

Discussion paper on

Agricultural TVET in developing economies: Challenges and possibilities



Published in 2020 as the result of a collaboration between the Dr Trent Brown, University of Melbourne, Dr Shyamal Majumdar, former Head of UNESCO-UNEVOC, and members of the UNEVOC Network.

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How to cite this document

Brown, T., & Majumdar, S. (2020). 'Agricultural TVET in developing economies: Challenges and possibilities' [UNEVOC Network Discussion Paper]. Available from www.unevoc.unesco.org/I/687

Front page attribution

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Acknowledgements

This discussion paper was made possible by a University of Melbourne Early Career Researcher Global Mobility Award, awarded to support a collaboration between the authors. The discussion paper is also partly informed by the findings of Dr Trent Brown's Australia Research Council funded Discovery Early Career Researcher Award project, titled 'Agricultural Skill Development in India: Assessing Acquisition and Impact' (Grant No. DE180100901).

The authors would like to thank staff at the UNESCO-UNEVOC International Centre in Bonn for their support in compiling this discussion paper – in particular Asheh Takeh, Kenneth Barrientos, Wouter de Regt, Nickola Browne, and Pooja Gianchandani.

The following UNEVOC Centres contributed to the development of this discussion paper:



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Introduction

In recent decades, countries across the Global South¹ have set themselves the agenda of expanding their capacity for technical and vocational education and training (TVET). Yet, while the need to provide high quality TVET programmes for the industrial and service sectors is widely accepted, questions are being asked of where agriculture fits within the TVET reform agenda, or even if it has a place within the agenda at all. Since most of the population in countries with developing and emerging economies is rural, it has historically been assumed that agricultural skills are best acquired through the family or community. Agricultural skills have been acquired for generations in this way, or simply through being embedded in the agricultural economy – one learns through doing – so why should anyone require formal training? Many have assumed that when there is a requirement for new knowledge and skills, farmers can simply appeal to extension service providers, who may provide short-duration trainings or field-based interventions. Such thinking still informs much research and policy on rural skill development.

Yet, there are compelling reasons to believe that now more than ever, countries in the Global South need to consider implementing formal initiatives for agricultural vocational training. Perhaps the most compelling reason is that gradually the social mechanisms for the inter-generational transfer of agricultural skills are breaking down. More children in countries from the Global South are attending primary and secondary education, which means that rural children are spending less time in the fields with their elders to acquire core agricultural skills. Moreover, in most countries with emerging and developing economies, youth may be disinterested in learning the traditional ways of farming from their parents – it does not align with their aspirations for more modern lifestyles.

A second reason why countries in the Global South should consider offering more formal agricultural vocational training is that the nature of agricultural production itself has changed. Young people who are becoming farmers today face a unique set of challenges and opportunities that did not affect their elders to the same extent. For example:

- Climate change and other forms of environmental degradation pose serious risks to agricultural production and require farmers to be more agile to adjust to change
- In many countries with developing and emerging economies, large numbers of people are leaving agriculture, meaning those who remain behind must learn to farm more efficiently, in some cases doing agriculture on a larger scale than was practiced traditionally
- The liberalization of economies throughout the Global South has exposed farmers to the instability of the global market, which requires them to take a more entrepreneurial approach to farming than was the case for their parents and grandparents' generations
- Young people today also have access to new forms of technology and innovative models of agricultural marketing, which may provide opportunities that were not present for generations past

Across the Global South, several countries are recognizing these needs and launching national and even supra-national schemes to introduce formal, standardized agricultural training programmes. If the twentieth century was marked by a view that development could only mean a shift away from agriculture, in the twenty-first century, there is growing recognition that agriculture should be part of any broad-based strategy of human development. Several countries are also aligning projects of agricultural skill development with sustainability objectives – for example, developing skills in organic farming and climate change adaptation.

¹ The term Global South is used in this discussion paper to describe countries with developing and emerging economies, including newly industrialized countries. The term does not imply that all developing countries can be brought together in one category but does highlight that these countries can face similar challenges.

Despite the potential benefits, there are many challenges to effectively implementing skill development schemes in agriculture. These challenges are especially acute when there is an attempt to make agricultural skill development integrated with the mainstream TVET system, because, in some key respects, agricultural training does not operate according to the accepted TVET wisdom. For the most part, the challenges are derived from the fact that the agricultural sector in most developing and emerging economies is marked by high levels of informality, self-employment, and precarity. This discussion paper explores seven unique challenges to the development of agricultural vocational education:

- 1 Lack of existing institutional capacity.** Most countries with developing and emerging economies have not historically had formalized vocational training programmes in agriculture. This means there is a shortage of suitable trainers, curricula, and infrastructure for practical agricultural learning.
- 2 Agriculture is not aspirational.** In many developing and emerging economies, agriculture is seen only as only a livelihood option of last resort. This is particularly true of young people, who generally aspire for urban employment and lifestyles. It is therefore difficult to recruit youth for agricultural TVET programmes.
- 3 Potential beneficiaries do not have time for training.** The most obvious beneficiaries of agricultural skill development programmes are practicing farmers. Yet, farmers have busy schedules and may be unable to take time out to participate in training. This may be especially true for women, as well as members of poor and marginalized communities.
- 4 Trainees have a need for improved entrepreneurship skills.** Economic globalization and the increasing dominance of agri-business have transformed the economic environment within which farmers work in the Global South. To thrive, farmers need training in entrepreneurship skills, but these have traditionally not been a major focus of agricultural training programmes.
- 5 Trainees must be prepared for technological and environmental change.** Climate change and other environmental challenges are placing the agricultural sector under pressure. Farmers in the Global South need knowledge of these changes and skills in adaptation, as well as access to appropriate technologies to thrive in a changing environment.

- 6 Qualifications recognition works differently in agriculture.** Training in the industrial sector results in certificates, which may be recognized by employers, leading trainees to better employment outcomes. Yet, in the agricultural sector, many trainees will go on to be self-employed. Having a certificate of training needs to offer benefits to graduates who aspire self-employment.
- 7 Agricultural TVET must respond to local demand.** Agribusiness demand for skilled labour, market demand for agricultural products, and local community demand for particular agricultural skills should all be factored into agricultural TVET design.

Strategies to overcome these challenges will vary between countries, in response to unique socio-economic and ecological conditions. This discussion paper draws on currently available evidence to offer a list of broad recommendations for policy-makers and practitioners seeking to craft successful systems for agri-skill development.

Aims and methodology

This discussion paper has four aims: (1) to highlight the reasons why in developing and emerging economies, TVET in agriculture differs to TVET in other sectors; (2) to explore seven key challenges faced in implementing effective agricultural TVET programmes; (3) to identify cases of innovative responses to these seven challenges; and (4) to offer a series of recommendations for countries in the Global South who are reforming their agricultural TVET programmes or introducing new programmes.

The discussion paper draws on three main sources of evidence to support its claims. The first is readings of the literature on agricultural TVET. The second is the ongoing research of one of the authors (Brown) on agricultural TVET in India, which has been funded by the Australia Research Council as part of a Discovery Early Career Researcher Award project. This research consisted of extensive interviews with trainers and trainees enrolled in a new scheme for agricultural TVET, overseen by the Agricultural Skills Council of India and funded by the National Skills Development Council. The third source of information was consultation with contact persons at seven key UNEVOC Centres in Africa, Latin America and the Asia-Pacific, who have experience in implementing agricultural TVET programmes. These centres form the main focus in identifying innovative solutions to the challenges faced in implementing agricultural TVET.

UNEVOC Centres are members of UNESCO-UNEVOC's global platform of TVET institutions, the UNEVOC Network. They are all centres of national significance involved in the development of policy, research, and/or practice in TVET. The seven UNEVOC Centres that participated in the development of this discussion paper are all based in developing and emerging economies and have substantive agricultural TVET programmes. The UNEVOC Centres consulted for this report were diverse in terms of the structure of their agricultural programmes, as indicated in Table 1.

Seven main challenges were identified, and this discussion paper has accordingly been structured around these challenges. Experiences of the UNEVOC Centres are drawn on to illustrate both the nature of the challenges and strategies used to overcome them. The discussion paper develops broad recommendations, though recognizing the diversity of local contexts in the agricultural sector, avoids sweeping generalizations. Instead, it identifies key factors and variables that need to be taken into consideration in framing research and policy on agricultural TVET in a way that is sensitive to the local situation.

Table 1. UNEVOC Centres consulted and the structure of their agricultural TVET programmes

Country	UNEVOC Centre	Structure of agricultural TVET programme
Brazil	CONIF (Federal Network of Vocational, Scientific and Technological Education Institutions)	Some campuses offer 3-year technical course on agricultural industries, as well as high-school integrated vocational courses on agriculture and livestock
Costa Rica	INA (Instituto Nacional de Aprendizaje)	1160-hour Organic Producer course available in all states of the country. Have developed standards for agricultural production, livestock, and fisheries training
Ghana	COTVET (Council for Technical and Vocational Education and Training)	Working with the African Union's ATVET Project, developed modularized curricula for skill development in relation to all levels of the value chain for key agricultural commodities (pineapple, citrus), taught in institutions across the country
Jamaica	HEART Trust	The HEART Trust's Ebony Park Academy offers 12-15 month courses related to agriculture with opportunities to specialize in agricultural production, processing, and agricultural extension
Nigeria	Centre for Technical Vocational Education Training and Research, University of Nigeria	Undertakes research and curriculum development on effective agricultural TVET programmes, and feeds these to agricultural extension institutions to inform their short-duration vocational courses
Paraguay	Fundación Paraguaya	Self-Sustaining Schools, a project sponsored by Fundación Paraguaya, offers education and training in agricultural entrepreneurship for senior secondary school students
The Philippines	Iloilo Science and Technology University	Offers short-duration training courses (120-300 hours) related to agriculture, alongside agricultural bachelor degree programmes

Diversity of programmes

In most countries with advanced economies, agriculture is fully integrated within the formal TVET system. Students have opportunities to study agriculture in TVET streams in high school, which they can study alongside academic courses. At the post-secondary level, there are options to study diploma courses in agriculture. In Germany, for example, students can undertake three-year diploma programmes in agriculture, within which two-thirds of the programme is delivered through situated, practical learning through job placements on a range of rural enterprises. These job placements are integrated with theoretical, classroom-based learning, so that theoretical knowledge and practical skills develop in tandem. Completion of the programmes leads to nationally (and in some cases internationally) recognized qualifications in agriculture, which assist trainees with gaining jobs in the rural sector and in starting their own agricultural ventures.

In developing and emerging economies, such comprehensive learning systems rarely exist for agriculture. What has been available historically when farmers needed to upgrade their skills in agriculture has been a network of agricultural extension services. These services, typically provided by extension officers with qualifications in agricultural sciences, serve to 'extend' the latest agricultural science and technology to farmers, usually in the form of short-duration training programmes or on-field demonstrations. They tend to be more theoretical in orientation, as it is assumed that in many countries in the Global South, farmers who seek out extension services already possess basic agricultural skills, most of whom would have been practically involved in agriculture since childhood.

In addition to extension services, skills may also be developed through NGOs and private sector organizations, who may offer short-duration trainings. In these cases, training will be highly targeted, focusing on a specific need of a community, or a set of skills that the organization has deemed to be of high priority for social, economic, or environmental reasons – for example, imparting skills in sustainable farming or collective marketing strategies. As with extension, however, these trainings tend to be of only a few days' duration.

In most developing and emerging economies, agricultural skill development opportunities within the formal TVET system have only been introduced relatively recently – if at all. Although some training providers within the UNEVOC Network have indicated that they have offered agricultural TVET since as early as the 1960s, agricultural offerings were relatively peripheral compared to training opportunities for the industrial or service sectors. It is only within the last two decades that agricultural TVET has been considered a serious priority, and many countries still neglect it.

There has, however, clearly been something of a paradigm shift within the last ten years or so, with greater recognition of the importance of agricultural skill development and significant government investments in building agricultural TVET capacity. The Government of India, for example, as a part of its 'Skill India' initiative, has inaugurated the Agricultural Skills Council of India (ASCI). The ASCI has developed nationally standardized qualifications packs for more than 160 job roles in agriculture, which are being implemented in 200-300 hour training programmes by both government and private providers across the country. Likewise, the African Union in 2012 started an Agricultural Technical and Vocational Education and Training (ATVET) Project, as part of its Comprehensive Africa Agriculture Development Programme (CAADP). The ATVET Project involves some 12 member countries of the African Union and is developing training modules for key agricultural supply chains that have been identified as having a high potential to enrich rural livelihoods. Training programmes developed under the ATVET Project relate to all levels of the supply chain, from production through to processing. In implementing these training programmes, the African Union has placed special emphasis on ensuring that trainings are gender inclusive.

Even where investments are occurring, however, there are significant variations in how programmes are structured and the maturity of the institutions through which they are implemented. Some countries in the Global South have a firm foundation of institutions capable of delivering integrated, long-term courses. Egypt, for example, has more than 130 agricultural high schools distributed across the country, offering 3-5 year courses on both the theoretical and practical aspects of agriculture, while Ethiopia has some 25 agricultural TVET colleges, which integrate agriculture with a broader set of literacy and life skills for rural people (Robinson-Pant, 2016). In most instances, however, a paucity of funds, combined with a general perception that there is insufficient demand for agricultural vocational training, mean the programmes that do exist across the Global South are unstructured, localized, and short in duration. Even within the UNEVOC Centres consulted

for this discussion paper, the structure of programmes varied tremendously, with some offering courses of up to 3 years, while others offer only short-duration modular courses of 120-300 hours (see Table 1). There were also great variations in the extent to which curriculum had been developed. Poorly developed curricula can lead to unstructured programmes and also make it difficult to integrate programmes within a meaningful qualifications framework, through which trainees can advance their knowledge and skills in a cumulative fashion for the development of their careers and/or livelihoods. For example, there are few places in the Global South where there is a sufficiently developed qualifications framework that would allow a trainee to combine a series of modular qualifications for recognition as a Diploma-level qualification in agriculture.

Challenge 1.

Lack of existing institutional capacity

As previously noted, agriculture has been widely neglected in TVET systems across the Global South. One implication of this historical neglect is that when countries do make the decision to prioritize agricultural TVET, they often find themselves with no foundation to build from. There is little or no existing institutional capacity to provide agricultural TVET.

There are three components to this. First, there are few, if any, training centres for agriculture. Agricultural TVET often needs specialized training centres, due to the requirement of having sufficient land to conduct field demonstrations and practical classes. Establishing new centres is costly, especially given challenges of finding appropriately endowed sites for their construction. Second, even when there are training centres, there is often inadequate funding for them to function effectively. Many centres do not have access to the latest equipment and technology, which is essential to provide meaningful demonstrations and practical classes. They are often serviced by poor infrastructure and curricula are out-of-date. This is especially an issue in training centres that are based in rural or remote locations – which are places where the need is greatest. In such locations, a lack of internet access can be a barrier to harnessing the benefits of the latest

digital technology. Third, and most critically, there is a lack of suitably trained staff. To deliver agricultural TVET, trainers should have: (1) knowledge of agricultural science; (2) relevant work experience within the agricultural sector; and (3) training in vocational pedagogies. Across the Global South, there are many people with degrees in agricultural sciences who can be enlisted as trainers, but they lack industry experience or knowledge of vocational pedagogies. They understand how plants grow, but not how to devise a lesson plan, particularly for practical lessons. This implies that establishing an agricultural TVET system capable of operating at scale may first require training an entirely new workforce of suitable trainers.

Consolidating the capacity of institutions to support agricultural skill development is especially challenging when governments do not award levels of funding that are adequate for the task. Some countries attempt to get around the problem of resource constraints by encouraging private sector sponsorship of agricultural TVET. Brazil, for example, leverages private sector support in the provision of technology and scholarships to support training. The merits of dependency on the private sector, however, are questionable. Private sector support is rarely constant and can result in a lack of stability in programmes. Without consistent sources of financial support, it is difficult to consolidate permanent teaching staff who can consolidate their own skills in administering training and foster institutional learning (Gomes and Câmara, 2004).

Lacking institutions that are purpose-built to administer agricultural TVET, some countries with developing and emerging economies have attempted to repurpose other institutions, whose mandates in some sense overlap with those of agricultural skill development. India's agricultural skill development scheme, organized by the Agricultural Skills Council of India and financed by the National Skill Development Corporation, for example, implements its programmes primarily through agricultural universities and Krishi Vigyan Kendras (Agricultural Science Centres), institutions whose mandates are to deliver agricultural extension programmes to farmers, rather than to provide vocational training in the usual sense of the term. These extension services have the advantage of already having a nation-wide distribution, and staff who have both advanced knowledge of agricultural science and experience in engaging with farming communities. Similarly, the Centre for Technical Vocational Education Training and Research at the University of Nigeria does a wide range of research on effective forms of vocational teaching interventions for the agricultural sector, but rather than implementing this through TVET centres, feeds the findings of research into Agricultural Development Agencies for implementation by agricultural extension agents.

The use of agricultural extension services for the delivery of agricultural skill development programmes is certainly an efficient response to a lack of institutional capacity. It does not require the same substantial investment as establishing entirely new institutions or departments for administering agricultural TVET and the time required to build an adequate base of qualified trainers. But it remains the case that agricultural extension is not the same as comprehensive, competency-based TVET that feeds seamlessly into a national skills qualification framework. To name just the biggest shortcoming, extension service providers often lack the practical work experience and skills in vocational pedagogies that are usually expected of TVET providers. Thus, any attempt

to deliver agricultural TVET through other institutions – such as agricultural extension services – needs to put in some groundwork to ensure that trainers are adequately equipped for the task.

Equipping trainers with the skills required to undertake agricultural TVET is a crucial, but often underappreciated task. Some centres within the UNEVOC network offer trainers professional development opportunities to consolidate their skills in vocational pedagogies (Baird and Harrelson, 2008). These, however, tend to be short-duration workshops, and are a far cry from the requirements of agricultural trainers in countries with advanced economies – in Australia, for example, vocational teachers in agriculture must have undertaken a six-month course on 'Training and Assessment'. Matters are made more challenging by a lack quality international guidelines on suitable approaches to vocational teaching for the agricultural sector in developing and emerging economies. There is a need to address key questions like how to approach practical teaching strategies for farmers who may already have extensive practical experience in agriculture, but who require some additional, more technical skills. Developing materials to advise trainers on these matters should be a priority.

Challenge 2.

Agriculture is not aspirational

Agriculture in the Global South is often marked by high levels of insecurity, making it an undesirable profession, especially for young people. Rural youth often aspire to find job opportunities in other sectors (Baird and Harrelson, 2004). Having said this, given the lack of job growth in the Global South in recent years, most rural youth recognize that some kind of agricultural activity is necessary to sustain themselves. But studies have shown that even in such circumstances, most youth will not see agriculture as an area in which they want to develop further skills – they prefer to concentrate on skills that can open up opportunities in urban areas (Robinson-Pant, 2016). Agriculture is a fall-back option rather than a vocation to which young people are drawn out of personal interest or passion (Tadele and Gella, 2010). A further problem is tenure: as rural populations are living longer and remaining healthier until an older age, it is often not until people are in their 50s or even 60s that they are inheriting the family farm (White, 2012). Young people's lack of ownership rights – and hence executive control – over land makes farming a less attractive option. As long as agricultural work is itself undesirable, enrolling in an agricultural TVET programme will be even less so. This problem is compounded by the fact that in the Global South – like in many countries in advanced economies – TVET in general has a poor image (e.g. Woronov, 2016). As a result of the non-aspirational status of both agriculture and TVET, many agricultural TVET programmes struggle with recruiting motivated trainees.

If a core objective of agricultural TVET is to involve youth, then training providers must better understand the aspirations of rural youth and find ways to work with those aspirations. One way of doing this is to allow pathways for youth to build on the skills they gain through agricultural training, to gain qualifications to move into desired job roles – perhaps in sectors allied with agriculture or in agricultural service provision. A successful example of this comes from the Ebony Park Heart Trust Academy in Jamaica. The academy offers a range of vocational trainings, including several courses in agriculture. Its key target audience is unemployed youth, whom it provides training in agriculture free of cost, with some nominal fees for food and lodgings. Youth are immersed in agricultural activities as part of their daily routines. After completing trainings on basic agriculture, youth have options to develop additional skills – which may be more complex or

allow them to develop their leadership capacity. For example, the Academy offers a Level 2 programme in food processing, which allows youth to develop skills to work as employees at agri-processing plants or to start their own ventures in pickling, processing, and packaging. After completing trainings in several other agricultural job roles, youth can also take an Extension Services Level 3 course to gain the qualifications necessary to become agricultural extension officers. In this course, trainees learn how to engage with the latest agricultural science, and how to communicate their knowledge and skills to other farmers to help improve production. In this way, the academy offers rural youth opportunities to develop their capacity for leadership, to develop professional careers in agricultural extension, and to make meaningful contributions not only to their own farms and communities, but to the development of the agricultural sector of their country.

To make agriculture aspirational, it is necessary to challenge its long-term association with rural poverty and underdevelopment. Agriculture needs to be re-cast as a profession within which there is scope for innovation and applications of new technology. There is evidence that if agriculture can be represented as a site of innovation, it may become far more attractive to youth, including youth with high levels of formal education (Mwaura, 2017). Several centres within the UNEVOC Network conduct awareness camps, which highlight what is possible in agriculture if one develops the right skills and adopts an innovative approach. The Council for Technical and Vocational Education and Training (COTVET) in Ghana for example provides career counselling services for rural youth, which challenge their perceptions about agriculture and encourage them to think about the potential of agriculture as a business, not just a fall-back option. They are also told about government schemes that are available to support them in starting new agricultural ventures. These counselling services help to drive recruitment in agricultural TVET programmes. Similarly, the Federal Network of Vocational, Scientific and Technological Education Institutions (CONIF) in Brazil hosts regular 'Farmer Field Days' which showcase what their graduates have been able to achieve to the local community. Such initiatives help foster youth interest in agriculture.

Challenge 3.

Potential beneficiaries lack time for training

The core beneficiaries of agricultural TVET programmes are members of the farming community, yet a challenge faced in reaching them is that most of those involved in agriculture lack time to dedicate to training. Farming is a demanding profession and for the many farmers who live at or below the poverty line, time spent on training represents an opportunity cost that they cannot afford. This poses a particular challenge to the development of longer-term training programmes. Those developing training programmes need to engage in a balancing act. On the one hand, training needs to be sufficiently all-encompassing as to allow for comprehensive skill development, but on the other hand, must be of a duration and intensity that is compatible with farmers' busy schedules.

Time constraints pose a barrier to the enrolment of women trainees in agricultural TVET programmes. In many developing and emerging economies, women do the majority of the work in agriculture, but often have less decision-making power than men. For this reason, targeting women for trainings may serve the double advantage of both improving agricultural output and challenging patriarchal gender relations and empowering rural women. Yet, women often face the burden of having to manage both agricultural and domestic responsibilities and so are exceptionally time-poor. Taking time out to attend agricultural trainings would require special arrangements within the family or community. Women may also face additional barriers to participation, as the family may place restrictions on their mobility – a major issue if the training centre is at a distance from home. Regrettably, the barriers to female participation have not received adequate attention in many developing and emerging countries, where the benefits of including women in agricultural skill development programmes has been overlooked. Some countries have even avoided including women in training for fear that this would disrupt local patriarchal relations (Gomes and Câmara, 2004).

Consultation with UNEVOC Centres indicates that the most common way of dealing with the challenge of potential beneficiaries' time constraints is to allow options for flexible delivery of agricultural TVET programmes. These include options for modular programmes, delivery of programmes at slower periods in agricultural seasons, and at times of day that work with farmers' schedules. This often involves community consultation during the planning phases of developing agricultural TVET programmes. In Ghana, COTVET provides a clear illustration of the benefits of flexible delivery systems for improving access to training. COTVET's competency-based training in agriculture is divided into discrete units, which can be acquired in a flexible manner. The individual trainee can decide the pace at which they build their competencies and qualifications, in accordance with their unique needs and schedule. There are also efforts to make trainings more accessible to women. COTVET is part of the African Union's ATVET Project, which has placed a major emphasis on ensuring that agricultural trainings are both accessible and beneficial for women. This involves, for example, delivering courses in the evenings or on the weekends – times which are more suited to women's routines. They are also working towards making childcare options available at training sites.² Another example of COTVET's efforts to make training more accessible to women and marginalized people is its appointment of a designated officer for women and persons with special needs, who provides support in the form of counselling and guidance. To date, COTVET's agricultural TVET programmes report a 30 per cent female participation rate – which is good by global standards, although there is still much room for further progress.

² See <https://www.youtube.com/watch?v=0A6ymWxu2lo&t=12s>

Challenge 4.

Trainees have a need for improved entrepreneurship skills

Farmers in the Global South operate in a substantially different economic environment than was the case 30 years ago. The increasing dominance of large-scale agribusiness is applying pressure to the smallholder farmers who make up most of the rural population in most countries. Moreover, the effects of trade liberalization and the gradual erosion of subsidized agriculture have exposed farmers to greater market uncertainty than was present in times past. Adapting to that uncertainty requires a set of skills that go beyond merely technical agricultural skills to include a broad set of personal, social, economic, and political competences that can be broadly classed as 'entrepreneurship skills'. A focus on such skills may also assist in overcoming some of the more traditional challenges of farmers, such as exploitation by wholesalers and money lenders, and the neglect of local infrastructure and government services.

'Entrepreneurship skills' in the context of this discussion paper refers to competencies related to resilience and adaptability that enable farmers to thrive, even in volatile circumstances. They include:

- Social competencies, particularly the kind of communication skills and self-confidence necessary to negotiate with traders or to form farmer cooperatives
- Economic competencies, such as responding to market demand, managing labour, logistics, recognizing new opportunities and pursuing innovation
- Civic competencies, which are necessary for individuals to act as responsible rural citizens and voices of their communities, and to campaign to improve the situation in infrastructure, education and health

Possession of entrepreneurship skills can have a substantial impact in enabling farmers to endure times of economic and ecological uncertainty (Singh and Krishna, 1994). Yet, regrettably, the focus on developing technical skills within curricula for the agricultural sector often comes at the expense of these more personal, social, and business competencies (Wang et al., 2016). Nonetheless, several institutions within the UNEVOC Network have developed novel approaches to incorporating entrepreneurship skills into their agricultural programmes. For example, Costa Rica's Instituto Nacional de Aprendizaje (INA) [National Institute for Apprenticeship] has a 1160-hour course in organic agriculture, which includes a 36-hour module on 'Entrepreneurship in the Rural Economy'. The focal points in this module are clearly articulated in the syllabus, which is important, since many

trainers of agricultural TVET programmes have technical and/or scientific backgrounds in agriculture rather than in entrepreneurship and business, and it may at first be difficult to conceptualize what rural entrepreneurship training should entail. INA's organic agriculture curriculum includes a focus on the personal qualities of entrepreneurs, the strengths and weaknesses of small enterprise, how to make a business plan, and risk management. Other modules in the organic agriculture course develop other critical social and cognitive competencies, including marketing skills, planning new ventures, communication, and maintaining good relationships.

Another particularly novel approach to entrepreneurship training is Paraguay's 'Self-Sustaining Schools'. An initiative of Fundación Paraguaya, the programme is implemented through three senior secondary schools (grades 10 to 12), which involve the development of academic and practical skills, with a focus on agriculture. The novel feature of the model is that students learn through making money: the school itself is funded by a series of on-campus enterprises, for which students and teachers are responsible. The enterprises include growing organic food for local markets, running on-site shops, and running a rural hotel. Students are involved in all aspects of these businesses alongside their academic schooling, and in the process, become aware of local market dynamics and factors of success in small rural enterprises, including agriculture. They learn how to identify which produce is in demand, assess costs and risks, and how to find profitable pathways to reach markets. They learn about different business models and develop their own business plan that is tailored to the local rural economy as a core component of their final year of studies. From the first year, there is a strong focus on the 'soft skills' required to be a successful rural entrepreneur, such as independence, self-confidence, and self-sufficiency (Baird and Harrelson, 2008). Youth in the regions surrounding the schools have developed a greater interest in agriculture, as they have seen their peers gain employment and start their own rural ventures after graduation, and the Self-Sustaining Schools make an effort to showcase the success stories of its graduates in local communities (see Challenge 2).

Several other agricultural TVET centres have developed some focus on business competencies for the agricultural sector. There is great scope for global cross-institutional learning on 'what works' in relation to imparting these skills.

Challenge 5.

Trainees must be prepared for technological and environmental change

The FAO (2017) projects a number of major challenges facing agricultural systems in the decades ahead. Population growth, especially in Asia and Africa, combined with rising income levels, will lead to increased global demand for food. At the same time, the natural resource base on which agriculture depends is likely to diminish – particularly in relation to water – while climate change and other forms of environmental disruption pose significant risks to yields and are likely to make farming a more uncertain and precarious venture.

TVET systems will need to make two complementary changes in order to help address these challenges. On the one hand, there is a need for training related to climate change adaptation. Such training would include improving farmers' knowledge of the kind of environmental change that is projected and imparting the necessary skills to plan, adapt, and be versatile in response to unpredictable conditions. Until now, there are few examples within the UNEVOC Network of agricultural TVET programmes that have attempted to impart climate change adaptation training in a systematic way.

On the other hand, TVET systems can respond through greater integration of new technologies. Technology will be a key factor in finding ways of producing more food, in a manner that is more profitable to farmers, while also having a less detrimental impact on the natural environment. Precision farming, micro-irrigation, vertical farming, and the use of digital technologies such as mobile phone apps are commonly touted as potential solutions to pressing challenges facing agriculture. The FAO (2018) emphasizes that technological change should be driven by sustainability objectives and aim to build more circular economies.

The UNEVOC Centres approached showed various ways new technologies are introduced to trainees in agricultural programmes. An innovative example is CONIF in Brazil, which attempts to incorporate new technologies into training programmes wherever possible and also hosts an annual 'Field Day', for which local farmers are invited to attend and gain exposure to the latest technological innovations. Having said this, UNEVOC Centres also noted constraints in incorporating the latest technology into their programmes.

On the one hand, the centres themselves often face financial constraints which may prevent them from procuring the latest technology. On the other hand, some noted that even if they can expose their trainees to technology in training programmes, many trainees will not have the resources necessary to invest in these technologies. This highlights the importance of a focus on appropriate technologies: technological innovations that can be adopted at low cost and at a scale that is suitable for poor and smallholding farmers. If R&D (research and development) centres were able to collaborate with agricultural TVET institutions, there may be potential to jointly develop appropriate forms of technological innovation for smallholding farmers.

Challenge 6.

Qualifications recognition works differently in the agricultural sector

In the industrial and service sectors, the main task of qualifications recognition is to ensure that potential employers recognize the value of a certified qualification, and respond accordingly by awarding those with qualifications with better prospects of employment and remunerative salaries. The same may be true of agricultural TVET qualifications in countries with advanced economies, where in many cases trainees will go on to work on large rural enterprises. In developing and emerging economies, however, this is most often not the case. Although in some cases trainees will go on to work for others on larger farms or in agribusiness, in most cases, those undertaking training plan to apply what they have learned in their own ventures or on their family farm. At first glance, therefore, encouraging qualifications recognition amongst employers would appear to be a lesser priority in agriculture than in other sectors.

The challenge that arises is that many training providers neglect that there may be other institutions and actors – besides employers – who need to recognize qualifications for trainees to gain the full benefits of training. Trainees may expect, for example, that in addition to gaining useful skills that they can deploy on their farms, that having a certificate of training will help them gain access to government subsidies and schemes. Moreover, many may hope that having a certificate will get them preferential access to loans to start their own rural ventures. If banks and other sources of rural credit recognize the value of a nationally recognized qualification in agriculture – or in a specific facet of agricultural production – they may be likely to give farmers loans, and may provide favourable interest rates. This may also serve as a critical way of managing risk in rural finance. If trainees can gain these kind of benefits from having a certified qualification – better access to loans and government schemes – this will provide a crucial incentive to enroll in an agricultural training programme.

Some centres within the UNEVOC Network have been able to leverage their existing connections to ensure that trainees are able to access these kinds of benefits after completing their training. The Fundación Paraguaya's Self-Sustaining Schools, for example, have been able to ensure that their graduates gain preferential access to the Foundation's micro-

credit schemes (Baird and Harrelson, 2008). COTVET, helps its trainees to gain entry into venture capital support schemes and other government programmes. These, however, are just small steps – there is potential to establish a more robust approach to qualifications recognition that is relevant to the agricultural sector. A crucial way to start this process would be to follow the German 'dual systems' approach to TVET, which involves all relevant stakeholders in the development of curricula. Involving banks and relevant government departments in developing curricula would ensure that those institutions recognize qualifications and reward those who hold them. Moreover, it would improve the quality of curricula. For example, involving the finance sector in curriculum development may lead to better modules related to the development of business plans and ensuring financial stability.

Challenge 7.

Agricultural TVET must be responsive to local demand

Related to the challenge of qualifications recognition is the somewhat complex task of making agricultural TVET 'demand-driven'. In the industrial and service sectors, demand-driven approaches to TVET typically involve systems that are responsive to industry demand for skilled labour: in short, the courses that are available and competencies imparted through TVET should reflect the skills that industry needs. In some cases, agribusiness demand may be useful in informing agricultural TVET programmes. For example, when agribusiness serve as major procurers of particular forms of agricultural produce, it makes sense that their input should be taken on board. However, because agriculture in the Global South mostly is undertaken by people who are self-employed or working on family farms, agricultural TVET systems need to take on board a more diverse set of 'demands' when planning programmes.

One important aspect of this is market demand. Changes in market demands for particular agricultural products should inform the kinds of training programmes that are offered – for example, when there is a surge in local demand for a kind of food that is not grown locally, there may be an opportunity for agricultural TVET programmes to train local people in how to grow that product and reap the benefits of remunerative prices. The African Union's ATVET Project attempts to do this by targeting skill development for agricultural commodities for which there are substantial market opportunities.

Beyond market demand, however, there is also a need for agricultural TVET to be responsive to the local community's demand for new skills. This can be a challenge, given that TVET systems in the Global South have often been marked by centralized approaches to planning. Here, there is some potential to learn from research on agricultural extension. For several decades there have been attempts to make extension programmes more responsive to input from local communities when designing training – particularly from women and marginalized communities – about the kind of agricultural skills people actually want to develop (Birner and Anderson, 2007). This has been achieved through the decentralization of agricultural extension planning (Glendenning and Babu, 2011).

Recommendations

Agricultural societies across the Global South are diverse – both in terms of agro-ecological conditions and in terms of social, cultural, economic, and political structure. Each of the seven challenges identified in this discussion paper will play out differently in different locations and need to be reflected upon within their specific national context. There is no one-size-fits-all approach to agricultural TVET and this is reflected in the diversity of programmes currently on offer. How a country chooses to establish an agricultural TVET system will depend on available resources and local conditions. However, generally speaking the following broad recommendations should be taken into consideration:

- 1 Adequate funding** is necessary to overcome the challenges identified, particularly the problem of underdeveloped institutional capacity. Governments must first identify what stands to be gained from agricultural TVET and provide appropriate resources to finance programmes to ensure those gains are met.
- 2 Flexible delivery** of agricultural TVET courses is essential to ensure that farmers (and aspiring farmers) can have access to comprehensive skill development opportunities – including further education and training opportunities – at times that are suitable to their busy schedules. This is especially important for making agricultural TVET accessible to women. Modular courses that allow trainees to build their competencies at their own pace, as well as weekend and night classes are especially important.
- 3 ICT-based delivery** of theoretical content should also be developed for to make agricultural TVET more accessible to those with little time or those living in remote locations. However, this should only be a complement to face-to-face classes, rather than a replacement.
- 4 Diverse stakeholders** should be included in the development of qualifications and curricula, to ensure a more robust system of qualifications' recognition. It is not enough to just involve potential employers of trainees in a sector in which many trainees will go on to be self-employed. Institutions of rural credit and agricultural departments offering schemes to assist farmers need to be included, so that they can meaningfully engage with trainees after graduation, and so that trainees can receive a wide range of benefits from having certified qualifications.
- 5 Meaningful partnerships** between agricultural TVET providers and relevant institutions should be undertaken to ensure better the provision of practical training. This may include agri-technology companies, who can offer demonstrations of how to use their products, and larger agricultural enterprises, which may offer short-term apprenticeships.
- 6 Entrepreneurship, life skills, and civic skills** need to be incorporated within agricultural TVET. The focus must extend beyond technical agricultural skills to recognize the diverse and holistic needs of rural people in today's world. Trainees must learn how to engage with markets, how to communicate and work with confidence, and how to lobby for the improvement of conditions in their communities, if their training is to have sustained impacts.
- 7 General awareness campaigns** should occur alongside recruitment drives for agricultural TVET programmes, to make people more aware of the potential to improve livelihoods prospects through skill development. This is especially important for youth. Many people will not have considered the benefits that can come through skill development, so without such efforts to improve awareness, recruitment for agricultural TVET will be challenging. Such awareness campaigns can also highlight government schemes that are available to support farmers – young farmers in particular.
- 8 Quality over quantity** should be the mantra for countries that face a lack of institutional capacity to deliver agricultural TVET. It will take time to develop quality teaching staff and materials. But if local centres of excellence can first be developed in a few locations, demand for more such training will increase, and upscaling will become easier. Trying to achieve scale without having first developed a group of effective trainers and training centres is a recipe for failure.

- 9 Vocational pedagogies** must be the focus of teacher training efforts in agricultural TVET. Teachers must be competent in how to design practical classes and how to impart life skills for entrepreneurship and sustainable livelihoods. Partnerships with countries that already have established agricultural TVET systems may be beneficial in bringing vocational pedagogies to the fore.
- 10 Local demand** should be reflected in the content and structure of programmes. This can be achieved through decentralized planning and mechanisms for local rural communities to have input into the kind of programmes offered, both in terms of the kind of skills imparted and the modalities of training.
- 11 R&D (research and development)** institutions should partner with training providers to help develop appropriate technologies to improve local livelihoods and to impart knowledge and skills related to optimal utilization of technology.
- 12 Work with the UNEVOC Network** to consolidate materials on effective practical learning and teaching strategies for the agricultural sector – such as the development of a handbook, instructional videos, and best practice models for training.

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