Complex Training and Qualifications System in Kenya.* RUFORUM Working Document Series No 16, 19-32.

[135] MoALF, 2017a. Ibid.

[136] Njine, M. W. 2014. *The role of agriculture training centres in promoting sustainable rural development in Kenya.* Journal of Developments in Sustainable Agriculture 9: 68-77.

A range of rural advisory services, including farmer training via demonstrations, field days, farmer fields schools and ad hoc courses, etc. is provided in Kenya by public extension services (now decentralised to country administrations), NGOs and private companies (e.g. input providers, produce buyers), and an array of agricultural development and/or value projects sponsored by development partners.

Although there are 16 national Research Institutes under the Kenya Agricultural and Livestock Research Organization, (KALRO), and although KALRO's mandate includes dissemination of appropriate information and technologies to intended users, and some of these institutes include practical training services, there appears to be relatively less interaction with agricultural colleges and training than in some other countries.

Support to ATVET development

Kenya has been the beneficiary of a number of Nuffic NICHE and now OKP institutional projects to strengthen various ATVETs, over the years 2011-2021, and with a value of over €11m. These include:

- NICHE KEN 124/134 – Bukura Agricultural College; 2011-2017; €0.75m; partners Q-Point B.V., Delphy, HAS Den Bosch, Radbout University, Egerton University.
- NICHE KEN 126/140 – Horticultural PTC; 2012-2016; €1.5m; partners Wageningen University Research, AERES, Delphy, React Africa.
- NICHE KEN-127/139 – Egerton University/Dairy Training Institute; 2012-2018; €1.15m, partners Wageningen University Research, AERES and SNV.
- NICHE KEN 168/181 – Horticultural PTC; 2013-2017; €0.6 m; partners Royal Tropical Institute and Wageningen University Research.
- NICHE KEN 211 – Liwa Trust; 2015-2019; €0.6m; partners Maastrict School of Management, East African Business Council, Q-Point B.V.
- NICHE KEN 213 – Latia Resource Centre; 2014-2018; €0.5m; Maastrict School of Management, DTI Kenya and Wageningen University Research.
- NICHE KEN 214 – Baraka Agricultural College; 2015-2018; €0.9m; partners CINOP Global, AERES, SNV.
- NICHE KEN 281 – Kenya School of Agriculture; 2017-2020; €1.4m; partners Q-Point B.V., MICAS Ltd.
- NICHE KEN 283 – TVETA; 2017-2020; €1.1m, partners MDF Training & Consultancy, Cadena International Development Projects, HAS Den Bosch and the University of Eldoret, Hanse University of Applied Sciences.
- OKP KEN 10003 – TVETA, Egerton University, Kenya Technical Trainers College; 2019-2021; €1.18; partners Aeres Group, MDF Training and Consultancy, and Cadena International.
- OKP KEN 10017a – Meru University of Science and Technology and 5 ATVCs; 2019-2021; €0.75m; partners Wageningen CDI, AERES, HAS University of Applied Sciences, Van Hall Larenstein, Horticulture Crops Directorate.

- OKP KEN 10017b – Bukura Agricultural College, Egerton University and Latia Resource Centre; 2019-2021; €0.75m; partners Maastrict School of Management, InHolland University of Applied Sciences, Q-Point B.V. and Micas Ltd.

The NEPAD CAADP Transforming Agriculture and Promoting Employability through Skills Development Project, implemented from 2013-2017 with GIZ support. Kenya was one of 6 countries included (along with Burkina Faso, Benin, Ghana, Togo, Malawi). In Kenya, the project helped develop OS, curricula and training materials for horticulture, dairy and aquaculture, in partnership with MoALF and private stakeholders, as well as support to TVETA to harmonize ATVET with TVET generally.

The Agricultural Technical Vocational Education and Training for Women (ATVET4W) Project, which is being implemented in Kenya, as well as Benin, Burkina Faso, Ghana, Malawi and Togo by the African Union Development Agency (AUDA-NEPAD) with GIZ technical support.

Nigeria

Country Overview

Nigeria covers an area of 923,769 square kilometres. About two-thirds of an estimated 206m Nigerians live below the poverty line of USD 1.9 day. While the agriculture sector accounts for about 25% of GDP, it employs about two thirds of the labour force, but only 3% of total government expenditure (compared to the CAADP target of 10%). Nevertheless, almost half of the working population, 60% of these being young people between the ages of 15 and 29, is considered unemployed or underemployed. With a population growth rate of 2.6% per year, youth employment is expected to be a growing problem.

About 40% of the Nigerian population is under the age of 15. Basic education to the age of 15 is compulsory and free for Nigerians. However, among the population aged 15 years old and above, 27% of men and 43% of women have no education. Literacy levels are consequently low: 60% for adults and 73% for youths, relatively lower in rural areas, and slightly lower for women.

Senior secondary education is divided into either general or vocational education. The general education route leads to the West African Senior School Certificate (WASSC) and access to higher education via the Unified Tertiary Matriculation Examination (UTME). Three years of secondary vocational education, although less common, leads to a National Vocational Certificate (NVC), and is intended to prepare graduates for the labour market[137].

TVET in Nigeria

The vocational training sector in Nigeria is regulated by the National Board for Technical Education (NBTE), which comes under the Ministry of Education. Established in 1977, and later modified by Federal Acts in 1985 and 1993, its functions include determination of skilled manpower needs, coordination of all TVET, accreditation of training programmes, as well as recommendations concerning the establishment of private Polytechnics and Monotechnics in Nigeria. Basic data on TVET in Nigeria is given in the UNESCO TVET country profile[138]

The NBTE currently (in March, 2020) lists some 557 TVETs, including 33 Colleges of Agriculture (19 Federal, and 14 State); 134 Federal, State and Private Polytechnics, of which only 7 have agricultural programmes; 31 Specialized Institutions; 158 mostly Private Innovation Enterprise Institutions (IEIs), offering National Innovation Diploma (NID); 78 mostly Private Vocational Enterprise Institutions offering NVC; and 123 (mostly public) Technical Colleges that mostly focus on sectors other than agriculture.

At the same time, the Nigerian Universities Commission currently lists 171 accredited universities: 43 Federal Universities, 48 State Universities and 79 Private Universities. Seventy-eight percent (78%) of these universities were established in the last 20 years, and some are yet to become operational. Including 4 specialised Federal Universities of

[137] Hawkins, R. and Sobukola, O., 2020. Insight into agricultural education in Nigeria: a scoping study to identify potential areas of NL support. Unpublished report, Netherlands Agency for Enterprise Development (RVO, Netherlands.

[138] UNESCO 2019. *TVET Country Profile Nigeria.* UNEVOC, UNESCO

Agriculture, 30 Federal, 28 State, and 7 Private universities have agricultural faculties, schools or colleges. In addition, a number of business schools in Nigeria also offer specialised programmes in agribusiness.

According to data cited in Okorafor and NNajiofo, 2017, only 3% of senior secondary school students enrolled in TVET in 2007, against a target of 20%, with low esteem for TVET generally. TVET came lowest in the priorities of the education budget, which itself was only 6% of Federal government expenditure, and only 0.05% of the Federal government budget was allocated to TVET in 2012. The authors conclude that while TVET has been recognised as the "hinges and bolts of the economy", TVET is underfunded, TVET policy is divorced from practice, and TVET outcomes have fallen far behind expectations in Nigeria[139]. A recent country study by Ogwo and Ezekoye (2020) comes to similar conclusions, stating that while underfunding is the key issue, TVET policies are over-centralised, programmes are too ephemeral, the formal and informal economies are disconnected, the NSQF is underdeveloped and non-formal skills are not recognised, and employers and TVET institutions do not collaborate to develop curricula[140].

ATVET

Of the TVETs listed above, 6 Polytechnics (3 Federal, 3 State) had agriculture or food related schools or departments, 18 are Federal Colleges of Agriculture, Livestock, Forestry, Fisheries, Land Resources Colleges, 2 are Federal Cooperative Colleges, and 17 are State Colleges of Agriculture. The annual turnover of students in Federal and State Agricultural Colleges is reported at 27,000. Nevertheless, the current ATVET system does not provide specialized public training in agriculture at a grassroots level. By one estimate (FAR), about 4m youths could potentially and usefully be mobilised to take up occupations in the agriculture sector[141].

In the agricultural HE sector, policy development is complicated by the involvement of different ministries, at both Federal and State levels. While the universities are generally financed via the Federal or State Ministries of Education, the Federal Colleges of Agriculture are financed via FMARD. In line with general government spending in agriculture, resources for ATVET are considered a problem.

Eleven of the Federal Colleges of Agriculture (FCAs) in Nigeria come under the The Agricultural Research Council of Nigeria (ARCN), and hence the Federal Ministry of Agriculture and Rural Development. The ARCN was established in 2006 with a mandate to coordinate, supervise, and regulate agricultural research, training, and extension in Nigeria. It became the apex organization for 15 (of a total of 18) mostly commodity-oriented or thematically focused Agricultural Research Institutes (ARIs). The 11 FCAs come under the direction of the ARIs, and hence are likewise commodity or thematically focused (e.g. horticulture, fisheries, forestry, stored products and food technology, etc.). However, the

[139] Okorafor, A. O. and Nnajiofo, F. N. 2017. *TVET policies and practices in Nigeria: why the gap?* European Journal of Education Studies: Vol 3; p 612-623.

[140] Ogwo, B. and Ezekoye B., 2020. *Potential for skills partnerships on migration in Nigeria.* International Labour Office

[141] Akinde, S and Vitung, A. E. (2020). Analysis of Agricultural Technical and Vocational Education and Training (ATVET) System In Nigeria: Report of a pre-feasibility study conducted from 23rd February to 4th March, 2020. Reseau International formation Agricole et Rural (FAR), Montpellier SUPAgro, France.

ARCN does not allocate financial resources to these ARIs and colleges, although reform proposals currently being considered address organizational strategy, capacity strengthening, funding, and integration of research, extension and education. The curricula of the FCAs are determined and regulated by the National Board for Technical Education (NBTE).

An interesting development in Kaduna and Kano states is the "Division of Agriculture Colleges" or DAC. Under this arrangement, a number of agricultural colleges in these states come under the administration of prominent universities – Amhadu Bello in Kaduna, Wudil University of Science and Technology in Kano. This university umbrella gives the constituent colleges the advantage of joint administrative and teaching staff (e.g. Amhadu Bello University and Samaru College of Agriculture, which share the same campus and facilities).

ATVET Curricula

ATVET curricula in Nigeria are still mainly based on academic standards (e.g. the 2-year National Diploma, and Higher National Diploma after 1 year of experience and 2 further years of study). Holders of ND and HND can be admitted into the second and third year, respectively, of a university to obtain a BSc degree.

The NBTE currently lists 15 ND programmes under agriculture and related technology:

Agricultural Extension and Management, (General) Agricultural Technology, Animal Health & Production Technology, Animal Health Technology, Animal Production Technology, Crop Production Technology, Fisheries Technology, Forestry Technology, Home & Rural Economics, Horticulture & Landscape Technology, Pasture & Range Management, Pest Management Technology, Soil Science & Technology, Veterinary Laboratory Technology and Wildlife Management.

The NBTE is responsible for developing these curricula and providing the Benchmark Minimum Academic Standards (BMAS) for these accredited programmes. Curricula are usually developed at a national level with consultants (e.g. from UNESCO) and stakeholders (including instructors, industry, private sector). ND and HND programmes are each for a period of two academic years, with a mandatory one-year internship period after the ND and prior to the HND programme. These programmes are intended to consist of 50% lectures and 50% practical, although facilities and infrastructure are often too limited to achieve this balance in publicly funded colleges. Assessment is said to be 40% competency based while the balance is 60% as highlighted in the guidelines for such programmes by NBTE. According to (FAR), agricultural training institutions in the non-university sector are structured like university sector institutions, and increasingly characterised by course delivery along the same lines as universities.

Recently however, international agencies such as GIZ are supporting the recent development of Competency Based Education and Training (CBET) curricula under the "National Skills Qualification Framework" (NSQF), which has levels 1-6 (level 4 being equivalent to ND; 5 to HND/BSc; 6 to MSc). National occupational standards have been developed and classified in several sectors of the Nigerian economy, including agro-processing (rice milling), and an NSQ Code of Practice and Operational Manual have been developed and approved. GIZ is training on how to develop and implement such curricula. For such levels based NSQF training, there are no examinations as entry requirements (i.e. it is also open to less literate persons).

Non-formal ATVET

Apart from the formal ATVET programmes, there are numerous initiatives that contribute to the development of skills in agriculture, most of which do not offer formal and recognised qualifications. Many of these are aimed at developing the capacity of the numerous youth who are unable to access study at government approved institutes. Most of these initiatives have their inherent structures based on the founder or agency. A few examples of these include:

- Short "vocational" courses, typically of 1 week to several months in duration, offered by the Agricultural Colleges themselves;
- Farmer training (mainly via Farmer Field Schools, or Farmer Business Schools) offered by government extension through the Agricultural Development Programmes (ADPs). ADPs work closely with NAERLS – the National Agricultural Extension Research & Liaison Services, which is administratively one of the ARIs under the ARCN and FMARD, with a specific mandate for promoting extension and linkages between research and extension, but NAERLS also provides a link with HE in agriculture;
- Foundations such as the Leventis Foundation, a charitable private company with 6 agricultural schools in Nigeria and 3 in Ghana, offering a highly practical 1-year course, free to participants, who get a certificate on completion. Also The FarmAgric Foundation, in partnership with GIZ, which combines training using internationally recognised modules with financial aid available to trainees;
- Private companies such as Sahel Consulting, which collaborates with 7 universities and organizes a range of educational seminars; BIC Farms Concepts an agribusiness consulting firm;
- NGOs, of which there are an estimated 3,000 NGOs active in agriculture in Nigeria, who provide farmer training via short courses, farmer field schools etc., Prominent examples in include Sasakawa Global 2000 (SG2000), Technoserve, ACDI-VOCA, and many more.
- Producers Organizations such as TOPAN (the Tomato and Orchard Producers' Association of Nigeria), which offer short and/or long term training programmes in selected value chains.

Outside support to ATVET

There has been relatively little outside support to the formal ATVET system, which is mainly financed through government expenditure. Most of this external support is directed at the informal ATVET sector, including via the international NGOs mentioned above. Other initiatives include:

- The DFID financed *Mafita* ("The Way Out" in Hausa) programme, implemented by Adam Smith International and others to support training of 60,000 marginalized young people in N. Nigeria at Community Skills Development Centres, to find employment or become entrepreneurs; of 28 skills areas, 4 are directly related to agriculture. MAFITA also partners with polytechnics to train trainers, and is negotiating with the NBTE to produce curricula, develop occupational standards and

assessment procedures within the National Vocational Skills Qualification Framework.

- The GIZ, Green Innovation Centres support farmers and processing companies in seven of the country's 36 states, through a cadre of 340 extension agents training 200,000 farmers and using a curriculum developed with international and national research centres. GIZ has also supported training in Farmer Business Schools in Nigeria and other countries in West Africa, focussing on training farmers in good agricultural and business practice.
- Netherlands Africa Business Council, with is supporting a group of Dutch Companies to develop a horticultural "impact cluster" in N. Nigeria, including activities with various agricultural HEIs (universities and ATVETS) to train farmer trainers in horticulture production technology.

Uganda

Country overview

The current population of Uganda is estimated at 45m, with a yearly increase of 3.3% - one of the highest rates of increase in the world[142]. The population has doubled since 2000 and is expected to double again to about 100m by 2050. Almost 80% of Ugandans are less than 30 years old, and some 700,000 young people now reach working age every year in Uganda, but only 75,000 formal jobs are created. This leaves more than 70% of Ugandans employed in informal jobs in agriculture, mainly on a subsistence basis, with agriculture accounting for about 25% of GDP and 46% of exports. Undernutrition is high and stunting affects one-third of all children in Uganda aged five years and below. A child born in Uganda today only expected to be 38% as productive when she grows up as she could be if she enjoyed complete education and full health[143],[144]

The education system of Uganda has been described by Nuffic (2019)[145]. Primary education is compulsory and takes 7 years, resulting in a Primary School Leaving Certificate.

Secondary education consists of 4 years of lower secondary (ages 13-17), and 2 years of upper secondary (17-19):

- Lower secondary results in the Uganda Certificate of Education (UCE) or “O-levels” (“ordinary"), in 8-10 subject areas. Agriculture is mandatory up to Senior 2 (15 years), and a vocational, non-compulsory subject at O-level.
- Upper secondary normally focusses on 3 elective main subject areas or A-levels (Advanced), 1 of which can be agriculture, and 2 subsidiary areas (the mandatory general paper, ICT, mathematics), and results in the Uganda Advanced Certificate of Education (UACE).

After secondary education, students can go on to higher education:

- Certificate programme, requiring O-level passes in 3-6 subjects;
- A diploma programme, requiring UCE with 5 O-Levels, plus UACE (with at least 1 A-level), or a Certificate.
- A degree programme, via “direct entry” - requiring a UCE with 5 O-levels, and UACE with 2 A-levels; or via the “Diploma Entry Scheme”, requiring a diploma at a UNCHE accredited institution.

Higher education institutes include universities, other degree awarding institutes (ODAI) and other tertiary institutions (OTIs). The 3 categories include public and private institutions. Universities and ODAIs can award degrees, diplomas and certificates. OTIs can award

[142] https://www.worldometers.info/world-population/population-by-country/

[143] https://www.worldbank.org/en/country/uganda/overview

[144] https://www.sdfuganda.org/USDP/project-background

[145] Nuffic, 2019. *The education system of Uganda described and compared to the Dutch system.* Nuffic, The Netherlands.

certificates and diplomas. Of the 700,000 entrants to the labour market each year, about 40,000 (i.e. 6%) are graduates of some 260 tertiary education institutes, according to NCHE.

ATVET in Uganda

According to Okinyal, 2012[146], the colonial education system was available to only a small elite group, and oriented towards white collar jobs. The small BTVET sector (as it is now known) was small, and directed towards underprivileged and uneducated sectors of society, leading to a social stigmatization of BTVET. The establishment of the Directorate for Industrial Training (in 1972), training levy, training schemes and regulations marked a significant step in establishing BTVET. The 1987 Education Policy review marked another milestone in recommending vocational education stages. The first 5-year Business, Technical, Vocational Education and Training (BTVET) strategic plan was produced in 2002, with extensive consultations and German support via GIZ.

The Business, Technical and Vocational Training (BTVET) Act of 2008, which aimed to promote and coordinate business, technical, vocational education and training; then established the principles governing BTVET, the institutional and financing framework needed, and the scope and levels of BTVET programmes, from certificate to diploma levels according to the Uganda Vocational Qualifications Framework (UVQF) also established under the Act. According to Okinyal, 2012, it was decided to "start small", and target the certificate courses and trades qualifications, prior to a more comprehensive national qualification framework (NQF). The UVQF followed the principles of CBET, including flexible training, recognition of formal and non-formal training, etc.

In 2011 the Ministry of Education and Sports (MoES) published the ten-year (2012-2022) strategic plan 'Skilling Uganda'[147]. This strategic plan was aimed at creating employable skills and competencies relevant to the labour market rather than educational certificates as was typical before. More recently, The Technical and Vocational Education and Training (TVET) Policy was revised and approved in January 2019 along with implementation standards and guidelines[148]. The TVET policy shifts TVET management from the government led to Public-Private Partnerships (PPP) delivery, provides for the establishment of a TVET Council, TVET Institutions and providers, and the operationalization of the Skills Development Fund.

At the same time, the recent policy document acknowledges that the provisions of the 2008 Act were not fully operationalized, and that building a new TVET system has been slow and challenging. It requires a complete paradigm shift from the current skewed, theory-based system of education which emphasises acquisition of academic certificates instead of the requisite skills and competencies needed in the world of work. Overlapping institutional mandates, establishing the institutional framework in coherence with other educational acts, the procedures for BTVET institutions, building the competencies of instructors in competence-based education and training (CBET), and general negative perceptions of TVET

[146] Okinyal, H.F. 2012. *Reforming the business, technical, vocational education and training (BTVET) sub-sector: Challenges, opportunities and prospects*. Paper presented to the Uganda Vice Chancellors' Forum (UVCF). Department of Industrial Training, Republic of Uganda.

[147] Ministry of Education and Sports, 2011. *Skilling Uganda: BTVET Strategic Plan 2011-2020*. Republic of Uganda.

[148] Ministry of Education and Sports, 2019. *The Technical Vocational Education and Training (TVET) Policy*. Republic of Uganda.

in general have all been factors. The Budget Monitoring and Accountability Unit of the Ministry of Finance (BMAU) also confirms, in June 2019, that "while there have been many positive changes and advancements, the [BTVET] sub-sector is still failing to achieve its planned targets"[149].

Nevertheless, the new policy reiterates the intention to construct an employer-led tripartite TVET system governed employers /private sector (represented on the TVET Council through the Sector Skills Councils (SSCs), Government represented by Ministries, Departments and Agencies with a role in TVET through an Inter-Ministerial Committee and the supply side, consisting of employees and learners from public/private training institutions and providers. The TVET Council will also approve all TVET institutions and providers. The operational guidelines also reconfirm the mandate of the Directorate for Industrial Training to regulate training and trainers, develop occupational standards and curricula, and assess training packages. The National Qualifications Framework (NQF), with level descriptions of 1-8 (with VET from levels 1-4, and technical education from 5-8), is further defined to facilitate national and international comparison of qualifications. And the policy makes provision for the establishment of a Skills Development Fund (SDF), which will include funds from government, development partners and the private sector.

The Uganda BTVET-Portal establishes a single entry point for BTVET and operates as a directory of individuals and organizations with an interest in skills development. It currently lists 75 training public and (mostly) private providers (technical institutes, vocational institutes, polytechnics, community polytechnics, rural development centres, vocational training colleges, etc.) by name, location, and training area. Eighteen of these are listed as providing training in agriculture related subjects.

At the same time, the BTVET page of the MoES webpage lists 154 public BTVET institutions, including: 7 technical colleges, 6 colleges of commerce, 10 schools of nursing/midwifery, 8 allied health training institutes, 6 departmental training colleges (including fisheries), 5 agricultural colleges and farm institutes, 70 technical institutes, 25 technical schools, and 17 community polytechnics.

The Uganda Association of Private Vocational Institutions – UGAPRIVI – list 587 registered institutions; from the information given it is not easy to see which qualifications are offered, or how many are related to agriculture, but a search for "agriculture" gives 19 results, including the the Oasis Farm Institute (national certificate in agriculture, Mbuye Farm School, (diploma in animal husbandry and organic agriculture), and the Institute of Agriculture, Business and Technology (diplomas in crop production; animal production and management, and Gulu Community Vocational School (national certificate in agriculture).

The Uganda Business and Technical Examinations Board (UBTEB) lists technical/vocational education programmes so far accredited/approved: 3 higher diploma, 9 national diploma, 8 advanced craft, 18 national certificate, and 16 community polytechnic certificate programmes. These include the 2-year national certificate in agriculture, and 3-year community polytechnic certificate programmes. Also listed are 17 (2-year) business diploma programmes, 28 (2-year) business certificate programmes, and 11 diploma/ 6 certificate

[149] BMAU, 2019. *Business, technical and vocational training: Are objectives being met*? BMAU Briefing Paper 26/19.

"specialised programmes" (which include national diplomas in crop production and management, animal production and management, wildlife related occupations, agro-meteorology, and others.

The Directorate of Industrial Training (DIT), which is responsible for developing occupational standards, states that the department has 70 occupational profiles (Assessment and Training Packages – available for sale); the ones listed do not include agricultural occupations, and it is recognised that there is an urgent need to expand the UVQF to other skills and to higher, technical levels (Okinyal, 2018).

The National Council for Higher Education (NCHE) lists 7 public and 46 private universities, 13 other degree awarding institutions, and 161 other tertiary institutions or OTIs (55 public, 106 private). Okinyal (2018) describes this expansion as part of the challenge to BTVET of the "degree syndrome" – where youth apply for degree courses even without employment opportunities, leading to an imbalance of the skills needed in the country. The conversion of public BTVET institutions into universities has meant that BTVET courses have been lost, and BTVET development undermined (e.g. Uganda Polytechnic Kyambogo, Institute of Teacher Education, Uganda National Institute of Special Education – which are now all part of Kyambogo University; Busitema National College of Agricultural Mechanization and Arapai Agricutural College, which are now part of Busitema University).

Of the private universities, Makerere, Gulu and Busitema have a range of BSc and postgraduate programmes in agriculture and/or nutrition. Makerere, Busitema, while Mbarara University of Science and Technology, Kyambogo and Kabala also some agriculture related programmes. Makerere, Kyambogo, Busitema also offer diplomas in agriculture related occupations. Of the private universities, at least several offer graduate and in some cases diploma programmes in agriculture related disciplines.

An interesting programme offered by Mbarara University of Science and Technology (MUST) is the Bachelor of Science in Agricultural Livelihoods and Farm Production offered by the Faculty of Interdisciplinary Sciences, which is oriented to community outreach. In this programme, students undertake classes and practical sessions on both the university farm and on university assessed private farms during years 1 and 2 of instruction. At the end of years 1 and 2, they undertake a 2-3-month field attachment at one of these farms or a specialised institute. During year 3, students spend part of each week attached to a community group and at the end of year 3 with assessment combining an "on-farm assessment" by farmers/managers and a "university assessment" based on students' own reports and lecturer visits. The 4th year consists mainly of a student research project attached to a community[150].

ATVET

The above online registries include a great variety of public and private BTVET or higher education institutes offering programmes at craft, certificate or diploma levels (levels 2-4) in agriculture or agriculture related subjects. These include:

- The 18 public and private institutes listed by the BTVET portal as providing training in agriculture related subjects (Foundation for Development of Needy Communities; St

[150] Hannington Odongo, personal communication

Joseph's Technical Institute (TI) I at Fort Portal; Kabira TI, AICM Vocational Training College; Dokolo Technical School; St Joseph's VTC, Kabale Inst. of Technology and Applied Sciences; Olio Community Polytechnic (CP); Kaberamaido TI, Lumino CP; Bungokho Rural Development Centre; Lake Bunyoni Christian Community Vocational Secondary School; Ave Maria Vocational Training and Youth Development Centre; St Joseph's MAYO VTI; Kyamubililbwa VTC; Kyabera Forestry College; Bbira Vocational training School and Arapai Agricultural College).

- The 5 public agricultural colleges and farm institutes listed by the BTVET page of the MoES (Bukalasa Agricultural College; Ssese, Rwentanga, Rwampara and Kitagata Farm Institutes)
- The 19 private institutes listed by UGAPRIVI, (including Oasis Farm Institute; Mbuye Farm School; the Institute of Agriculture, Business and Technology; and Gulu Community Vocational School).
- The 11 public and private universities (Makerere, Mountains of the Moon; Ibanda; Ndejje; Ibanda; Kampala, St Augustine International; Nkumba; Busitema; Uganda Martyrs; and Islamic universities) and 11 other public and OTIs (Bukalasa Agricultural College; St Mathias Mbuye Agricultural College; Fisheries Training Institute; Uganda Catholic Management and Training Institute; Fountainhead Institute of Management and Technology; Management Institute for Science and Technology; Human Technical and Business College; Mityana Agrovet Institute; Uganda Christian Institute for Professional Development; Labour College of East Africa, and Kyera Agricultural Training College) offering diploma programmes in agriculture, crop or livestock programmes, as listed by UNCHE.

Although there is some overlap between these different databases and they are no doubt not always up-to-date, it seems clear that there is a great variety of public and private (often faith-based) organizations offering ATVET, that not all the existing organizations are registered with the different (BTVET, DIT, UGAPRIVI or UNCHE) databases.

According to Odongo (pers. comm.) there are 4 public colleges which offer 2-year diploma programmes in agriculture: Bualasa Agricultural College, Arapai Agricultural College (now part of Busitema University), Uganda Fisheries Institute, and Lira Human Technical Development Training Institute. The Farm Institutes (Ssese, Rwentanga, Rwampara and Kitagata) and the private college at Kyera offer formal 2-year certificate programmes. Many of the other (A)TVETs noted above offer shorter (e.g. 3-9 month) "non-formal" certificates.

Okiror et al (2017)[151] concluded that teachers at secondary schools lack the facilities and equipment and are ill prepared to engage learners in practical work and motivate them towards agricultural careers. According to Jjuuko et al (2019)[152] training at one Ugandan public agricultural college studied ("the only remaining public tertiary institution dedicated

[151] Okiror, J.J., Hayward, G. and M. Winterbottom, 2017. *Enhancing students' engagement in vocational agri-science and after-school careers in agricultural business: a case study of Uganda*. International Journal of Vocational and Technical Education, Vol 9(3), pp 20-30.

[152] Jjuuko, R., Tukundane, C., & Zeelen, J. (2019*). Exploring agricultural vocational pedagogy in Uganda: students' experiences.* International Journal of Training Research, 17(3), 238-251.

to post-secondary agricultural education and training") consists of excessive theory, delivered mainly through lectures and notes in the form of handouts.

Okumu and Bbaale (2018)[153] found that employers in both horticulture and plumbing occupations perceived poor levels of both technical and softs skills in graduates, attributing this to outdated learning technologies, ill-trained trainers, inadequate practical classes and poor student attitudes. They also concluded that current certificates of completion do not include competence certification, that employers are unaware of competence certification, and hence do not look for this, but that this type of certification should be mandatory.

Kyambogo University and the associated National Instructors College Abilonino specialise in preparation of vocational instructors (with Abilonino offering a Diploma in Instructor and Technical Teacher Education (DITTE) of Kyambogo University). However, TVET teachers and trainers in private institutions are mainly drawn directly from graduates of technical institutes and polytechnics who have rarely had industrial experience or pedagogical training (and worse – according to Okinyal, 2018 – it is often the "academic failures" that go on to be TVET instructors). It is therefore unsurprising that the paradigmatic changes involved in the move towards CBET are slow to take root in the Ugandan ATVET system.

Many authors have observed that training remains overly theoretical, resulting in poorly prepared professionals. A recent NCHE report[154] tracing graduate outcomes in 2014 from 7 universities and 7 OTEs makes interesting reading. Among the survey findings are:

- 75% of BSc agriculture graduates and 58% of agriculture diploma holders had found formal employment, while 18% and 33%, respectively, were self-employed;
- 54% of employers (of all disciplines, agriculture being about 5%) were satisfied with the level of knowledge and skills, with professional ethics and integrity, as well as computer skills, critical thinking, teamwork, confidence and self-presentation identified as areas needing improvement;
- 80% of both BSc agriculture graduates from Makerere, Gulu and Uganda Martyrs universities, and crop/livestock diploma graduates from Bukalasa Agricultural College, found their skills to be relevant – a percentage slightly higher than other disciplines (at 75%), showing that agriculture is perhaps no worse than other disciplines in preparing graduates for employment;
- agricultural BSc graduates found courses in agricultural marketing and agribusiness to be among the least relevant of their courses studied, compared to agronomy (12% and 20%, compared to 48%, respectively). At the same time, agricultural BSc graduates felt that computer skills, practical skills, and adequate agro-processing and marketing were the three course areas most recommended for strengthening, and diploma graduates recommending more practical skills (73%), computer skills and agribusiness. The conclusion seems to be that the current courses in agribusiness, while needed, are perhaps poorly delivered.

[153] Okumu, I.M. and E. Bbaale, E. 2018. *Employer perception of TVET graduate competence: Case of Uganda.* RUFORUM Working Document Series 17; 135-140

[154] NCHE, 2019. *Tracer Study for the 2014 graduates from seven universities and seven colleges*; National Council for Higher Education NCHE, 2019.

External Support

Currently, external financing to the BTVET sub-sector is a combination of budget support from Korea (Korea International Cooperation Agency), Japan (Japan International Cooperation Agency) and The World Bank. Off-budget support has also been given by Belgium (Enabel), Germany (German International Cooperation) and Ireland (Irish Aid).

The World Bank funded, Uganda Skills Development Project (USDP), supports the operationalization of the BTVET strategic Plan. The 5-year programme, effective from October 2016, is budgeted at US USD 100M. The Project targets key priority sectors of the economy - agriculture, construction and manufacturing, in line with Uganda's National Development Plan (NDPII) and Vision 2040. The 4 components of the project include:

1. institutionalizing systematic reforms (establishing skills councils, strengthening assessment system, management information system, communication and marketing);
2. improving quality and relevance of skills development (establishing centres of excellence, supporting vocational training institutes);
3. supporting training through a Skills Development Facility (SDF), with USD 18m of grants managed by Private Sector Foundation of Uganda (PSFU), and including 4 windows for employers (for short-term training and internships from MoES accredited organizations), self-employed, training institutes developing innovative models, private sector interested to support development of accreditation systems and recognition of prior learning (see also SDF slide show, for additional information).
4. Project management, monitoring and evaluation (project coordination unit, baseline/tracer studies, capacity development of implementing units, etc.).

The USDP (component 2) supports 4 colleges to be centres of excellence (CoE) in BTVET, networking these to vocational training institutes. One of these colleges is Bukalasa Agricultural College (BAC) which will be networked with Ssese and Rwentanga Farm Institutes, and Kaberamaido Technical Institute.

Now under the responsibility of the MoES, BAC was originally established 1920 by the Colonial government as a cotton research centre. Over the years, the centre was transformed into a comprehensive agricultural research and training institute. In 1952, BATI began offering a two-year certificate course and a further 2-diploma course was introduced in 1960. It now Diploma and Certificate level in disciplines of Agriculture (Crop Science), Animal Husbandry, Agribusiness, Horticulture and Human Nutrition, and is introducing short courses for farmers.

Under the USDP project, BAC will be supported by Dalhousie University (Canada), with the principle aim of establishing BAC as a CoE in competency-based education and training (CBET). Under Nuffic OKP-UGA-10021b, (EUR 0.65m grant) a consortium led by Maastrict School of Management, and including Kyambogo University, Egerton University in Kenya, Q-Point BV (Netherlands) and InHolland University of Applied Sciences, is supporting BAC to offer training in horticulture value chains. BAC is also supported by Technoserve, to train

students on entrepreneurship skills. Kaberamaido Technical Institute, is also receiving a grant for the European Union to improve agro-processing facilities and hence training.

As well as the OKP-UGA-10021b project supporting BAC mentioned above, Nuffic is also financing 2 other OKP Institutional Projects in Uganda during 2019-2021:

- OKP-UGA-10015 (EUR 1m grant), to strengthen tertiary education programmes in food and nutrition security, through support to the National Instructors College at Abilonino, and implemented by Hanze University of Applied Sciences in the Netherlands.
- OKP-UGA-10021a (EUR 0.65m grant), to improve quality of training in horticulture value chains at the Mountains of the Moon University, with Muni University, ADRAA Agricultural College, and the Institute for Agriculture, Business and Capacity Building, and supported by a Dutch consortium led by Wageningen University Research and including Zone College, Ecopolis Europa BV and Holland Greentech Uganda.

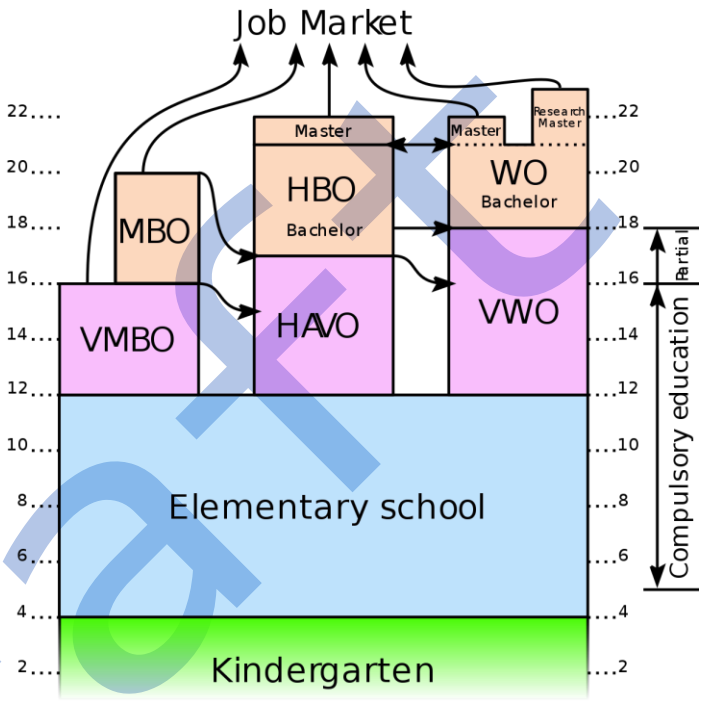
Under the previous NICHE programme, Nuffic also supported Gulu University to enhance capacity for agricultural research and training with a EUR 1.3m grant, implemented by iCRA, and supported by the Royal Tropical Institute (NL) and the Natural Resources Institute (UK).

The Netherlands, also supported The Skilling Youth for Employment in Agri-business (SKY) project during 2015-2020. This project, with a financial support from the Dutch government (EUR 8m), and the AVSI Foundation (EUR 3.5m), and implemented by the AVSI, aimed to "strengthen the capacity of agri-skills providers in a sustainable way to provide marketable and employable skilling. According to the AVSI SKY results platform, it skilled 4684 youth, through 13 agri-institutions, and with 35 agri-business partners.

The Netherlands

Country overview

The Netherlands is a relatively small country in area (41,500 km2) and population (17m). Only a relatively small proportion of this population – 2.4% - of the economically active population worked in agriculture, according to the 2010 agricultural census. In 2019, agriculture contributed to about 1.66% of the total national GDP, based mainly on horticulture and livestock (dairy, pigs, poultry). Nevertheless, the country is the 2nd biggest agricultural exporter globally in terms of produce value.



After primary education is completed in the Netherlands at around the age of 12, students can follow – or are guided into - one of 3 routes: vocational, professional or academic. Although there are possibilities to switch between these streams at later different stages, e.g. from vocational to professional, or from professional to academic, this may require additional study to catch up in certain topics (such as mathematics, basic sciences). A more complete description of the Dutch educational system is available on the SBB website, although a slightly simplified version is shown in Figure 1 (from Wikipedia).

Vocational training and ATVET

After primary education ("*basisschool*") the "vocational" route consists of a 4-year preparatory secondary vocational education ("VMBO") or "pre-vocational training, when students are given exposure to a number of practical occupations to facilitate a decision about which career they would like to follow in the subsequent MBO level. Although not generally considered as formal, this skills training is probably equivalent to level 1 in the national qualifications framework.

The vocational education route then continues with (now) 3 years of "middle-level applied education" (*MBO*) at one of the regional training centres (*ROC*) for non-agricultural careers, or one of the 13 agricultural training centres (*AOC,* or "colleges of green education"). According to the Netherlands Council for Vocational Education and Training (MBO Raad), approximately 40% of the Dutch working population has obtained an MBO vocational qualification – a figure rising to 80% of workers in the "green sector"[155]). TVET is thus

[155] Harm Holleman, Aeres, personal communication.

regarded as the "foundation of the economy". Concise overviews of TVET in the Netherlands are given by the MBO Raad[156], and CEDEFOP[157].

During their MBO, students follow a specific occupation; for example, dairy, pig rearing, poultry – although the first year of the 4-year programme is likely to be somewhat broad and cover several animal enterprises, to give basic understanding and skills for each enterprise.

The MBO programme is designed to produce entrepreneurs. MBO students develop specific skills to qualify at levels 2-4. Level 2 graduates are expected to demonstrate e.g. husbandry skills to work with guidance; level 3 to work independently, and level 4 to manage an enterprise or farm. During each year of study, students accumulate a "dossier" of theoretical learning (demonstrated through tests) and practical experience. Typically, one day per week is spent on a farm, with an 8-week on farm assessment period (at a different farm) at the end of each year where the student is assessed by both the farmer and college instructor, having to demonstrate a defined set of expected competencies appropriate for that level. Students thus typically get exposure to 2 different farms per year – or 4-5 different farms over the MBO study period. In the 4th year of study, the student will undergo the internship at an agribusiness company, to become familiar with the business.

Farms receiving students need to be accredited themselves. The farm should show an acceptable level of facilities and professionalism, and farmers are made familiar with what is expected of the students, of them, and the assessment procedures. These expectations are formalised in a tri-partite contract between the college, the farm and the student. Many, but not all farms in the Netherlands are accredited in this way.

Aeres MBO college, as an example of an AOC, has a "Sector Advisory Committee" to get feedback from the sector on the organization and delivery of the MBO programme. However, curricula are normally developed by the Foundation for Cooperation on Vocational Training and Labour Market (SBB), using consultants and industry consultation. The SBB is responsible for regulation of professions (ensuring compatibility with other European countries) and training programmes, advising and accrediting work placement companies, developing and maintaining the qualification structure and providing research on the labour market, work placement and efficiency of TVET programmes. A complete and detailed listing of all (several hundreds of) approved occupational programmes and competencies (qualification files) is given on the SBB website (in Dutch).

Professional Education

The professional route consists of 5 years of "higher general continued education" (*HAVO*), giving entry to "higher professional education" (*HBO*) at one of the 43 *hogeschools* (37 of which public) or Universities of Applied Sciences (UAS).

[156] MBO Raad (n.d.) *Dutch vocational education and training in a nutshell.*

[157] CEDEFOP, 2016. *Vocational education and training in the Netherlands. European Centre for the Development of Vocational Training.* European Union.

Two out of every 3 higher education students (including the UAS and "Research Universities" attend the UAS. Teaching programmes at both UAS and Universities[158] lead to bachelor-masters qualifications, although the approach to teaching differs between the UAS and research universities.

Three of the Universities of Applied Sciences (HBO) operating as independent foundations, specialise in agriculture: Aeres (with 3 UAS campuses), HAS den Bosch (with 2 campuses) and Van Hall Larenstein 2 campuses).

The Aeres group of vocational training institutes in the Netherlands was created between 2004 and 2009 from a merger of various colleges and applied universities. It now comprises a variety of vocational training institutes, offering programmes at all levels of "green" education: secondary and post-secondary vocational practical training at levels 1-2 ("VMBO") and 3-4 ("MBO") at one of the Aeres VMBO/MBO schools; professional, post-secondary vocational occupational training ("HBO") leading to Bachelor's and Master's degrees at the AERES University of Applied Sciences; and short (1-5 month) certificate programmes or BTEC level 3 diploma for international students, as well as other short international training courses for continuing professional education.

Van Hall Larenstein (VHL) UAS also offers a variety of programmes in sustainable environment, agriculture and business at its campuses in Venlo/Arnhem and Leeuwarden. These include: 1-year certificate programmes in food dairy technology, innovations for sustainability, and sustainable water technology; 4-year applied BSc programmes In animal husbandry, food technology, international business, international business in food and flowers, and international development management; and the 1-year Masters programmes in agricultural production chain management, innovative dairy chain management, river delta development, and management of development. It has 2 applied research centres and some 30 research professors

The HAS University of Applied Sciences also focuses on agriculture, food, agri-food business, environment and related industries. As well as higher vocational training with 16 HBO bachelor programmes, it offers large variety of tailor-made corporate training courses (from 1 day to 6 months), consultancy and applied research across 13 research groups. It currently has 3700 full-time students and more than 640 students on various company courses at 2 campuses in Den Bosch and Venlo near Arnhem. HAS has extensive laboratories, greenhouses, gardens, test factories, etc., which can be accessed by the private sector for research and testing. Like Aeres and VHL, and given the international nature of the Dutch agri-food business, HAS emphasizes internationalization in its courses, student intake and general culture, and collaborates in ATVET activities in Africa through projects supported by Nuffic, the Netherlands African Business Council and others.

The first 2 years of the 4-year Bachelor programme at the UAS are typically focussed more on primary production; the 3rd and 4th years more on organization and business practice. At HAS, from the first year, students undertake work experience placements. During the 2nd and 3rd years of the Bachelor programme at AERES, about 25% of student time is spent on assignments to farms or companies, often in groups of 3-4, under supervision of teaching

[158] There are 13 "research universities" in the Netherlands. These include Wageningen University "of life sciences" (formerly Wageningen Agricultural University) which is now integrated with the main strategic agricultural research institutes in the Netherlands.

staff. During the 4th year, most of the time is spent as intern or on professional assignment to a company or related agricultural support service agency and undertaking thesis research. During the Masters Programmes, nearly all the student time is spent on company assignment. Good descriptions of how the internships and professional assignments (both in the NL and overseas) are integrated into the curricula of the Bachelor's programmes is given by the HAS course prospectuses for companies on International Food and Agribusiness, Animal Husbandry, Environmental Sciences.

Applied research at the agricultural UAS is integrated with education, and they work closely with the agricultural business community in the Netherlands. For example, students, teacher-researchers and lecturers carry out commissioned research studies using the UAS facilities (farms, laboratories, test factories), developing new techniques and practices, which gives students opportunities to learn about the latest techniques and equipment. An example of this is the collaboration between Aeres and *De Heus*, an animal feed company, where one of the Aeres university dairy units is used for feeding trials. Recently, the number of research professorships (*lectoraten*) dedicated to specific applied research topics at the UAS has increased to cover different topics under both very applied themes as well as more fundamental topics on healthy living, sustainable entrepreneurship and environmental management for the future.

Private companies and agricultural organizations also contribute to UAS programmes through hosting excursions, offering guest lectures, etc. Many of these activities are arranged informally, through personal contacts of staff members.

More formal structures to link the UAS and industries exist. Taking Aeres as an example, its "Werkwereld Advisory Committee", consisting of agricultural industry and advisory services (such as DLV, the privatised Dutch advisory service) meets twice a year to consider developments in the agricultural sector and adjustments to the Aeres teaching programme (including the need for any new courses/teaching programmes). Curricula changes which can demonstrate response to labour market needs are then approved by the Accreditation Organization of the Netherlands and Flanders (NVAO), on behalf of the Ministry of Education Culture and Science, for inclusion in the Central Register of Higher Education Programmes (*CROHO*).

Horizontal transfer between education streams

The three streams of education from age 12 depicted in the diagram above are not mutually exclusive, although switching may involve an extra year or two of study to readjust to the different subject matter and knowledge/practice expected. For example, secondary school students who have followed the 5-year HAVO route can also enter the MBO programme, and in agriculture many do, to obtain a more practical education and go into production management, rather than a support industry or research. MBO graduates can enter the HBO programme, although they may be 2-3 years older than those who enter directly from the HAVO stream. HAVO graduates can enter the final 2 years of the 6-year VWO stream, to enter one of the research universities, although they may be one year older than other students who directly entered VWO, etc.

Acknowledgements:

Much of this section is based on discussions with Daan Westrik, Harm Holleman of AERES, for which acknowledgement is given here, although any errors remain the responsibility of the author.

PART III ATVET CASE STUDIES

Aligning ATVET to national policy and key value chains in Benin

By Vivien Senouwa, Mireille Kissezounon and Marcellin Hyle [159]

The NEPAD ATVET initiative in Benin

The Agricultural Technical and Vocational Education and Training (ATVET) programme[160] - is an African Union initiative, implemented within the framework of NEPAD and funded by GIZ. The pilot phase of this project, which ran from 2014 to 2016, was implemented in six African countries including Benin. The second phase brought together six additional countries, bringing the total 12. Concurrently with this project, another TVET/F project has also emerged, which ends in 2021. These TVET projects aims at developing, among young people and women, professional capacities in order to improve their employability and their capacity for self-employment in the agricultural sector. The implementation of these projects relied heavily on the skills-based approach (SBA) applied to promising value chains in the Beninois agricultural sector.

Challenges faced in ATVET in Benin

Apart from the ministries in the education sector, several other ministerial departments are also involved in agricultural training, as well as the private sector and civil society organizations. Each of these stakeholders had developed, according to their interests, initiatives in ATVET which were not necessarily well coordinated or in line with national agricultural policy. This diversity of actors and practices in agricultural training could have been an asset, if it did not suffer from the absence of coordination, regulation and synergy. In particular, we observed:

- poor compatibility of the training offer with the demands of the labour market, resulting in very low employability of graduates from agricultural colleges and high schools;
- an absence of synergy or even complementarity between the institutions supporting vocational training and those involved in professional integration in agriculture;
- an absence of relevant information on the trajectory of the trainees.

Another weakness of the ATVET system had been the work placement provisions of ATVET students. As part of TVET training in agricultural colleges and high schools, learners normally undertook internships, as an integral part of the training curriculum. In practice, companies involved learners did not participate in defining internship objectives and what the learner should learn, or how this learning should be achieved and related to the scientific, technical and practical knowledge received at the school. In these conditions, the "professional project" was simply a period of "whatever practical work that can be found", in the eyes of the trainee.

[159] Educational Advisor in Agricultural Sciences and Techniques, National Technical Advisor EFTPA / GIZ and 3) Permanent Secretary of the National Consultative Framework for the Promotion of "EFTP", respectively

[160] Education et Formation Technique Professionnelle Agricole (EFTPA), in French

The internship time in the company varies from one to three months with well-defined objectives (one month for the first three years of training and three months for the last year of training devoted to the preparation and support of the professional project of the learner).

Implementation of the ATVET Project in Benin

The ATVET Project in Benin involved piloting a new approach with a sample of public and private agricultural training institutions. This approach piloted was a market-oriented training scheme, centred on the school-enterprise partnership with a view to significantly improving the employability of trained young people and the competitiveness of agricultural products in local and national markets. The pedagogical approach implemented thus combined a competency-based education and training (CBET) approach with a value chain (VC) approach, around 2 essential pillars: 1) the institutional anchoring of technical and vocational education and training in the broader agriculture sector; and 2) redefining the training offer based on the needs of the consumer market for goods and services in the agricultural sector.

Facilitating the institutional anchoring of ATVET in Benin.

Two sub-results were targeted through this objective:

- Ensuring the provision of ATVET by a set of key players at both the strategic and operational levels of agricultural training and action in Benin and;
- Aligning agricultural training policy to the broader National Agricultural Investment and Food and Nutrition Security Plan of Benin (*PNIASAN,* in French).

As part of establishing this institutional context, a workshop was organized at the start of the project to take ownership of the objectives and the implementation of the ATVET project, and to share the roles and responsibilities of each of the institutions identified as stakeholders involved in the implementation of the project.

To the link the ATVET Project with the broader policy of PNIASAN, a workshop was organized to appropriate the various policy documents in force in the Ministry of Agriculture, Livestock and Fisheries (*MAEP*), and the Ministry of Secondary, Technical and Vocational Education (*MESTFP*) by the key players in the implementation of the ATVET Project. During this appropriation workshop, aspects relating to agricultural and rural training were integrated into the strategic axes of PNIASAN. This initiative to make the agricultural and training policies consistent, and consequently to establish a permanent dialogue between the executives of the two sectoral ministries was a first since 1976.

Key policy documents linked to the PNIASAN were the National Agricultural and Rural Training Strategy (*SNFAR*) and the associated ATVET curriculum reform; the National Strategy of the Agricultural Council (*SNCA*) and the Strategic Plan for the Revival of the Agricultural Sector (*PSRSA*).

Piloting the improved ATVET system

The ATVET Project piloted its approach in eight agricultural training schools, and around four value, for which additional curricula based on the competency-based approach were developed with a strong involvement from professionals in the sector. Support to this

market-oriented experimental training system was provided by the "Agricultural Sciences and Techniques" (STA) Consultation Sub-Framework of the National Consultative Framework for the Promotion of TVET.

Piloting involved three main steps:

1. *The selection of a sample of value chains and pilot training schools*.

This selection of value chains and training schools was initiated by a consultant who proposed key agricultural sectors based on government priorities, and training schools capable of serving as pilots. The results of the consultant's study were then presented at a workshop which brought together the main actors involved in agricultural training, considered by a team of well-informed executives from both Ministries (MAEP and MESTFP) as well as the National Coordination of the ATVET project and finally validated by a national workshop of the stakeholders concerned.

Economic analysis of the selected sectors resulted in the section the value chains: local chicken meat, local pork, processed sheep meat (esp. for the Tabaski Festival); processed steamed rice; processed soybean derivatives; and processing meat by-products.

Four public agricultural technical high schools (*lycées*) and four private agricultural vocational training centres were selected to pilot training in these value chains. The public schools were: the Médji De Sékou Agricultural High School (LAMS) in the Municipality of Allada; the Barienou Agricultural Technical High School in Djougou; the Agricultural Technical High School in Natitingou; and the Agricultural Technical High School of Kpataba in Savalou.

The four private institutions include: the KOBERSIDE International Agricultural Technical Private Education College (CEPTAKI) in the Commune of Kpomassè; the BOUGE training centre in the commune of Allada; the Research Centre, Kpanroun Agricultural Education and Training (CREFAA) in the Municipality of Abomey-Calavi, and the Dassa Centre for Learning and Entrepreneurial Training (CAFE) Dassa in the Municipality of Dassa-Zoumé. CREFAA and CAFE are diocesan training centres.

2. Designing CBET curricula for the selected value chains

The five selected CVAs were the subject of curriculum development entrusted to the National Institute of Training Engineering and Capacity Building for Trainers (INIFRCF) of the Ministry in charge of vocational training (MESTFP). The development of these curricula followed all the steps required in a CBET approach with a strong participation of professionals in each of the sectors from which the targeted VC are extracted. At the end of the curriculum development process, documents made available for each VC included: the labour market or "business situation" analysis; the detailed definition of training modules related to the job; the educational guide; the guide to learning resources, integrating gender, environmental protection and entrepreneurship. These curricula are called "additional" because they complement the study programs already in force in the pilot institutions.

3. Organizing practical internships

The company internship has been reorganized to place the company at the heart of the technical and vocational education and training system. To do this, particular attention has

been paid to the selection of partner companies. The criteria for choosing these companies focused, among other things, on: the presence of at least one of the targeted CVAs, operational capacities and the quality of business links in relation to the considered CVA, availability of welcoming trainees, the presence of technical staff capable of providing support to trainee learners, the accessibility of the company and its proximity to the training establishment, partner. These companies, numbering 07 at the start, are considered as “witness companies” for the system put in place.

The company internships by trainees were reorganized to place these at the heart of the technical and professional teaching and training system. Special attention was paid to the selection of partner companies, based on their role in one of the targeted VC, their operational capabilities and quality of the business links in relation to the VC, their facilities to receive trainees, the presence of technical staff capable of providing support to trainee learners, and the accessibility of the company and its proximity to the training establishment, partner. These companies, numbering seven at the outset, were considered as "partner companies".

The active involvement of companies in the vocational training of learners was formalized by a framework partnership agreement between the training institution and the company.

Every year, at the pilot level, a cohort of 200-300 trainees or “agripreneurs”, including at least 30% girls, was recruited according to the annual workplan and budget of the ATVET project. These were shortlisted from their profiles and the shortlisted candidates interviewed by members of the administration (Censeur, Chief Operating Officer, Head of the Continuous Training Cell), a representative of the trainees and one from the ATVET project. Recruited candidates each embarked on a process of developing his/her professional project with the help of a mentor with practical skills in the appropriate value chain.

The costs of company internships were shared between four institutions:

- The ATVET Project, which provided training for internship supervisors, teaching and visualization equipment, and signed a lump sum contract with the supervisor responsible for providing technical supervision to trainees;
- The training centres, which provided an internship guide that defined the purpose of the internship, the roles and responsibilities of each of stakeholder involved, the assessment procedures and conditions;
- Parents, who provided living costs and travel expenses of the trainees.

Results of the ATVET Pilot

The strong involvement of companies in the pedagogical management of the training in the pilot schools has enabled more relevant and practical training between 2015 and 2018 of around 1200 future agripreneurs, including 300 girls and 208 women farmers in the compost manufacturing component. In turn, this has led to the ease of professional integration for graduates of the schools, made agricultural entrepreneurship more attractive to rural youth, and motivated candidates for future training.

The facilitation of business links within the selected value chains by the ATVET Project has also:

- improved the dynamics of value chains at all levels (micro, meso and macro), leading to "clusters" of partner companies;
- broadened the network of partner companies, which doubled 2015 and 2018;
- led to the creation and institutional strengthening of two agri-food processing cooperatives and the establishment of the National Association of Women Agricultural Entrepreneurs of Benin (*ANaFeA-Benin*);
- improved producers' incomes between 2015 and 2019;

In addition to production benefits, partner companies have become reference centres for the continuing training of producers. Targeted companies have contributed to training activities at the financial, material and intellectual levels, providing a viable model of public-private partnership in the ATVET sector.

At the national level, the scheme has also strengthened cooperation between the Ministry of Agriculture, Livestock and Fisheries (MAEP), and the Ministry of Secondary, Technical and Vocational Education (MESTFP), and established coherence between agricultural policy and TVET policy.

Future outlook

In view of the very significant results achieved in terms of impact, we recommend scaling this market-oriented training approach. To do so, MESTFP will need to evaluate the practicalities of its generalization. As part of that process, it is desirable to seek synergy with other projects that have a similar approach. Two such projects are the Canadian Project “Sustainable Integration of High School Graduates in the Agro-Pastoral Sector (Projet d’insertion durable des diplômés du secteur agropastoral - IDDA) and the Nuffic OKP BEN-103632 project “Building TVET capacities for youth employment in agro-food chains in Benin”.

Integrating ATVET teaching and practice with local stakeholders at Bure Agricultural Polytechnic College, Ethiopia

By Aschenik Kassa and Wale Firew[161]

Overview

Bure Agricultural Polytechnic College (BAPTC), established in 1994, is one of 10 government polytechnic colleges in Amhara regional state, Ethiopia. Located in a fertile and productive region, with a total area of 37 hectares near Bure town, and in line with TVET reforms, BAPTC aims to train middle and lower-level agricultural experts, managers of micro and small enterprises (MSEs) and model farmers for the technological and socio-economic development of the country. The current construction of one of the four pilot Integrated Agro-Industrial Parks in Bure, a key element of agricultural development strategy in Ethiopia, also provides a demand for a skilled labour force, and has led to the proposed introduction of 11 new curricula at BAPTC. The College is therefore striving to become a centre of excellence and model ATVET college in capacity building in the sector of agriculture, including crop and livestock production and agro-processing. In this respect, the college has puts considerable emphasis on the improvement of all administration processes, to establish an "Outcome Focused and Customer Oriented Management".

The College now has 13 education and training departments, including: Natural Resources, Animal Husbandry and Dairy Production, Crop Production, Animal Health, Automotive Technology, Electrical and Electronics, Building Construction, Metal and Furniture Making, Textile and Hotel Tourism, Garment and Fashion Design, Surveying and Drafting, and ICT. The main source of income/finance for the College is the annual government budget, the monthly training salary of trainee and assessment fee of the trainees, as well as the production of metal and woodworking, dairy products, crop development products and surplus products.

Governed by a Board of 12 members, drawn from Bure city and surrounding district administrations, the college has a staff of 153 trainers (48 C-level, 93 B-level, and 12 A-level), and 57 support staff for a total of 200 employees. Trainers are graduates from various universities in the country, including a few C-level coaches and shop assistant trainers are graduated from the college itself. They train only in the profession for which they have been assessed by the National Qualification Centre.

In line with the National TVET Qualification Framework (NTQF), the College provides training leading to qualification certificates from levels 1-5 across more than 31 Occupational Standards (OS). Training to level 1 lasts 6 months; to level 2, one year; to level 3 two years, to level 4 two years and 6 months, and to level 5, three years, on average. Some organizations do not want their trainees to be trained over such a long time, but emphasis is placed on practical training, which accounts for 70% of the training time. The training system at BAPRC is "outcome-based" training based on occupational standards and required competencies, skills performance rather than knowledge assessment through exams, and flexible learning rather than rigid time units for courses[162].

[161] Dean and Academic Vice Dean, respectively, Bure Agricultural Polytechnic College, Bure, Ethiopia

[162] Referred to as Competency-Based Education and Training (CBET) elsewhere in this report

Bure Agricultural College graduates an average of more than 1,100 trainees each year and in the last five years alone (2014-2019) has graduated a total of 20,279 trainees in various professions, of which just over half (53%) were in agricultural fields.

Linkages with local industry

Labour market needs are assessed through market research done by an annual survey, as requested by the "College Market Tracer Study Committee". This survey is done to identify the needs of the government and non-government sectors, and the annual intake of trainees and support from regional government is determined by the needs for different professions. Clients from government, trade and industry participate in the development of occupational standards, which are set by the Ministry of Higher Education, which also provides the curriculum for technical and vocational institutions.

Many local and regional institutions work in partnership with BAPTC to offer opportunities for the practical placements and training, serving collaborative or cooperative training centres on the basis of agreements and pre-agreements. For example, BAPTC provides close and collaborative training with Ayehu Agricultural Development Corporation, Bure Integrated Agricultural Production Factory, Bure Damot Agricultural Mechanization Company, Bure Soft Drinks Factory, Bure Livestock and Fisheries Development Office, Bure City Agriculture Office, Bure City Veterinary Clinic, and others.

When BAPTC trainees go out for cooperative training, they stay in the cooperating organization for the practical component of 70% of the total training hours, with the 30% of conceptual training at BAPTC. For example, if a trainee is trained in a professional unit of competency for 60 hours, he/she will study at the college for 18 hours, with the remaining 42 hours spent at the collaborating factory or industrial institute. To improve the quality of this collaborative training, BAPTC provides short-term training for the staff of cooperating organizations in training methodology, so that these staff are more capable of training BAPTC trainees.

This collaboration goes for all levels from level 1 to 5 and takes into account all the major competency units required. As well as learning the use of machines not available at BAPTC itself, trainees comply with any industry rules and regulations, entry and exit time, inspections, etc. at the collaborating institute. Under these practical training arrangements, there is no charge from the College or the trainees to the collaborating organization, and the trainees do not get any fee for the services they provide to the factories. The trainees themselves are responsible for board and lodging and other personal necessities. Both the collaborating organizations and trainees benefit from the placements by assessing each other for suitability for subsequent employment.

As an example of such collaboration, Ayehu Agricultural Development Institute is a private agricultural and development institution located at 50 km from Bure and has been very supportive of receiving BAPTC trainees. It provides an ideal place for BAPTC trainees to receive practical training in dairy production, natural resource management, crop development, plant science and animal husbandry skills. They receive instruction in and practice the use of large-scale farming machines in crop production, horticulture, honey production and irrigation. At the end of their attachment period, the industry coach assesses the competency results for each trainee and provides written feedback to BAPTC, which is then part of the student assessment as submitted to the Registrar. Ayehu Agricultural Development Institute now employs a large number of graduates from BAPTC.

Another example is the Bure City Veterinary Clinic, which provides practical training to our intermediate and advanced veterinary service trainees. It is a partner organization that allows trainees to receive and successfully graduate with quality as they are trained in the clinic's diagnostic, treatment and laboratory procedures. As the Clinic is located 3 km from BAPTC, trainees do not have to pay for transportation and hence costs are lower. Instructors from BAPTC go to the clinic to attend the training of the trainees and supervise the practical training process. In addition to the training itself, the clinicians also monitor the trainees' completion of vocational discipline, wearing safety gowns, assess the trainees' results and report back to the college instructor.

A third site for collaborative training is Bir Agricultural Development Company (PLC), located 30 km from BAPTC, making it attractive for trainees. As with Ayehu Agricultural Development Farm Corporation, Bir was purchased from the Ethiopian privatization agency in March 2001. Major crops cultivated at the Bir farms include maize, wheat, soya, haricot beans, chickpea, pepper, rape seed, sesame, essential oils, and spices such as coriander and black cumin. Bir farms use sprinkler irrigation systems for onion production, fruit and vegetable production. The farm is also specialized in hybrid maize seed production, beef farming and honey production. In an effort to improve environmental balance the farm has started planting perennial crops such as mango, avocado, banana, citrus fruits and coffee. This farm therefore provides an ideal site for trainees in natural resource management, crop production, irrigation and horticulture, as well as animal production and apiculture. In addition to improving the quality of BAPTC training, the collaboration has enabled the college to reduce its need to purchase machinery for training.

We believe that in such collaborative training, trainees gain not only a familiarity with and better understanding of technical practice such as use of appropriate machinery and equipment, but also learn to communicate with others, develop entrepreneurship skills, work ethics, networking abilities, and occupational hazard and safety procedures. We have seen and confirmed through interviews, tests and comments, as well as the feedback from the industrial trainers, and assessing the competencies of students before and after their industrial placements with these collaborative training centres. Collaborating organizations give comments on gaps in the BAPTC training curricula, which are then feedback to the curriculum developers.

However, BAPTC collaboration with these organizations for practical training is not without some problems. Occasionally they have commented that trainees' have behavioural problems, lack the right attitudes were, or are not available on time, resulting in a waste of training materials. In addition, clients at the veterinary clinic for example, also prefer to deal with qualified staff (“we will only tell the specialist”). In such cases, the trainers at BAPTC provide counseling to trainees, to help them develop their professional ethics, and improving their work habits.

International Collaboration

In developing its activities, BAPTC has benefitted from collaboration with a number of various international organizations. These include including KFW, which has provided substantial support to provide key equipment (combine harvester, tractors, vehicles, laboratory and office equipment).

Through the Sustainable Training and Education (STEP) Project in Ethiopia, GIZ has supported BAPTC by building capacity of senior staff in leadership and management, as well

as for trainers and gender focal persons. GIZ has also provided machine maintenance and internet connectivity for the focal person and the college dean. In our college renovation, maintenance and reparation were not considered and taken properly. Phase IV of this collaboration is keenly anticipated.

More recently, the College has also participated in the Nuffic project “East African Network of Excellence in Dairy Training (EARNED). In this project, a number of trainers will be trained to use a blended learning platform in dairy, and targeted ICT equipment will be provided to enable this.

Need-Based Curriculum Development: Training of TVET Instructors in Agro-Processing in Ethiopia

By Biadgelign Ademe, PhD [163]

Introduction

The Federal Technical and Vocational Education and Training Institute (FTVETI) was initially established as the Ethio-China Polytechnic College. However, the Federal Government of Ethiopia felt the need to establish an independent higher learning institute responsible for the training of TVET teachers at different levels (B.Sc. and above) following a change of role of Adama University (which was the only TVET teacher training College in Ethiopia), to the current Adama Science and Technology University. FTVETI is now the only TVET instructor training institute in Ethiopia financed by the Ethiopian Government. The Institute is governed by a Board drawn from public universities and Federal ministries, with the General Director of FTVETI as secretary.

The current mission of FTVETI is to provide competent, innovative and resourceful TVET instructors (for levels 2-5) and TVET leaders, through short- and long-term training, demand-based research, technology transfer and consultancy services in support of micro and small-scale enterprises. The institute is organized in seven faculties: Agricultural; Civil Technology; Electrical-Electronics and Information and Communication Technology; Language, Basic Sciences and Vocational Pedagogy; Mechanical Technology; Textile and Apparel Fashion Technology; and Hotel and Tourism Management. In addition to the main campus in Addis Ababa, FTVETI has 15 Satellite centers in TVET and ATVET polytechnic colleges located in the different Regional States which were selected based on their demand and resources.

At present FTVETI has more than 300 local and about 40 expatriate teaching staff (recruited from China, Cuba, Germany, India, Philippines), with more than 10,000 undergraduate and postgraduate students across all programs (regular, evening, weekend, *Kiremit*/summer, and Satellites). The regular program leads to B.Sc. and M.Sc. degrees in Technical Teacher Education; *Kiremit*/summer program leads to the degree of B.Sc. in Technical Teacher Education and MA degree in TVET Leadership and Management. The evening and weekend B.Sc. degree programs train industry technicians, and the weekend MA degree program in TVET Leadership and Management. All graduates in Technical Teacher Education from the regular and *Kiremit* programs were already employees of TVET or ATVET, and hence they resume working for TVET; MA graduates in TVET Leadership and Management in the *Kiremit* program are also go into the TVET sector.

New Agro-Processing Curricula Needed

Current Ethiopian government policy is to industrialize its agriculture-led economy. In support of this policy, it is looking to develop a skilled workforce in different agro-processing occupations. To this end, FTVETI decided to develop curricula in 6 agro-processing domains:

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[163] Associate Professor in Curriculum Design and Development, Federal TVET Institute, Addis Ababa, Ethiopia

Animal Feed; Dairy; Fruit and Vegetable; Honey and Beeswax; Meat; and Poultry Products. As a typical example of the curriculum preparation process, the preparation of the dairy processing technology curriculum is described in this case. The dairy industry has a huge potential in Ethiopia, but traditional dairy processing methods and low-quality dairy products fall below international standards.

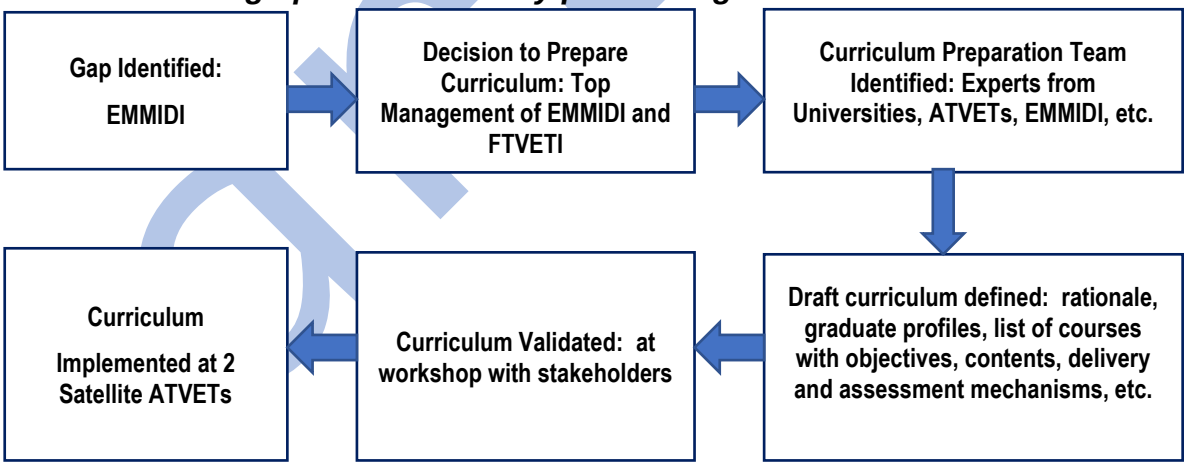
Dairy Processing Needs Analysis

The starting point for any curricula is the demand of the community where it is expected to serve. Accordingly, one of the development institutes of Ethiopia - the Ethiopian Meat and Milk Industry Development Institute (EMMIDI) located at Debre-Zeit/Bishoftu - conducted a needs assessment in 2016. One of the results of this assessment was to identify the need to improve milk processing, but teachers of dairy processing in the current ATVETs were scarce, and few of these also had been trained as instructors. Based on this needs assessment result, the top management of EMMIDI and FTVETI agreed to jointly prepare a curriculum for ATVET dairy instructors, including three domains of competencies: technical (dairy processing); pedagogical (how to teach, assess, and carryout research); and general competencies (mathematics, language, civic and ethical education, and entrepreneurship). FTVETI assumed the responsibility of implementing this curriculum and employing the instructors to deliver this curriculum.

Developing the Curriculum

The curriculum designed to train ATVET teachers/instructors to B.Sc. degree level in Dairy Processing Technology with approximately 50-50% theory-practice proportion was prepared and financed by FTVETI and EMMIDI following the process described in the Figure below.

Curriculum design process for dairy processing instructors



In the preparation and validation processes (under the guidance and facilitation of curriculum experts from FTVETI), experts from Development Institutes of Ethiopia (e.g. EMMIDI; the Food and Beverage Development Institute, FBDI), Universities (e.g. Mekele and Oda Bultum), Agriculture Research Institutions (e.g. Holeta Agriculture Research Center), International Research Organizations (e.g. ILRI-International Livestock Research Institute, involved in the validation workshop), and ATVET teachers (from e.g. Holeta and Wukro) participated. These experts for curriculum preparation, defined the different components of

the curriculum: the rationale, graduate profiles, objectives (based on the Ethiopian Occupational Standard for Dairy Processing), the degree nomenclature, and delivery/pedagogical and assessment mechanisms.

A team of experts from FTVETI (teaching and non-teaching staff) then assessed the capacity of different ATVETs in Ethiopia to deliver the curriculum. Two ATVET Polytechnic Colleges were identified as having the resources and facilities needed to provide training at the B.Sc. degree level in Dairy Processing Technology. Holeta ATVET Polytechnic College in Oromia Regional State and Wukro ATVET Polytechnic College in Tigray Regional State were therefore selected as FTVETI Satellite Centers responsible for the training of ATVET Teachers in Dairy Processing Technology at the B.Sc. degree level.

In this process, three parties (FTVETI, the Tigray and Oromia Regional State TVET Bureaus, and the Holeta and Wukro ATVET Polytechnic Colleges) signed a Memorandum of Agreement with clear definition of the responsibilities of each party. FTVETI was responsible for identifying and providing the BSc programme trainers (recruiting graduates from universities in Ethiopia and abroad in the diary processing and related study areas), teaching materials, learning facilities, laboratory equipment, and for issuing degree qualifications to successful graduates (i.e. qualified instructors in dairy processing). The Regional TVET Bureaus and ATVETs were responsible for coordinating the training, provision of classrooms, libraries, teacher offices, and providing non-teaching and administrative staff needed for the programme.

Holeta and Wukro satellite centers started the BSc. instructor training in the 2017/18 academic year with 41 students, and now (2019/20) there are 60 students in two cohorts. Every year, the satellites accept new dairy processing technology students so as to supply the continuing need for dairy processing technology teachers in ATVETs. This satellite structure, building on the resources already available these satellites, is more economical and better than starting from scratch, due to the resource sharing.

Graduate Competencies

Graduates from the program are expected to teach theoretical and practical lessons in dairy and dairy processing at Ethiopian ATVET Polytechnic Colleges and in other similar colleges. They therefore need competencies in three main domains explained as follows.

- **Technical Competency:** how to handle milk and operate dairy equipment in line with international quality standards; design various dairy and dairy products; preserve, package and label these products; work with cold chains; monitor quality control, etc. These competencies are required because graduates are going to teach these competencies; or in short, the 'what of teaching' will become possible.
- **Pedagogical Competency**: how to teach; assess learning; undertake research, including how to communicate effectively to ATVET students and the wider public; how to design, execute and evaluate practical lessons; how to handle students and classroom activities (use of time, student discipline, and utilization of learning resources); prepare session plans; how to use learning-teaching materials useful to facilitate student learning; prepare and use training materials; design methods of competency assessment and assess competency levels; demonstrate skills; coach

students to develop the practical skills; review learning-teaching materials; prepare reports on the strengths and weaknesses of the curriculum etc. In short, pedagogical competencies are needed so that these graduates will meet the requirements of "the how of teaching" and hence they will be trained and professional teachers.

- **General Competencies:** mathematics, English language, civics and ethical education; entrepreneurship, etc. General competencies are required so as to help graduates have all round capabilities; they need to communicate effectively, including in English which is the language of instruction in Ethiopian higher learning institutions; they should be ethical and act in a socially acceptable manner; and they are expected to show their respective students how to create their own businesses. General competencies are also designed to help graduates personal skills like communication skills with students and the academia; life skills/living skills in multi-culture or in diverse communities; and ICT.

Conclusions and lessons learned

On the one hand, FTVETI has gained rich experience on the training of teachers in dairy processing for ATVETs in the satellite centers. Hence, it is easy to expand this practice, raise the number of satellite centers together with the resources needed so as to solve the critical shortage of Dairy Processing Technology teachers. The Federal TVET Institute is the only specialized higher education institute for training TVET and ATVET instructors; agriculture universities do not train teachers, they only train practitioners who have not undertaken pedagogical courses.

There are, nevertheless, challenges in the process. These include the shortage of materials for practical training, the shortage of specialized lecturers in Ethiopia to train instructors (even these lecturers themselves were not trained to be teachers, rather they were trained to be practitioners in their domains), and the scarcity/unavailability of dairy processing industries near to the satellite centers for cooperative, practical training. To alleviate these constraints, short-term trainings on pedagogy were provided by expatriate lecturers from the Philippines and India, the Federal TVET Institute subsidized the purchase of materials for practical training and for books and provided transport for students dairy processing industries for cooperative training.

On the other hand, the newly trained dairy processing instructors are also now equipped to create their own businesses in dairy processing, even though the primary purpose is to employ them as Dairy Processing Technology teachers/instructors. In return, students of these dairy teachers, who will successfully compete their respective level-based training in dairy processing technology will work in the dairy processing industry, providing the dairy industry with a better trained workforce. The aggregate of such practices will make the dairy processing industry more productive, profitable, competitive, and will provide better services to its customers, leading in turn to reduced unemployment, increased job opportunities, and decreased out migration to other countries.

Linking ATVET to value chain development: collaboration between Holeta and Maichew Colleges and the HortiLIFE project in Ethiopia

By Merga Nagassa and Fisahaye Abraha[164]

Introduction

Holeta Polytechnic College (HPTC) in Oromia Regional State and Maichew Agricultural Technical and Vocational Education and Training College (MATVETC) in Tigray Regional State, were both established by the Federal government of Ethiopia, and are now owned and operating under the respective State TVET Bureau, which in turn are governed by the Federal Ministry of Science and Higher Education. Both colleges have strong agricultural programmes.

HPTC was originally established in 1975[165] as Holeta Farmers Training Center with 3-6-month training programmes for farmers. It was upgraded to an ATVET College in 2001, with a main focus on training "development agents" (DAs) – agricultural extension agents located at "*kebele*" (parish) level – over a nine-month period. In 2018, it was further upgraded to a Polytechnic College, now offering training from levels I-V in agricultural and also non-agricultural fields. HPTC also now functions as a satellite campus of the Federal TVET Institute (FTVETI) to train ATVET instructors in agro-processing and agricultural fields at BSc level. The aspiration of HPTC is to become a leading institute in East Africa and eventually upgrade to a vocational university, keeping a focus on practically oriented training. With 31 hectares of land, and surrounded by commercial agriculture, agro-processing industries and research centers, HPTC is particularly well-located to provide training in the field of agricultural production and agro-processing,

MATVETC was established in 2001, also with the primary mandate to train DAs. Located on 17 hectares of land used, with a further 25 hectares being obtained mainly for income generation off-campus, the college has about 36 classrooms (including 2 "smart classrooms" with projector and computer access), main auditorium, two laboratories and two dormitories. The seventy-three instructors (27 level A; 42 level B and 4 level C) and 13 farm technicians, in animal science, crop science, veterinary medicine, business and agricultural cooperatives, are mostly graduates from Ethiopian universities or MATVETC itself. MATVETC offers training up to level IV in crop production, livestock production, horticulture production and marketing, natural resource management, animal health and cooperative production and marketing, in programmes lasting up to 30 months. MATVETC normally graduates about 300-400 persons per year – although some 400 are delayed in 2020 because of Covid-19. As with HPTC, MATVETC also offers short courses of 1-3 weeks for youths, women, farmers, according to identified needs. In the medium term, MATVETC aims to become a model agricultural polytechnic college and extend its curricula to level V.

Local collaboration and partnerships

Both HPTC and MATVETC collaborate extensively with local and international partners.

[164] Dean of Holeta Polytechnic College and Academic Vice-Dean of Maichew ATVET College, respectively.

[165] Dates are given using the Western calendar (not Ethiopian calendar).

MATVETC, for example, currently has collaborative agreements (MoUs) with about 45 stakeholders, including agribusiness companies and farms, universities, local government, NGOs and external agencies. Agribusinesses (such as Bokra Union, Valverde Food Processing PLC and Raya Beer), and private farms (such as Amaniel Horti-Farm, Simur Horti-farm, Desta Horti-Farm etc.), provide opportunities for student practical work and internships. Universities (such as Raya, Mekelle, and Adigrat Universities in Tigray Region) provide assistance in technical areas such as livestock and animal health and provide opportunities for MATVETC internships, as well as benefit themselves from use the MATVETC farm as a site for practical work by their own students, a seeds source for forage establishment and material support for land preparation. Twenty-three local governmental offices, such as Woreda (district) offices of Rural and Agricultural Development, Micro and Small Enterprise, Women's Affairs, Sport and Youth Affairs, etc., have their staff trained through short courses, and provide financing for students, as well as internships. All these partners benefit from being able to identify potential staff recruits from interns. As a general principle, MATVETC meets with such partners four times in a year, to evaluate the success of these MOU agreements and share feedback.

Similarly, HPTC collaborates closely with local private companies, government offices, the Holeta Research Centre and nearby universities such as Ambo. The College Vocational Guidance and Counseling Department undertakes training needs assessments, identifies opportunities for cooperative training with these partners, and organizes trainees' data. It facilitates a College-Industry Forum twice a year, chaired by the Holeta town Mayor who is also the Chairperson of the College Board. In addition, the Industry Advisory Board at HTPC discusses skills requirements with industry, trainers and other concerned bodies to identify gaps in existing occupational standards (OS) and report back to the Ethiopian Federal TVET Agency, which is responsible for establishing and review of OS at a national level. College instructors then develop curricula for these OS, with approval of the curricula being the responsibility of the College.

Externally supported projects

Projects with external financing have supported HTPC and MATVETC in terms of institutional development, infrastructure and equipment, capacity building of staff, etc. HTPC has benefitted especially from support from Netherlands Nuffic (NICHE ETH146, 2012-2017; and OKP-EAR104104, 2019-2021; OKP-ETH10019, 2019-2021), and currently from the World Bank (East Africa Skills for Transformation and Regional Integration Project – EASTRIP). MATVETC has been supported by the Canadian government through the Agricultural Transformation Through Stronger Vocational Education (ATTSVE, 2014-2019) Project. Both colleges have benefited from German (KFW) support to TVET in Ethiopia.

Collaboration with SNV and HortiLIFE

One collaboration involving both Colleges is that with the Horticultural Livelihoods, Innovation and Food safety in Ethiopia (Horti-LIFE) Project, financed by the Netherlands Government and implemented by SNV and Ministry of Agriculture working in partnership. The project, now in its second phase, aims to increase the involvement of some 100,000 smallholders in horticulture by improving productivity, food safety and diversity, access to market and service provision, and also improving horticultural education at vocational and graduate levels. Working in Amhara, Oromia, Tigray and the Southern Nations Nationalities

and Peoples regions, the project is partnering with 10 ATVETs in Ethiopia, as well as four universities, two research institutes and 60 commercial service providers.

Of particular benefit to HTPC and MATVETC are the opportunities for practical training that Horti-LIFE affords. Ethiopian TVET policy states that the TVET training should be 70% practical and 30% theoretical but, in reality, this emphasis on practice is difficult apply due to the shortage of resources and appropriate materials, the lack of improved technologies and the lack of technical training of instructors themselves. A key activity introduced by Horti-LIFE are "student plots" on the college farms, which replicate commercial production plots of the main horticultural crops, and which are integrated into both regular and short-term training. Home garden technology, which can be easily applied in smaller plots and by a range of household types, has also been introduced.

To facilitate the student plots, the project has donated improved seeds and fruit seedlings, infrastructure such as water tanks and drip irrigation, equipment including laptops, handbooks, PH meters, soil augers, chemicals and knapsack sprayers, fertilizers and pesticides, personal protective clothing and the necessary hand tools which are typically used by the private sector. The project has also provided technical training for instructors and general ideology for management staff. Horti-LIFE has also provided technical training and support to assist college instructors with the preparation of standardized student learning guides (also referred to as Teacher Trainer Learning Materials - TTLM) in English, which have now been translated into Amharic, Afan Oromo and Tigrinya, printed and circulated to 9 of the Colleges in the project to enable students to understand and learn more easily.

With the materials provided, trainers and trainees are able to actively practice all aspects from site selection to marketing of the products and calculation of costs and income generated. Students and instructors are also encouraged to consider the contribution that fruit and vegetable crops can make to farm income, household food security and dietary diversity. The student plots have also increased female participation in practical work, improved the confidence and general satisfaction of students who happily and freely discuss in their work in the field. Second year trainees share their experience and practical skills with first year trainees. All short training and regular training students trained in student plots are assessed by an external body in national assessment at the end of training, and the results of this show a remarkable improvement in the performance of the two colleges.

The student plots also serve as a means of sharing experience, demonstration and extension with farmers, small and medium enterprises, trainers and managers from other colleges, college Board members, NGOs and other projects (such as the Nuffic OKP project "Bright Future in Agriculture", JHPIEGO, etc.). The HortiLIFE project has enabled visits by trainees and trainees to local farms, horticultural enterprises and Farmer Field Schools implemented by the project. As a specific example of this type of outreach activity, trainers at HTPC are expected to serve farmers and small and medium enterprises (SMEs) during 4 hours per week, for which there is no fee and the College provides the transportation. This service is considered as part of the regular work of the trainer, who are attached to specific farmers and/or SMEs, giving service on technical skills and technology transfer, entrepreneurial skills, and KAIZEN[166] application. Trainers at HTPC have provided such services to SMEs such

[166] "KAIZEN" is a customer-oriented system of continual improvement of business activities and processes.

as *Riqichaa* and *Walqixummaa,* (organic vegetable producers), and their members of also visit HTPC to learn practice at the student plots. In MATVETC, students are temporarily attached to private farms (e.g. for 1-2-week periods), thus providing labour for the farms as well as gaining practical experience.

The approach has also been critical to developing entrepreneurial abilities of the trainees, the majority of whom are now expected to be self-employed after graduation, although many are still recruited as DAs. The income from sale of the products from the student plots and home gardens to surrounding communities and local markets goes to the Colleges and supports the Ethiopian Government TVET strategy of supplementing government budget through income generating activities.

Because the students have gained more hands-on skills through the student plots, they are more attractive as interns for local farms and companies where they can undergo cooperative training (usually for 2-month periods). The Horti-LIFE project has provided financial support for visits to farms and private agro-enterprises by instructors, extension instructors and management staff, giving them exposure to the real "world of work".

Farms and agro-enterprises have also got a chance to select experts with better skill and knowledge resulting from the time trainees spend as interns in cooperative training. MATVETC, for example, now has graduates in almost in all the horticulture farms in Raya Valley, but specifically in Desta and Amaniel Horticultural Farms, which now do not require to spend so much time on retraining graduates without the practical skills.

Summary

Through the Horti-LIFE project, collaboration with SNV has enabled HTPC and MATVET colleges to effectively implement the 70% practical TVET strategy of the Ethiopian government. As well as provision of crucial equipment used in the horticultural sector, it has strengthened the practical and teaching skills of college instructors, improved organizational standards and curricula in the sector, enabled the development of improved learning materials, improved the learning outcomes for ATVET students and greatly improved collaboration between the colleges and horticultural producers and SMEs. The private sector now sees value in collaboration with the college and in implementing collaborative learning programmes, gaining new technology and a better-skilled labour force with an improved work ethic. Students who have benefited from the new and more practical and participatory approach to training supported by Horti-LIFE have greater practical skill, confidence and ability to apply learning to the workplace. These students are more able to provide relevant advice for farmers, and/or have the motivation and skills base to become successful entrepreneurs.

Moving from theory-based to competency-based practice at Agricultural Colleges in Ghana

By Ishak Shaibu[167]

Overview

The government of Ghana, through the Pre-Tertiary Education Bill of 2019, is taking steps to migrate all TVET and ATVET institutions in the country to the Ministry of Education, and for these to be supervised and accredited by the Council for Technical Vocational Education and Training (COTVET), and to ensure that all TVET education is competency based – including agricultural TVET (ATVET).

The Nuffic OKP project 'Capacity Building of Four Agricultural Colleges' is designed to strengthen the four main Agricultural Colleges in Ghana: Kwadaso, Damongo, Ejura and Ohawu. Kwadaso is the lead Agricultural College for the project, which is also supported through collaboration with CINOP, Q-point and University of Applied Sciences (HAS) from the Netherlands, and Kwame Nkrumah University of Science and Technology (KNUST), Quente Africa and the University of Cape Coast (UCC), in Ghana.

Until now, the four Colleges have been affiliated to the University of Cape Coast and accredited by the National Accreditation Board (NAB) and required to meet UCC and NAB requirements, which are more "theory-based", rather than those of COTVET and a more "competency-based education and training" (CBET) approach. The project has resulted in the successful revision of the curriculum of the Diploma program from a more theory-based curriculum to a more gender sensitive, practical and competency-based education and training (CBET) curriculum that is changing the face of the agricultural colleges in Ghana. While these colleges are not yet running fully CBET programs, due to their UCC and NAB affiliation and standards, the steps taken in the revised curriculum (2019) represent an advance in this direction. The current programmes at the colleges can therefore be described as a 'blend' of CBET and the traditional theory-based education, while making efforts towards becoming fully CBET institutions.

CBET in Ghanaian ATVETs

By CBET, we mean here a system of training where capacities of the trainees are built to make them more competent and hands-on in their work. The CBET training puts the trainees at the center of the learning by giving them the freedom to pick and choose what they want to learn and how they want it done though supervision by CBET-accredited professionals and institutions. This helps ignite the creativity, inspiration and enthusiasm of the learners, because learning is seen as pleasurable and meets felt needs and career aspirations.

For example, in the Agribusiness, Entrepreneurship and Value Chain classes, learners choose the kind of task they would like to carry out for the semester, writing business plans to reflect their ideas and timelines for achieving their objectives. Tutors facilitate and support this process by assisting the students to achieve their learning objectives using best practices as described in the curriculum course outlines, objectives. Assessment is a blend of

[167] Kwadaso Agricultural College, Kumasi, and Coordinator, NICHE-GHA-270 Project.

written exams and practice assessments. This process makes a change from the previously dominant theory-based learning, where a strict course outline is developed with accompanying lecture notes and previously designated ("straight-jacket") assignments which students have to follow to pass a written exam.

Revision of the Diploma curriculum

To kick-start the revision of the Diploma curriculum, and also achieve the buy-in of the UCC as the affiliate university of the Diploma programs – which does not itself practice CBET - a number of CBET and gender sensitization workshops were organized for major stakeholders, to bring them up to speed on the nature and benefits of CBET. These stakeholders included staff of the UCC School of Agriculture, the Ministry of Food and Agriculture (MoFA), and the Colleges and Farm Institutes. UCC and the other stakeholders were actively involved in all subsequent curriculum development processes, including a labour market analysis leading to the determination of occupational standards, curriculum development, validation and module development. The outcome of the revised curriculum is a blended one as it still has certain elements of theory, blended with practical activities (towards CBET). This was necessary to meet the standards of both UCC and NAB whilst also aspiring gradually towards CBET.

Among the challenges encountered during this process were that COTVET played virtually no role in the process, except its participation in the validation exercise, due to the fact that the Colleges have not been weaned completely from NAB to COTVET yet. Again, as Colleges under NAB, efforts to involve COTVET in the processes but were not successful as they indicated that the approach adopted does not completely meet their CBET curriculum review standards. Another challenge was that most of the Colleges do not have the required facilities and systems in place for CBET education, and not even the entire investment component of the project is sufficient to address this challenge; additional efforts and support will be required.

In addition, the curriculum was not revised along value chains, as has been promoted by GIZ in other ATVET projects in Ghana and adopted by COTVET. The new Diploma curriculum is still a 'Diploma in General Agriculture' and hence more "generic" than one based on specific value chains, but with lots of built in practical, assignments and cases to make it more hands-on. From the labour market analysis conducted, the demand for graduates specialized in specific value chains is not yet well developed, and most prospective students prefer to pursue programme of a generic nature in order to increase their scope for opportunity across the employment spectrum. The value-chain oriented curricula also has the disadvantage that it does not create room for academic progression according to the national qualifications framework (NQF).

Building staff capacity in CBET

Through the collaboration with the OKP project, and using a blend of local and Dutch expertise from CINOP Global, Q-point and HAS, the capacities of staff at the colleges have been strengthened in areas such as gender mainstreaming in agricultural production, competency-based training and education, value chain development, entrepreneurship and business creation. Through collaboration with local universities such as KNUST, selected staff members from the ATVET colleges have been trained to MSc and PHD levels to meet

the requirements of the National Council for Tertiary Education in Ghana. While these universities do not use a CBET approach (but follow NAB regulations), staff in a Diploma awarding college are required to have an MSc as a minimum qualification. Therefore, in order to build the capacity of the staff in the CBET approach, the staff were encouraged to undergo practical internships in addition to participation in short term CBET workshops and trainings**.**

As a result of the curriculum revision and staff capacity strengthening, teaching and learning in the Colleges is now more practical and hands-on than before. One of the principles of CBET is to limit class size to enhance facilitation of practical lessons; however, with the current large class sizes (average of 150 students per class), the strategies adopted include division of the class into groups or mini-classes of 10 – 15 for practical lessons, with extra time in the revised curriculum for practical work and self-study.

Introducing entrepreneurship

The project has also turned the Colleges into an entrepreneurial centers, with support offered in terms of training and finance leading to establishment of on-campus income generating such as aquaculture, poultry and other agro-processing businesses. These income generating activities not only generate extra cash for the Colleges but also serve as sources of inspiration and practical training hubs for the students, as they are fully involved in all operations of these campus businesses. At Kwadaso Agricultural College for instance, the project has supported the College to raise 1,000 poultry layers, with the College collecting not less than 20 crates of eggs per day and generating a revenue equivalent to about 1,300 Euros per month. Additionally, a mini concrete pond with a capacity of some 1,000 catfish also generates income.

To make full use of the Home Science Department at Kwadaso, and also the staff that attended the Food Processing internship at CSIR/FRI, food processing equipment has been procured for the College, including juice extractors. The intention is to pay more attention to the agro-processing aspects of the value chain which is also important for curriculum implementation. To facilitate sales of these College-produced agro-products (eggs, fish, fruit juice and vegetables), the project has also funded the construction of a “Green Market” – a container shop located at the entrance to the College.

In all these enterprises, students are actively involved in production operations (feeding, medication, records keeping and other routine operations). Unfortunately, the agro-processing unit is yet to fully become operational due to closure of the schools as a result of the Covid-19 pandemic. When the Green Market is fully operational, a student committee will be established, with responsibility for processing and sales activities, under the supervision of a staff member.

Staff practical internships

To build staff capacity for practical activities, and to inspire them to embrace CBET concepts, the NICHE-GHA-270 project also assisted the staff at the Colleges to undertake industrial /practical internships (workplace experience learning). Placements have been arranged with public and private organizations such as private agro firms, the Council for Scientific and Industrial Research (CSIR), the Ministry of Food and Agriculture (MoFA) Veterinary Directorate and Topman Farms to enable staff to meet the practical demands of the revised Curriculum. These internship opportunities not only build practical skills of the tutors but

have also led to strengthening the relationships between the Colleges and industry, with mutual benefits of technology transfer and research innovations etc.

For example, two staff members from Kwadaso, one from Ejura, one from Ohawu and another from Damongo Agricultural College, respectively, underwent a one-month intensive practical training at CSIR Crops and Soil Research Institutes. During this period, the staff were not required to report to duty / work in the Colleges, but were taken through practical lessons including vegetables cultivation greenhouse management, laboratory practice, soil sampling and testing, field crop production and management protocols etc.

Similarly, two staff from Kwadaso, two from Ohawu and one each from Ejura and Damongo were also sent to CSIR – Food Research Institute for training in food and agro-processing. However, in this case the practical training was limited to one week due to the Covid-19 challenges. Even in one week however, the staff members were taken through food safety and handling protocols, and practiced processing and packaging of dried fruits and fruit juice production, pasteurization, bottling and labelling.

Two staff members from Damongo and one from Kwadaso Agricultural College respectively, were sent to Topman Farms, one of the major commercial poultry farms in Ghana. During 5 weeks of practice and lessons, they practiced artificial insemination of poultry birds, egg selection and sorting for hatchery and hatchery practices, brooding practices and management, etc. One of the beneficiary tutors, Mary Badu, stated “As a tutor, I have a learned a lot that I did not know to do in practice, so this time when I go back to my College I will be able to teach my students better by getting them to practice artificial insemination as I have learned here”. Another staff member (Tahiru Ibrahim), from Ejura Agricultural College, was sent to a private agricultural mechanization services provision centre at Atebubu to practice routine minor maintenance and operation of farm machinery and implements. Kumah Farms, an aquaculture farm was also identified for staff work experience, and negotiations are complete to make do this during the next semester break.

The College management were not left out, as Kwadaso had its administrator sent to Ghana Institute of Management and Public Administration (GIMPA) to undergo training in personnel and office management and best practices. A driver and a machine operator at Kwadaso were also sent to a private firm (Bethel Training and Consultancy Services) to undergo safe machinery operations and road safety training. These trainings are necessary as these personnel are technical and administrative staff who offer support services to the teaching staff in management of student groups and assignments.

Out of a total of 20 staff trained for internships and work experience, about 30% have been trained by the private sector, whereas 70% were located at public institutions. Private sector organizations usually prefer interns to be attached for a longer period than the 4-6 weeks normally proposed, and, in addition, the recent Covid-19 pandemic has resulted in a reluctance of private companies to take on more people when they are reducing their own labour force.

Apart from the administrator whose training was mainly administrative, all the other placements, including teaching and non-teaching (supporting staff), were trained technically. It is also important to mention that the staff were not financially compensated for participating in the training (beyond their normal salaries) but were supported in the training in terms of transportation cost, accommodation and contingencies. Training costs (fees) were also an issue particularly in the public sector, which is challenged to find

materials and consumables for trainee use due to budget constraints; the private sector firms are less concerned about payment for training.

The attachment of the staff to these firms was noted to have mutual benefits especially to the private firms. One manager at Topman Farms mentioned during a monitoring exercise that “they are not only learning from us; we are also learning so much from them. They sometimes give us the theory behind the practices we undertake, and we are very happy to have them”. They also indicated that it is their first-time to have teaching staff visit their companies to do internships.

These staff internships have opened the doors for increased collaboration, including short-term and long-term training of the industries concerned. As an example, MoUs providing internships for students as well as staff placements are currently being drafted between Kwadaso College and Topman farms, and with other organizations and firms such as Akate Farms, Asare Farms, MoFA, Cocobod, although the process is often slower than anticipated. Efforts are being made with other companies such as Blue Skies (a fruit processing company) are also being pursued to establish collaborative activities.

Developing a competence-based curriculum at the Dairy Training Institute, Kenya

By Samuel Kamau[168]

The Dairy Training Institute

The Dairy Training Institute (DTI) is a public technical and vocational education and training (TVET) institution located in Nakuru County, Kenya. The Institute was established in 1963 as a centre of excellence in training dairy industry stakeholders on all aspects of the dairy value chain. The target group at inception was the rural dairy managers, dairy cooperatives management committees, plant operators, dairy farmers and entrepreneurs.

The Institute is under the State Department of Livestock in the Ministry of Agriculture, Livestock and Fisheries (MoALF), Department of Livestock Production, which finances recurrent and development budgets. Enrolled students pay fees to meet expenses such as medical, insurance, attachments, etc. Additional support comes from occasional projects funded by government and development partners on areas of mutual benefit. The ministry has a strategic plan to strengthen the institutional capacity of DTI by converting it to a semi-autonomous government agency (SAGA), once the necessary policies and legal matters are finalized. This will devolve functions and human resources, hasten decision making and improve efficiency.

The DTI has forty trainers qualified at diploma to Masters levels in dairy technology, animal production, veterinary science, and agricultural economics and extension. Many of these have undergone professional skills upgrading courses lasting from one week to six weeks in topics such as: training of trainers, senior management, strategic leadership development, curriculum development and assessment, and soft skills development. The institute sits on 1,300 acres of land, including 33 acres of buildings comprising office blocks, classrooms, conference room and accommodation, student hostels, dining hall, library, laboratories, and dairy plant. Animals on the farm include dairy cattle, goats and camels, and pigs are being introduced.

Activities

Presently, the institution has 230 residential students, 90% of whom are high school leavers yet to be employed (pre-service). Eighty-two students are pursuing a two-year diploma programme in Dairy Production and Processing (DPP), 88 a one-year certificate programme in Dairy Technology and Management (DTM) and 60 the one-year Dairy Production and Management (DPM) course.

The dairy farm and plant allow for demonstration of technologies and practical work by students, organized in small groups. Additionally, students carry out projects in groups, while each student has to undertake eight (8) weeks industrial/ field attachment at a relevant site, during which they are assigned supervisors and keep logbooks as a proof of their participation, with visits from trainers at scheduled times.

The training calendar, examinations and certification are currently overseen by an examination board comprising of representatives of the ministry, the state department of

[168]Dairy Training Institute, Naivasha, Kenya

livestock and other stakeholders, with the institute principal as the secretary. The institute is in the process of adopting assessment and certification through guidelines of the TVET Authority (TVETA) already in place.

Egerton University and the animal health and industry training institutes (AHITIs) in Kabete, Ndomba, Nyahururu that are also currently TVET institutions in the department of livestock, provide quality control of DTI training programmes, through benchmarking and examination moderation. They also provide inputs and reviews during curriculum development. Egerton University offers training opportunities and capacity building to DTI staff in specialized areas through Masters and Bachelor programmes as well as short tailor-made courses. In return, DTI supports these institutions through review of their curricula, offering attachment opportunities and participating in collaborative research. A few DTI graduates also get employment and further training opportunities from these institutions. The bulk of the graduates (> 75%) are however employed by the dairy industry, while 10% are estimated to become self-employed.

The DTI also offers technical support to government programmes, especially through training of end users or through training of extension staff offering such trainings. In 2019, over 400 dairy actors were trained across the country in tailor-made short course modules in collaboration with partners. Other activities include business development and consultancies for dairy stakeholders, outreach services, collaborative research and dissemination, dairy processing and product development for training purposes as well as farm operations.

Curriculum development

Over recent years, the DTI has partnered with NUFFIC, FAO, SNV and GIZ among other development partners, receiving support in staff training, infrastructure development and curriculum development and general institutional capacity building.

Of particular importance for the DTI has been the collaboration with the Comprehensive Africa Agriculture Development Programme/ Agricultural Technical and Vocational Education and Training (CAADP/ATVET) programme, sponsored by the German Development Cooperation (GIZ).This project aimed to bridge the gap between the trainings and the skills needed in the industry through development of a competency-based education and training (CBET) curriculum and training of trainers. In Kenya; dairy, aquaculture and horticulture were identified as priority sectors for support, and the DTI joined the programme in 2014.At that time, the DTI had developed its strategic plan (2012-2017) and had identified programme diversification and expansion of training programmes as strategic objectives. The DTI thus had plans to:

- Carry out a labour needs assessment (LNA) for the dairy industry;
- Review existing curricula;
- Launch diploma programs;
- Develop new courses;
- Develop new training delivery methods in line with new technology

At that time, the DTI also benefitted from the Nuffic NICHE project: “Build capacity to deliver competent graduates for enhanced competitiveness in the dairy value chain”

(NICHE-KEN-127-139; 2012-2016). This project had conducted induction training on CBET curriculum to DTI and Egerton University staff. A labour needs assessment (LNA) for the dairy industry had also been carried out by SNV through PKF Consulting under the same programme. What remained to be done was to define occupational standards (OS) and the curriculum, so the CAADP/ATVET programme could not have come at a better time.

The CAADP/ATVET programme offered the opportunity for the DTI to align a national dairy curriculum with the Kenya TVET act of 2013, which had identified the importance of CBET curricula for vocational training in the country. Until this point, the DTI was implementing a more conventional certificate curriculum that placed the trainer at the heart of learning, and (theoretical) examinations as the means of evaluation. This resulted in graduates who were subject specialists who lacked working skills. In contrast, the CBET learning process is student centered, competence based and task oriented, which meant that our graduates would be better prepared to undertake duties and tasks related to their training as they would have hands on exposure during training. The assessment would also be based on mastery of professional competency. Additionally, there was the opportunity for the dairy industry to participate in the process of curriculum development.

At the time DTI had two certificate programmes: one lasting for two years covering aspects of production and processing, and another lasting one year concentrating on processing. The labour needs assessment report showed that there was demand for three categories of workers: dairy farm worker, dairy plant worker and one who could supervise the two cadres. To ensure this was captured in the developed curricula, and also as a requirement of the TVET, Curriculum, Development, Assessment and Certification Council (CDACC), the DTI together with local consultants of the CAADP/ATVET programme identified credible and knowledgeable individuals working across the Kenyan dairy private sector industry to be part of the team driving curriculum development process. These individuals formed the Dairy Sector Skills Advisory Council (DSSAC). Individuals holding working positions were also included in the team as dairy expert workers as well as DTI trainers and curriculum experts from CDACC. In the curriculum development process, the role of the DSSAC was therefore advisory, the design was the responsibility of the CDACC and the detailed content by trainers and experts.

Steps in curriculum development

The first step after the assembly of the curriculum development team was to draw a DACUM (developing a curriculum) chart that comprised of occupational/jobs analysis resulting to jobs profiles, duties and corresponding tasks.

The second step was to come up with occupational standards (OS) which described the standards of performance that the identified and profiled jobs are expected to achieve in their work, and the knowledge and skills they need to perform effectively.

The third step was to draw the curriculum to meet the OS. The curriculum identified the knowledge, skills and attitudes required which was organized into learning outcomes, content and suggested assessment methods. Suggested methods of delivery and recommended resources were also included. In this way, the curricula for dairy farm manager and dairy plant manager for levels 3-6 (artisan, craft and diploma) were developed.

The fourth step was piloting the developed curricula. A total of four modules from the CBET modular curriculum were piloted in training of progressive small and medium scale farmers

(having 3- 20 dairy animals) and dairy processing operators. These were selected from groups willing to work with the DTI on curriculum development and their feedback was incorporated in the curricula. In total, 15 farmers were trained on pasture and fodder production and conservation, 15 on feed formulation, 15 dairy operators were trained on quality control and assurance of milk and milk products, and another 15 trained on fermented milk production.

The final step of the process was a validation workshop in 2016 for validation of the curricula by stakeholders - over 100 individuals drawn from both public and private sectors. The public institutions represented include TVET institutions, universities, TVETA, Kenya agriculture and livestock research organizations, and the state livestock department. The private sector was represented by dairy farmers and farmer organizations, feed manufacturers, dairy equipment suppliers and dairy processors among others. Also in attendance were international NGOs such as GIZ and SNV. Thereafter the curricula were published by CDACC as the national dairy curricula. These are accessible by individuals and organizations wishing to conduct dairy training, after payment of requisite fees and approvals by CDACC. Currently Baraka Agriculture College, a private TVET institute is offering the dairy farm management course at level 5 and 6. Individuals and organizations may also request for reviews to make them more relevant or meet emerging needs. This year, the Micro Enterprise Support Programme Trust (MESPT) sponsored a review of the curricula to incorporate food safety issues.

To effectively implement the developed CBET curricula, learning guides for level 3 (Craft) to level 6 (Diploma) were developed for both Dairy Farm Manager and Dairy Plant Manager. Learning guides provide training content and also guide the learners and trainers on the learning process aimed at imparting the relevant knowledge, requisite skills and the right attitude. The guide shows the learning outcome, the competences and duration of learning.

In line with the DTI mandate, dairy farm manager and dairy plant manager curricula were adopted and offered at certificate level as Dairy Technology and Management (DTM) and Dairy Production and Management (DPM) lasting one year, and a combination of the two offered at diploma level as Dairy Production and Processing (DPP) lasting two years. This is to meet the demand for competent frontline dairy workers for the Kenyan dairy industry. Craft level curricula are also offered as short course modules to train dairy farmers and dairy plant operators across the country to fill specific skill gaps. The full adoption of the curricula including assessment is hampered by inadequate resources and policies yet to be aligned. For example, the government policy of increasing enrolment means more resources are needed, as the current funding levels are insufficient to fully implement hands-on training and assessments. The retooling of trainers, necessary to add skills and change attitudes, is also yet to happen.

The CAADP/ATVET programme ensured that the DTI remained in on the right track even after its exit in 2017. The programme provided linkages with stakeholders by fostering working relations with other training institutions in the agricultural sector, dairy private practitioners, affiliated projects and TVET regulatory authorities. As a result, the DTI was among the first institutions to request TVETA for assessment and eventual registration, in compliance with TVET act. In 2018, CDACC engaged the DTI to assist in development of national poultry curriculum, owing to skills gained by its staff.

To date the CAADP/ATVET programme together with affiliated programmes and partners have sponsored a number of activities that have enhanced the Institute's capacity to deliver on its mandate of training in the Kenyan dairy sector. A number of teaching staff have been sponsored to undertake trainings on training of trainers (ToT), CBET curriculum development, CBET curriculum assessment, value chain development, soft skills development, as well as other mandatory career promotional courses.

DTI has also received support from the GIZ food safety programme in the development of the DTI Strategic Plan 2020-2024, with the main themes being enhanced training capacity through development of physical infrastructure and upgraded operational facilities and equipment for efficient and effective service delivery among others. The challenge here remains resource mobilization. The DTI gender policy is currently under review and is aimed at further mainstreaming gender at all levels of operations covering staff and students.

Lessons learned in curriculum development

From the process described above, we can make the following conclusions:

- The industry players/stakeholders are willing to be part of curriculum development process and are able to participate and offer insights;
- The dairy industry is interested in a curriculum that addresses specific knowledge, skills and attitude applicable to duties and tasks for the job;
- The traditional (old) curriculum was mainly knowledge based packaged in subjects that had little emphasis on transfer of competencies;
- Conflicts can arise between different stakeholders as a result of areas of interest and scales of operation, hence the need for harmonization of ideas to ensure all are covered;
- Trainers participating in curriculum development borrow from what they already know. This was a challenge and it took time to change mind sets. Training in this area should come first;
- A curriculum to meet occupational standards is a challenge with limited resources at the institute and a fast-changing industry. Industry links, to participate in availing a real learning environment, are therefore critical;
- Working with others has helped the institute develop its capacity faster and stay in touch with the realities of the industry, leading to more relevant service delivery.

The Latia Resource Foundation – combining non-profit and for profit ATVET activities

By: Ann Macharia and Mary Mwaura[169]

Latia Organization

The Latia Resource Centre Foundation (LRC) was originally set up as a project in 2008[170] and was registered as a Kenyan Social Enterprise in 2011. It was established to provide training and business support services to farmers, pastoralists and agribusinesses in Africa. In 2016, LRC registered the Latia Agripreneurship Institute (LAI) to provide apprenticeship training to the youth, and to offer appropriate technology and mentorship to farmers, pastoralists and agribusinesses with the aim to help them to produce healthy crops and livestock and to apply sustainable agriculture practices.

In 2016, Latia also formed a new for-profit subsidiary company to allow an expansion of its programs that target commercial activities. The new company, named Latia Agribusiness Solutions (LAS), started in April 2017 and took over the commercial activities that includes the running of LAI. The LRC Foundation fundraises and manages projects, with LAS as the implementing partner. The non-profit LRC and for-profit LAS have project-specific implementation agreements that focus on their common areas

The Latia Resource Centre Foundation

The not-for-profit LRC Foundation has the ambition to become an African Hub for the preparation, exchange and dissemination of knowledge, skills and information drawn from practice and research, and to forge linkages between stakeholders in the agricultural sector. To achieve this ambition, the LRC Foundation has identified 3 strategic goals for the coming 5 years: 1) improving access of farmers to high quality ATVET and extension services; 2) optimizing value chains to impact positively on farmer's income; and 3) promoting the adoption of climate smart agricultural solutions that contribute to increased agricultural production.

The LRC Foundation seeks to achieve these goals through research (assessments), training and training support, and facilitation of multi-stakeholder partnerships along priority value chains, testing and demonstrations of new and improved practices, consultancies and provision of advisory services.

Based on its experiences during the last 10 years, the LRC Foundation develops and promotes innovative new models of competence-based e-learning in ATVET and implementing these with agricultural training institutions, as well as provision of extension services for young African farmers. To reach higher numbers of farmers the Foundation will seek resources to strengthen its emphasis on digital learning, develop digital training modules and set up a digital information platform that includes the provision of information

[169] Latia Agripreneurship Institute and LRC Foundation, respectively.

[170] Originally established as "Latia Resource Centre" it was later renamed as the "Latia Resource Centre Foundation", while retaining its non-profit status.

on service providers and markets, and access to technical briefs and discussion fora. Digital learning will be linked with competence-based education models practiced at LAI.

The Foundation also contributes to improving the learning environment (infrastructure, training materials, equipment's, etc.) of selected ATVET Colleges (currently LAI and in the future will target both public and private ATVETs) and training farms and strengthen their institutional and management capacity to deliver relevant quality ATVET and extension services. The LRC Foundation will forge new partnerships with 3 – 5 new or existing ATVET providers in the future to develop their capacity in delivering agricultural training. Finally, the Foundation will put a special emphasis on setting up a system for the professional development of ATVET teachers and extension officers. This will be a training course for ATVET instructors and will be covering pedagogy and technical training in agriculture (horticulture producer and nursery producer) for one year. LRC will fundraise, pilot the course as a grant and LAI will take over and run it on a commercial basis.

Latia Agribusiness Solutions (LAS)

Latia Agribusiness Solutions (LAS) is a private social enterprise, registered as a middle level private institution within the private sector landscape. The vision of LAS is to become a center of excellence in offering agribusiness solutions in Africa, and its mission is to empower agribusinesses through quality training and consultancy services for sustainable economic development.

LAS is an incubation services provider, helping unlock the potential of small and medium sized farms and agribusinesses. The services are provided through a business model offering "a one stop shop", where Agripreneurs can find all they need to make their enterprises thrive. The incubation services were developed after the implementation of the Telephone Farmer's Project where LAS developed a business model to support farmers achieve set goals as "incubatees".

LAS also has a robust agricultural consultancy unit that provides professional agribusiness advisory and support services to value chain actors, including small-scale farmers as well as well-organized commercial agribusiness firms. Small-scale farmers mostly access the services through bottom of the pyramid projects by LRC (development partner), while medium- and large-scale farmers pay for the services, either directly or via projects with external development partners. These services include the development of out-grower schemes (business and operating plans), the supply of skilled manpower at technical and management levels, training of farmers and provision of extension services, and assistance in certification to standards and legal requirements.

Having grown exponentially and expanded activities in all its business units, a disadvantage has been a silo effect emerging amongst its business units. We are currently working towards creating synergies among business units to increase efficiencies and avoid duplication.

Latia Agripreneurship Institute

The Latia Agripreneurship Institute (LAI) was established in 2016 as a private TVET College owned by Latia Agribusiness Solutions Limited. It is governed by the LAS Board of Directors and financed from student fees. The institute is situated in a 60-acre practical farm in Isinya Kajiado County, Kenya. Every year 300-400 graduate from the different courses offered. LAI

has classrooms, library, laboratory and a model farm where the apprentices carry out practical exercises. Latia has 8 trainers and 3 technical staff who are accredited by TVETA.

In 2017, the Latia Agripreneurship Institute was officially accredited by TVETA and The National Industrial Training Authority (NITA) to offer TVET and practical trainings in the agriculture sector. LAI now offers TVETA approved, training courses at levels 3-6 in Horticulture Production, Horticulture Nursery Management, and Agripreneurship courses at levels 3-6 (3 months, 6 months, 1- and 2-years duration, respectively for all the levels), using curriculum developed together with CDACC that suits the labour market needs. The curriculum helps to achieve our goals as a training institution of offering hand on or practical skills as per the labour market needs. The minimum entry requirement for these level 3 TVETA-approved courses is the Kenya Certificate of Primary Education (KCPE).

In addition, LAI is a competency-based education and training (CBET) assessment center, approved and licensed by the TVET Authority of Kenya (TVETA) to assess its students. The trainees pay the TVETA assessment fee through LAI for the assessment and they receive government certificates. It is LAI that does the assessment and other ATVET institutions bring their trainees for assessment at LAI. LAI receives a percentage of the assessment fee and the rest goes to TVETA.

Other short courses are designed and modeled to suit the client needs and approved by The National industrial training Authority (NITA). Its mandate is to promote the highest standards in the quality and efficiency of Industrial Training in Kenya and ensure an adequate supply of properly trained manpower at all levels in the industry. For these short, NITA-approved courses anyone who can read and write can apply. The core criteria for selection is a passion for agribusiness, and the ability and readiness to either invest in one's own farm or gain meaningful employment in the industry. NITA works on short courses such as piggery, poultry etc. while TVETA long term courses that are more rigorous are linked to the Agricultural Apprenticeship Programme.

LAI uses an apprenticeship model, a model of training where one learns mainly through work. An experienced trainer guides a trainee on their projects that are assessed at the end of their training as part of the assessments. The trainer also acts as a coach and mentor. Under this model the apprentice undergoes a programme including 30% theory and 70% practical, the practical component including training at Latia farm and also including an industrial attachment in Horticulture farms for all levels for a duration of 1- 2 months, depending on the qualification. This on-the-job training for the trainees at various commercial farms allows the trainees to experience work outside of LAS. The attachments take place in commercial farms, and in both public and the private sectors. The LAI trainers assess the student while on attachment, and they are also provided with a monitoring tool to be guided by the mentors while in attachment. All apprentices attend such an internship program which helps them to have on-the-job training before employment placement or being mentored to go into self-employment. As a CBET model, the graduate profile is a farm manager, a farm technician or operator with the necessary knowledge, skills and attitude to run a profitable farm enterprise or successfully operate a specific role in an agribusiness company.

LAI collaboration with other organizations

LAI has benefitted from a range of support from external agencies. These include:

- Netherlands Nuffic support under the NICHE programme (2014-2018) from Maastricht School of Management, Wageningen University Research from the Netherlands, and the Dairy Training Institute in Kenya (NICHE), and support from the OKP programme (2019-2021) to enable Latia to develop horticultural training with Bukura Agricultural College;
- Netherlands Embassy programmes, under the Agricultural Entrepreneurship Incubation Project (2016 to 2018), in collaboration with Maastricht School of Management, under which 67 commercial farmers were reached directly, and over 100 indirectly;
- The Netherlands supported HortIMPACT project (2017 to 2018) under which LAI trained over 600 farmers across the country on greenhouse farming technology as an aspect of conservation agriculture;
- BMZ with Welthungerhilfe (2019-2023) to enable training of 300 youth under the BMZ Global program 'Skill Up' project;
- Koppert Biological Systems is the world leader in the development and supply of biological crop protection solutions. Koppert leads the way in the development and provision of an integrated system of specialist knowledge and natural, safe solutions that improves crop health, resilience and production.
- Koppert's presence in the ecosystem greatly supports Latia's ambition of improving availability of healthy and affordable food in the market.
- KCB Foundation, in the implementation of the Young to Young African Works project in 2019-2020, under which 74 farm managers have been trained to in greenhouse management, and a pilot farm management ICT system has been developed for use in hydroponic greenhouses.
- Faraja Trust and GIZ programs, under which CBET training materials have been developed, trainers trained, and training programmes implemented for producers and value chain actors in Western Kenya.

Advantages of LAI as private ATVET

LAI places emphasis on soft skills, and it is mandatory that students are exposed to agripreneurship, life skills, and career guidance to address the skills gaps faced by young people seeking to engage in agriculture. Collaboration with farmers and the private sector helps LAS and LAI to arrange trainee internships for this practical experience. We also offer opportunities for graduates from different universities and colleges in Kenya to gain hands on/competence-based practical skills in crop and animal production.

Engagement with the private sector also helps LAI understand the labour market demand, and hence tailor our training to meet the need of the sector. We work with communities, conduct farmer field days and farmer field schools on crop and animal production. At LAI, farmers have access to high quality training on various value chains through our National Industrial Training Authority (NITA) courses on quality certification, poultry production, pig farming, dairy farming, modern greenhouse technology, etc. Over the years, we have trained over 5,000 commercial farms, equipped over 500 farm managers and conducted over 200 incubation programs to farms.

It is easier as a private ATVET to work with other partners as there is less bureaucracy and decisions are made faster. We are more adaptive to the current labour market needs as we have to meet our client's needs and ensure our graduates can compete in the labour markets. As a for-profit ATVET, it also helps us to easily engage with other for profit enterprises and as well adjust our fees to meet our operational costs to avoid losses. Having both NITA and TVETA courses assists in navigating labour market needs. TVETA curricula cannot be changed and any new changes are adopted in NITA courses which ensures we are up to date with what the market needs. The accreditation process with TVETA is a long process (2 years). LAI leverages this through support from development partners (LRC) by developing new updated short courses addressing current market needs.

ATVETs under a university umbrella: The Division of Agricultural Colleges at Ahmadu Bello University, Nigeria

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History

The history of the Colleges of Agriculture that make up the present-day Division of Agricultural Colleges of Ahmadu Bello University dates back to 1921, when the British Cotton Growers Association (BCGA) started an inservice training centre at Maigana, on the outskirts of Zaria, in the then Zaria Province, to modernize traditional practices of cotton growing and introduce the concepts of commercial agriculture. It became a formal school in 1928 under the responsibilities of the Federal Department of Agriculture and it was moved from Maigana to the present soil survey laboratory in Samaru. The first students undertaking formal training admitted in 1931 were sponsored by their various Native Authorities and Northern Regional Government becoming Agricultural Assistants on graduation in 1932. This Centre later metamorphosed into the Samaru School of Agriculture, which later became the present Samaru College of Agriculture (SCA), with the primary objective of training middle-level manpower for agricultural development in Nigeria.

In 1951, the Livestock Services Training Centre, Mando Road, Kaduna, was established to train livestock personnel, later becoming the College of Agriculture and Animal Science (CAAS). In 1964, a third School was established with the assistance of the US Government at Kabba, in Kabba Province, to cater specifically for horticulture and the needs of riverine agriculture in Northern Nigeria. This later became the Kabba College of Agriculture (KCA).

After independence in 1960, the regional authority was dissolved in 1966 and the states created. The schools of Agriculture and Ahmadu Bello University (ABU) were assets of the Northern Regional Government that could not be shared by the newly created states and were therefore transferred to be managed by the Interim Common Services Agency (ICSA). With the dissolution of ICSA, these schools were then transferred to ABU in 1968 as part of the Institute for Agricultural Research (IAR). To manage these colleges, an autonomous unit called the Division of Agriculture and Livestock Services Training (DALST) was established in 1971. A fourth school was founded in 1972 at Bakura with the assistance of the Dutch government. This fourth school was to take care of the need for technical staff with expertise in irrigation agronomy as a result of the prevailing draught experienced in the Northern States at the time, although this school closed in 1994 due to insufficient funding from the Federal Government.

The DALST was later renamed as "Division of Agricultural Colleges" (DAC) and referred to as “The Division” in 1977. The Division with its Colleges was gazetted as a national middle-level manpower training institute with its own Board of Governors and Academic Board but still as an academic division of ABU established by Statute 16 of ABU laws. When ABU could not

[171] Division of Agricultural Colleges, P.M.B. 1082, Zaria, Kaduna State, Nigeria.

[172] Samaru Collge of Agriculture, P.M.B. 1058, Zaria, Kaduna State, Nigeria.

[173] College of Agriculture and Animal Science, P.M.B. 2134 Kaduna, Kaduna State, Nigeria.

[174] Kabba College of Agriculture, P.M.B. 205, Kabba, Kogi State, Nigeria.

sustain funding of the Colleges, DAC became autonomous under the National Universities Commission (NUC) as an Inter University Centre. Thus the DAC is considered as an academic division of ABU although funded by Federal Government of Nigeria through NUC as an Inter University Centre (IUC) of the NUC. The Division is not the only IUC under NUC. However, because the Colleges of DAC offer National Diploma and Higher National Diploma programmes, these are not regulated and accredited by NUC, but by the National Board for Technical Education (NBTE).

The DAC as part of the "Agricultural and Veterinary Complex" of ABU

The primary function of the DAC as an academic division is to coordinate the academic activities of the Colleges. The (DAC) is an integral part of the "Agricultural and Veterinary Complex" in Ahmadu Bello University, Zaria, which also includes the Institute for Agricultural Research (IAR), the National Animal Production and Research Institute (NAPRI), the National Agricultural Extension and Research Liaison Services (NAERLS), the Faculty of Agriculture (FOA), the Faculty of Veterinary Medicine (FVM) and the Veterinary Teaching Hospital (VTH). The integration of these seven units is believed to offer opportunities for collaboration and technological development, ease of administration, lower investment costs, more influence over policy development, by bringing together key players along the value chain (researchers, extension agents, farmers, students, policy makers and the private sector).

Although each member of the complex has its own mandate, their collective mandate includes mediating within the regional structures in cooperation with Ministries of Agriculture, Agricultural Research Council of Nigeria (ARCN), agricultural stations within and outside the country aimed at facilitating the training of scientists, academics, agriculture and veterinary officers. At the same time, the complex undertakes and implements research programmes under close supervision and collaboration with universities, private, national and international donor agencies. Of the units within the complex, DAC, FOA, FVM and VTH are under the Federal Ministry of Education coordinated by the NUC, while NAPRI, NAERLS and IAR are under the Federal Ministry of Agriculture and coordinated by the ARCN.

The DAC has its Headquarters at Zaria, headed by a Director, while each of the Colleges is headed by a Provost. A Board of Governors chaired by the Vice Chancellor of ABU, formulates policy and guidelines which are implemented by the management of the Division, while a Professional and Academic Board chaired by the Division's Director is in charge of supervising the professional and academic activities in the Division.

The integration with ABU gives the Colleges in the DAC the advantage of having joint teaching and administrative staff, access to laboratories, farms and library. The technologists and technicians of other units in Agric/Vet Complex are often trained by the Colleges. Students of the Colleges undergo four months industrial training on requisite practical and technical skills at these institutes under the SIWES (Students Industrial Work Experience Scheme) funded by the Industrial Training Fund (ITF). Most of the academic staff domiciled in DAC are trained for higher degrees at FOA, FVM and other faculties of ABU.

The Provosts of the three Colleges meet quarterly to present reports on activities to the DAC management. Facilities are shared when necessary among the Colleges. A sports competition between the Colleges, tagged the Director's Cup, rotates between the Colleges and provides a means of social interaction.

Programmes and training activities

The DAC Colleges have the mandate of training middle-level manpower in various fields of agriculture. The Colleges run certificate courses, pre-national diploma (Pre-ND) and various courses in agriculture at both National Diploma (ND) and Higher National Diploma (HND) levels. Curriculum standards are set and regulated by the National Board for Technical Education (NBTE).

Admission of students is coordinated by a Joint Admissions and Matriculation Board (JAMB) along with other tertiary institutions in Nigeria and requirements for admission to the Colleges are the same. Matriculation ceremonies are conducted independently but convocation ceremonies are combined for the Colleges while the venue is rotated.

The curriculum being used at the three Colleges is monitored by the Ahmadu Bello University (ABU) Quality Assurance Committee (QAC). This curriculum accredited by the NBTE places emphasis on the conduct of practicals, it is tailored towards self reliance and employment generation. The DAC has a QAC that has representatives from individual Colleges who serve as a link between ABU QAC and College QAC. The Quality Assurance Committee of each College understands the peculiarity and ensures that practicals are conducted by adequately trained technologists, while the academic staff give the theoretical background.

The combined farms of the Colleges spans over 100ha of land, providing staff and students the opportunity to learn new technologies in agricultural practice. The livestock section of SCA has over 70 heads of cattle, 50 goats and 50 sheep, as well as layers, broilers, rabbits, pigs and fish. The rearing of these animals is mandatory for NBTE accredidation. All these animals are used for teaching, research and production. An engineering workshop at SCA allows fabrication and maintenance of machinery. A veterinary hospital at CAAS is being operated to cater for the neighbourhood while a 5 hectare pasture was recently established in CAAS. The KCA college manages five research farms to provide research education and knowledge linked primarily to its research programmes.

Extension and training programmes

The Colleges also organize tailor-made trainings and advisory services, both locally for neighbouring farmers and for nationally important development programmes. For example, SCA has organised tailor made trainings for Zamfara State Youth Empowerment Programme in Agriculture (150 participants), Kaduna State Women and Youth Empowerment Training on Aquaculture (334 participants) and extension agents from 36 states of Nigeria. Farmers from Bauchi and Kaduna states were trained on agricultural value chains, good agricultural practices and contract farming, in collaboration with various development programmes. These tailor-made practical trainings use a "competency-based training" (CBT) approach, emphasizing the specific skills required by the trainees. At the end of the training, guides for crop production, animal production, and pesticide application have been developed by SCA.

KCA has also collaborated with key national development programmes. Under the National Fadama III Programme on the Graduate Unemployed Youth and Women Support (GUYS) project in 2017, 300 beneficiaries were trained on improved and sustainable rice, yam, cassava, maize, and livestock production. Under the Agro-Processing, Productivity Enhancement and, Livelihood Improvement Support (APPEALS) Project, supported by the World Bank, Federal Ministry of Agriculture and Kogi State Government, 1,200 people were

trained during 2019 on sustainable agricultural production, processing, business development and marketing. After these trainings, participants were able to develop business plans to apply for startup funds.

A major challenge for these various short courses training (at e.g. KCA) is the limited facilities to cater for large numbers of trainees at once. However, the College trains in batches and uses facilities of nearby private farms to solve the inadequacies. The College partnered with Kogi State Government to establish cashew plantations and its value chains and Nigerian Institute of Horticulture (NIHORT) to develop improved seedlings of various horticultural crops and research collaborations.

In general, the Colleges provide advisory services to many farmers. An active network of alumni has made it possible to maintain close relationships with various agricultural agencies.

Linkages with international agencies

From 2013 till date, SCA has worked with Winrock International (USAID sponsored NGO) through Volunteer Technical Assistance (VTA) programme of the Farmer-to-Farmer Programme for Agricultural Education and Training (F2F for AET)/Nigeria. From this collaboration, SCA academic staff and technologists have benefited immensely in capacity building on programme development and planning; building pedagogical skills; agricultural leadership and communication; grant proposal writing and beekeeping. Also, SCA has collaborated with the German Agency for International Cooperation (GIZ), with staff of SCA being trained as trainers by and for GIZ in contract farming and good agricultural practices for maize. Such programmes develop staff capacity and provide some income for the Colleges, as well as increasing farmer productivity and income. SCA has now proposed the inclusion of contract farming in the NBTE curriculum.

SCA also collaborates with many private agro-allied companies, including Premier Seeds, Sun Seed, Saro Agro-sciences, African Agro, East-West Seeds and Indorama fertilizer. The College provides training for staff of these companies, and the companies provide internships for students and provide job opportunities for diploma graduates. Some of these companies also provide the post-diploma, 1-year industrial training which is mandatory in Nigeria. These collaborations further resulted in technology development through establishment of research for these companies in addition to providing advisory services to them.

In 2020, East-West Seeds established a learning site at SCA where technologies for the production of cucumber, tomato, pepper and cabbage were showcased. The learning site, beside a main trunk road, provides maximum visibility to the public as well as opportunities for learning by staff and students. Field days allow exposure of East-West products to neighbouring communities.

CAAS has in the past collaborated with several international and national organisations such as: Overseas Technical Trainers Award (OTTA) U.K in 1994; the Songhai Centre for Excellent Entrepreneurship Studies and Farming, Portnovo, Benin Republic in 2007; the Centre for Animal Disease Control Unit, Cuba; the Avian Artificial Insemination Unit (IVM) organization, France; Spartsholt College, U.K; University of Wolverhampton, U.K; Nigeria National Petroleum Cooperation Nigeria (NNPC), Central Bank of Nigeria (CBN), Red Cross Nigeria, Youth Empowerment Scheme, Military Retirees Formation, Lagos; Industrial Training Fund

(ITF), among others. Cooperation with these institutes has provided College staff the opportunity to learn innovative techniques in animal health and production technology, diagnosis and treatment of diseases, artificial insemination in poultry and sperm collection from cocks.

Advantages and disadvantages of the DAC model

The DAC model and its association with Ahmadu Bello University has advantages and disadvantages.

Advantages include:

- **Staff employment conditions.** Academic and non-academic staff at the DAC colleges enjoy equal rights, privileges and responsibilities with those of Ahmadu Bello University. Academic staff in the DAC enjoy the same promotion criteria and same salary structure as their colleagues in the faculties, which is significantly higher than that in other colleges of agriculture in Nigeria.
- **Staff mobility.** Staff can easily transfer within faculties and be accepted in other universities as visiting lecturers as well as on sabbatical. Academic staff in DAC can rise to Professorial level. There is a pool of staff in other faculties and institutes from which specialists can be drawn when needed.
- **Staff development.** Due to the fact that staff members domiciled in the Colleges are subjected to the same conditions of service as those in the faculties, the staff of the colleges are encouraged to develop themselves and their qualifications are enhanced. Academic staff at DAC Colleges are trained free of charge at the various faculties in ABU.
- **Branding and image.** As components of the University, the popularity of the colleges is increased, and it is more attractive to prospective students. In the award of certificates, while the NBTE regulations apply the representative of ABU senate at DAC's Professional and Academic Board ensures that the certificates awarded meet ABU senate minimum standards for all approved results.
- **Academic progression**. On completion of their diploma programes, some students further their education in degree programmes. Diploma graduates from DAC colleges who have acquired more practical skills transfer these to their classmates when they enrol for degree programmes, thus assisting students in faculties of ABU on practical skills transfer. Students that graduate from DAC Colleges and enrol at the university are more mature and better able to cope with the rigors of campus life.
- **Better integration with other knowledge and development actors**. The DAC structure enables better networking of staff, and integration of the DAC Colleges with other key national and international knowledge institutes, international and government development agencies, and private sector companies. This integration in turn leads to improved research and extension activities, information flow, and feedback from other actors, which in turn improves teaching programmes.
- **Alumni networking.** Graduating students from DAC increases the categories and spread of students graduating from ABU. This further increases the alumni base of the University as graduates of DAC colleges are by extension alumni of ABU.

On the other hand, the disadvantages of the DAC structure include:

- **Loss of independence.** Being in the university means that the Colleges lose their independence, and Heads of the Colleges become answerable to the DAC Coordinating Director. At times, the Director being appointed for a 2-year tenure is from another unit of the University, and it may take a while before he or she understands the peculiarities of the system.
- **Funding** for the Division that houses the three colleges is not commensurate with the requisite funding that each of the colleges would have had if they were separate from the university.
- **Increased administrative burden** on the University administration. Some administrative anomalies crop up sometimes due to influence of inexperienced administrative staff posted from other units of the University who may not understand the peculiarities of the Colleges.
- **Work burden on academic staff.** The academic staff at DAC have to supervise and participate to see that adequate practicals are conducted for diploma programmes. At the same time, they are also expected to teach undergraduate and postgraduate courses, supervise undergraduate and postgraduate students so as to be promoted. This is irrespective of their teaching load at the various Colleges. As such, academic staff at DAC are forced to learn to teach practically even when they interact with the undergraduate students. Also when academic staff are invited from faculties or other units to teach specified courses, the College QAC makes sure requisite practicals are conducted. However, such staff get used to such practices with time.

While the DAC model in Nigeria has its shortcomings, we believe the advantages outwelgh the disadvantages.

The Leventis Foundation Agricultural School in Kano, Nigeria

By Babatunde Bamidele Raji[175]

Overview

The Leventis Foundation is non-governmental and non-profit-making organization set up after the death in 1978 of Anastasios George Leventis, a Greek-Cypriot businessman with commercial interests in West Africa, and supporter of African nationalist movements. As well as interests in Cypriot and Greek culture, the Foundation also supports agricultural interests in West Africa, and the Leventis Foundation Nigeria (LFN) was established in 1988 to expand efforts to support agriculture among the less privileged members of Nigerian society. The LFN has an independent Board of Directors, consisting of nine members, drawn from mainly from commerce (e.g. the Leventis Group) and people associated with the Leventis Foundation at national and international levels.

The Leventis Foundation Agricultural School Programme therefore started in 1988, with the inauguration of two schools in Nigeria, one in Ilesa, Osun State, and another in Dogon Dawa, Kaduna State. Following the impressive performance of these two schools, the Kano State Government entered into a co-funding agreement with the Leventis Foundation to open a third school in Panda, Kano State – the Leventis Foundation Nigeria Agricultural Training School, Kano State – in 1998. Along with subsequently established schools in Edo, Ondo, Gombe states and the Federal Capital Territory, there are now 7 Agricultural Schools in Nigeria supported by LFN.

As a vocational agricultural training centre, the goal of the school is to empower youths through training in modern agricultural practice in different enterprises suitable to the semi-arid savanna and fadama region of Nigeria, such as crop production (millet, sorghum, maize, groundnuts, etc.), beekeeping, agroforestry, rural enterprises, livestock production (poultry, rabbit, cattle, sheep and goats) and agricultural engineering (simple tools).

The school currently has 10 instructors (teaching staff), with qualifications ranging from HND to PhD from universities, polytechnics and colleges of agriculture. The farm of about 60 hectares is run as a commercial enterprise, with integration between livestock and crop enterprises to utilize crop residues and animal manure, etc. Classrooms and laboratory enable the school to graduate some 150 students per year.

The Leventis training programme

To be admitted to the programme, students need proof of secondary school education, to give assurance that they will pursue an agricultural career, and to have access to a minimum of 0.5 to 3 hectares of land (depending on enterprise) after graduation.

The main training programme of the School covers a period of eleven months and leads to a Certificate of Participation in Modern Agricultural Practice awarded by the School. This qualification is not accredited by national authorities (i.e. NBTE). All trainees receive free board and lodging, school and work uniforms.

The emphasis of the Leventis Schools' programme is on practical work, which forms 80% of the student training time, and the remaining 20% spent in classroom theory. The average

[175] Lenventis Foundation, Kano State Agricultural Training School, Panda, Kano State, Nigeria

time spent on practical work is 5 hours per day; 3 hours in the morning and 2 hours in the evening. For practical sessions, trainees are divided into smaller groups, with each group practicing on their respective plots daily. As well as crop and livestock production practice, students also practice processing (e.g. tomato paste). Theory includes not only agricultural subjects, but also general studies (current affairs, good governance and democracy, leadership and HIV/AIDs sensitization, etc.). The curriculum is reviewed by subject matter specialists and updated periodically.

In addition to the regular, one-year programme, the School offers two types of short course: refresher courses conducted on the school farm for ex-trainees and local farmers, which usually take between one to two days; and community level courses for farmers lasting between a few days. For these short courses, resource persons are drawn from within and outside the school, depending on the training subject area.

Extension follow-up with graduates

On successful completion of the one-year regular training programme, the graduates normally go back to their local communities, to their own farms or join family enterprises. An extension team from the school visits all forty-four local government areas of Kano State to visit ex-trainees to monitor their farming activities, in order to help them identify problems and needs, offer professional advice to find solutions to these problems, and identify additional training needs or opportunities for ex-trainees.

During these visits, staff of the school also assess ex-trainees to evaluate where micro-credit can enhance their farming activities. For suitable candidates, the Leventis Foundation makes loans, typically of xxx The success of this micro-credit scheme can be measured by the fact that loan recovery rates currently exceed 95%.

Linkages with other organizations

The school is financed through Kano State and Leventis Foundation funds. Limited support is received from other sources although training of 35 youths has been conducted in 2017 in collaboration with the Bill and Melinda Gates Foundation and the International Institute of Tropical Agriculture (IITA) at the School.

The School supports other ATVET and university organizations in Kano State through taking their students under the Students' Industrial Work Experience Scheme (SIWES). Institutions supported in this way include Bayero University, Kano State University of Science and Technology Wudil, Kano State Polytechnic, the Federal College of Agricultural Produce Technology in Kano, Audu Bako College of Agriculture, Sa'adatu Rimi College of Education, and others.

The Leventis Agricultural Schools in Nigeria also collaborates with a range of other agricultural TVET and university institutions to exchange views and experiences, develop occupational standards and innovations, share information on community service, research and analytical services. Examples of academic collaborators in this sense include the faculties of agriculture in Nigerian universities such as Bayero University and Kano State University of Science and Technology (KUST), as well as Earth University in Costa Rica.

In a more general way, the School has also received technical support and advice from farmers' organization, NGOs, national and international institutions such as the

International Institute of Tropical Agriculture (IITA), the International Fund for Agricultural Development (IFAD), the Food and Agriculture Organization (FAO), the United Nations Development Programme (UNDP), the United Nations Industrial Development Organization(UNIDO), Pro-Natura International (PNI), Agricultural Institutions in Britain, the World and the American Farm School, the West African Rice Development Agency (NAEDA), the Nigeria Conservation Foundation (NCF) and SASAKA Global 2000 (SG2000).