SKILLS MISMATCH IN THE AGRICULTURAL LABOR MARKET IN BENIN

Rodrigue S. Kaki
Rodrigue C. Gbedomon
Fréjus S. Thoto
Donald M. Houessou
Kisito Gandji
Augustin K. N. Aoudji

SEPTEMBER 2021

Skills mismatch in the agricultural labor market in Benin

Citation

Kaki, R.S., Gbedomon, R.C., Thoto, F.S., Houessou, D.M., Gandji, K. & Aoudji, A.K.N. (2021). Skills mismatch in the agricultural labor market in Benin. Research report, 135p

Acknowledgements

TABLE OF CONTENTS

Chapter 1. Introduction

Chapter 2. Theoretical approaches to investigating skills mismatch

Chapter 3. Research methodology

Chapter 4. Skills supplied to the agricultural labor market

Chapter 5. Skills required in the agricultural labor market

Chapter 6. Mismatch between skills supply and demand in the agricultural sector

Chapter 7. Discussion of main findings and implications for policy and practice

Abbreviations and acronyms

AfDB	African Development Bank
AgEE	Employees Graduated from Agricultural Training Institutions
AgER	Employers in the Agricultural Labor Market
AgTI	Agricultural Training Institutions
ANPE	Agence Nationale pour l'Emploi
BAC	Baccalauréat de L'Enseignement Secondaire du Deuxième Cycle/ Secondary school leaving qualification
BEAT	Tropical Agricultural Studies Certificate
BEPC	First Cycle Studies Certificate
BIT	International Labor Office
CSO	Civil Society Organization
CSO	Civil Society Organizations
DEAT	Diploma of Tropical Agricultural Studies
ECA	Economic Commission for Africa
GDP	Gross Domestic Product
ICLS	International Conference of Labour Statisticians
IDRC	International Development Research Centre
ILO	International Labour Organization
INSAE	Institut National de la Statistique et de l'Analyse Économique
ItOrg	International Organizations
POrg	Public Organizations
PSect	Private Sector
TVET	Technical and Vocational Education and Training
UAC	University of Abomey-Calavi
UCAO	Catholic University of West Africa
UN DESA	United Nations Department of Economics and Social Affairs

List of tables

List of figures

Forward

Félicien Avléssi

Vice-Chancellor of the University of Abomey-Calavi

Abomey-Calavi, Benin

It is my great privilege to present to you the first report on Skills Mismatch in the Agricultural Labor Market in Benin. The University of Abomey-Calavi has highlighted the provision of trustworthy information, analysis, and signals on the demand and supply of skills in the agricultural sector as a key contribution to the building of a skills planning institutional system in Benin.

This report is a result of the project, *Mentoring young agricultural graduates in the search for decent jobs in the labor market,* which has been undertaken by a consortium of organizations led by the University of Abomey-Calavi.

The report represents a valuable resource for informing educational and training planning, as well as delivery, in the agricultural sector; it also seeks to assist individuals in making informed career and education decisions. The report is expected to contribute to the advancement of post-school agricultural education and training systems' responsiveness to the needs of the economy and society more broadly, by supporting decision-making on skills planning issues. It is expected to be used as a strategic resource to inform supply-side planning in agricultural post-school education and training, particularly in relation to funding allocation, strategy development, and prioritization, in conjunction with the development of qualifications and programs that are relevant to labor market needs and career information.

> This report is intended to serve as a guide for planners, funders, policymakers, education and training institutions, skills development providers, employers, and the media on issues related to skills planning and education, and training provisions.

The University of Abomey-Calavi will work diligently to improve the accuracy of this report and endeavor to be more responsive to the needs of stakeholders. Any potential recommendations for improvement, as well as your criticism, can be emailed to augustin.aoudji@fsa.uac.bj

Executive summary

Securing employment is increasingly difficult for most agriculture graduates despite employment opportunities in the agricultural sector in Benin. The lack of adequate skills development was identified as one of the main challenges to it. Therefore, the present empirical research aims to explore the mismatch between the supply of and demand for skills in the agricultural labor market.

To this end, a quantitative research design employing a subjective approach has been followed. A survey, involving 654 agriculture graduate employees, 336 employers in the agricultural sector, and 29 heads of schools or departments in agricultural training institutions, was carried out. On the supply side, the findings revealed an agricultural educational system comprising agricultural high schools (TVETs) offering two academic levels, namely Tropical Agricultural Studies Certificate (BEAT) and Diploma of Tropical Agricultural Studies (DEAT), and agricultural higher education institutions with the following academic levels: bachelor's, master's/ Engineering, and PhD.

This system, with a great diversity of training programs, produced an increasing number of graduates. Moreover, agriculture graduates, regardless of their academic level, perceived that agricultural training institutions equipped them with hard skills but not most soft and digital skills as well as the necessary job search skills they have currently acquired through self-training and/or from their workplace. On the demand side, the key findings indicated that there is a variety of employment opportunities in the agricultural sector for graduates of any academic level. Furthermore, all types of skills (hard, soft, digital, etc.), despite the study level, were of high value to all types of employers in the agricultural sector.

The study further showed that among available majors, "agricultural economics and extension" will be more in demand in the next 5–10 years in the agricultural labor market, followed by majors such as animal production, crop production, fisheries and aquaculture, and nutrition and food sciences. In terms of mismatch, the findings revealed that even though there is a good match between the education level and occupations of most graduate employees, DEAT, bachelor's, master's, and PhD holders are substantially more overeducated than they are uneducated in their occupations. In addition,

only about 2% of bachelor's, master's, and PhD holders and 6.38% of DEAT holders have employments irrelevant to their fields of study.

The findings further showed that,

regardless of the academic level, there is a mismatch between agriculture graduates' skills and the demand of the labor market for soft, and digital skills under review.

The study suggested an update of curricula in agricultural training institutions, integrating the skills lacking at each academic level, establishing a collaborative platform between employing organizations and training institutions, prioritizing the implementation of training programs based on the demand concerning study level and field of study, and improving employment services through the implementation of internship placement programs, which fit the profile of graduates, and employment-oriented mentoring programs providing skills training on accessing and securing an employment.

I

Introduction

Background and rationale

Africa's youth unemployment rate in 2020 is estimated to be 10.7%, the lowest in the world (ILO, 2020). This positive but misleading statistic masks the real state of the youth in the labor market characterized by the high level of informal and menial jobs, wherein they suffer from underemployment and a lack of decent working conditions. Most importantly, this already precarious employment situation of the African youth is likely to worsen in the foreseeable future as they are projected to make up 42% of the world's youth by 2030 (UN DESA, 2015).

Like other African countries, the Republic of Benin also had a remarkably low youth unemployment rate of 4 % in 2019 (World Bank, 2019), but with about 72% of the workforce underemployed, including 30.4% and 63.2% in terms of working hours and remuneration respectively (INSAE & BIT, 2013). In response, the country adopted a National Employment Policy in 2012, implemented over the last decade. This policy promotes youth employment through different schemes and initiatives with a focus on agriculture. Agriculture remains a key sector to the country's economy, generating about 26.9% of the GDP (Word Bank, 2019) while providing unexploitative opportunities to tackle youth un(der)employment. The youth have opportunities in the agricultural sector for the following reasons.

First, the successful agribusinesses supported by existing entrepreneurship programs require a skilled labor force; and second, the economic growth (AfDB, 2018) and improvement of the business environment (World Bank, 2017) attract new private investments in the agricultural sector. For example, under the Grow Africa initiative, since 2015, 26 companies have signed letters of intent in Benin totalling US$378 million of which US$64 million has been invested so far (Grow Africa, 2017). Besides the agribusiness sector, more job opportunities exist for youth in other agriculture-related sectors including government, research, academia, civil society, and development institutions.

Beyond the well-known factors underpinning un(der)employment in Africa, including the weak structure of most African economies (Fox et al., 2016; Ebaidalla, 2016) and the overdependence on natural resources (Ebaidalla, 2016; Ackah-Baidoo, 2016), authors are increasingly evidencing the transition from school to work as a great challenge in the debate on youth un(der)employment (Dedehouanou et al., 2018; Awad, 2020). The school-to-work transition is a critical step for young people as it is an attempt at connecting education (skills supplied) and jobs (skills required). However, despite allocating significant resources to enhance the quality of education (Devarajan et al., 2011), many African countries continue to produce unsatisfactory educational results, and their graduates frequently lack the skills needed by employers in a variety of industries and

sectors (Morsy & Mukasa, 2019; Coovi & Noumon, 2020). This has resulted in skill mismatches as graduates' skills fail to meet job requirements (AfDB et al., 2012; Coovi & Noumon, 2020). Thus, with the availability of opportunities in the agricultural labor market, the issue of skills mismatch between the supply and demand has received high policy makers' interest in Africa.

Skill mismatches have adverse implications at the individual, organizational, and macro levels.

At the individual level, significant skill mismatches can affect salaries, decrease job satisfaction, and increase the probability of frequent job switching (Chevalier & Lindley, 2009; ILO, 2020). At the firm level, the failure to find skilled workers to perform required jobs has adverse implications for firm dynamism, productivity, and profit, as well as global competitiveness, growth, and – in some cases – firm survival (AfDB, 2019). At the macro level, structural skill deficits can hamper a country's competitiveness and wor-

sen unemployment issues (Boll et al., 2014).While there are extensive literatures examining the mismatch between an employee' skills and those required in the labor market in developed countries, empirical evidences from developing countries, especially in Africa, are limited (Battu & Bender, 2020). Only a few African countries have reported skills mismatch (Pitan & Adedeji, 2012; Handel et al., 2016; David & Nordman, 2017; Giotis, 2018). In addition, although agriculture is considered a sector of opportunity for young Africans, little is known about the agricultural labor market. Most of the current research on youth employment in Africa only pinpoint skill mismatches as a source of increased youth unemployment.

Although these studies acknowledge that skills mismatch is likely more widespread and harmful in African labor markets, they either lack empirical evidence or report only case study findings and anecdotal evidence (World Bank, 2015; Honorati & de Silva, 2016; McKenzie, 2017). Therefore, by undertaking the case study of the Republic of Benin, this research aimed at filling this knowledge gap.

1.2
Research objectives

The main objective of this study is to examine the mismatch between the supply of and demand for skills in the agricultural labor market in Benin.

Specifically, the study intends to:

- identify the skills supplied to the agricultural labor market;

- determine the skills required from agriculture graduates by employers in the labor market; and

- analyze the mismatch between the skills acquired by agriculture graduates and the demands in the agricultural labor market.

Research questions

The study addresses a few key questions, listed below:

- **What are the skills provided by agricultural training institutions and those displayed by agriculture graduate employees at their workplace?**

- **What are the skills that employers in the agricultural sector are expecting from agriculture graduates?**

- **What is the extent of the mismatch between the skill acquired by agriculture graduates and the demands in the agricultural labor market?**

1.4

Structure of the report

This report is structured as follows. Following this introduction, Chapter 2 presents the theoretical approaches to investigating skills mismatch. Next, Chapter 3 discusses the research methodology. Chapter 4 is dedicated to the analysis of skills supplied to the agricultural labor market, while Chapter 5 analyzes skills required in the agricultural labor market. In chapter 6, the mismatch between skills supply and demand in the agricultural sector is examined. Finally, Chapter 7 discuss the research main findings and presents the implications for policy and practice.

II

Theoretical approaches to investigating skills mismatch

2.1
Conceptual clarification

Skills A variety of definitions and understandings about the concept of skills exists in the literature, which are conceptualized based on different perspectives and research purposes. For Wagenaaar (2014), skills refer to the cognitive and metacognitive aptitudes, knowledge and understanding, values (ethical, cultural, attitudinal, and creative), and interpersonal, intellectual, and practical abilities that a learner must acquire to obtain a degree, certificate, or credential attesting training in a field of study.

This definition describes the acquisition of skills through formal training. According to Vallera and Bodzin (2016), skills denote the ability to use one's knowledge effectively and readily in execution or performance; it is a learned power for doing something competently. However, ETF et al. (2016) perceive skills as the ability to carry out mental or physical activity, acquired through learning and practice, where skills is an overarching term that conveys knowledge, competency, and experience as well as the ability to apply these to complete tasks and solve work-related problems.

This definition suggests that skills can be acquired through either formal or informal training. Skills can take many forms, namely hard, soft, digital, and job search skills (Table 1). In addition, skills are multidimensional in the literature and consider qualification (academic level and field of study) (McGuinness, 2018). In this study, skills were considered hard, soft, digital, or job search capabilities, competency, and the ability needed by agriculture graduates to be employable, as well as their qualification including the level of education and field of study.

Table 1. Types of skills

Types of skills	Meaning
Hard skills	The abilites required to perform tasks and functions particular to a job. Also called occupational skills, technical skills, or vocational skills, these types of skills are associated with a particular task. Therefore, a graduate who does not possess such skills is unlikely to be able to carry out this task or will be less productive than somebody who has these skills.
Soft skills	These types of skills are also known as employability skills, transferable skills, or generic skills and are referred to as intra- and inter-personal skills, essential for personal development, social participation, and workplace success. These skills apply to work in general, rather than being specific to an occupation or industry.
Digital skills	Skills needed by graduates to become "digitally literate." These skills relate to the ability to locate, organize, understand, evaluate, create, and share information using digital technology. They can enable graduate to thrive in current and future digital environments.
Job search skills	Skills required to seek and secure employment in a competitive job market. These types of skills are also called job seeking skills.

Source: adapted from Bawden (2001), Kechagias (2011), Daud et al. (2012), and Wanberg et al. (2020)

Skills mismatch

Skills mismatch refers to the discrepancy between the skills possessed by workers and those required for performing their jobs (Desjardins & Rubenson, 2011; Farooq, 2011). The concept of skills mismatch is very broad and can incorporate a variety of dimensions. It may convey a mismatch of overall skills or types of skills (Stoevska, 2018). Specifically, skills mismatch describes vertical mismatch (usually measured in terms of overeducation, undereducation, overskilling, and underskilling) and/or horizontal (field of study) mismatch (Table 2) (Sloane, 2014; Montt, 2015; McGuinness et al., 2018; Bol et al., 2019). In this study, both the vertical and horizontal mismatches were explored (Table 2).

Table 2. Main types and dimensions of skills mismatches

Type of mismatches	Dimension	Definition
Overeducation	Vertical	The job requires a lower level of education than that of the employee
Undereducation	Vertical	The job requires a higher level of education than that of the employee
Overskilled	Vertical	The employee's level of skills (knowledge, competency, and abilities) exceeds the job requirements
Underskilled	Vertical	The employee's skills level falls short of the job requirements
Field of study mismatch	Horizontal	The worker trained in a particular field of study works in another field

Source: Authors

2.2
Theoretical framework

There is no single cohesive and widely acknowledged theory addressing mismatch. Therefore, existing theoretical frameworks seek to explain mismatches in the labor market using supply and demand side techniques. The human capital theory developed by Becker (1964) argues that skills mismatch can be explained by inefficiencies in the labor market and that organizations need time to adjust their production technologies to fully utilize the human capital stock. Moreover, the job competition theory (Thurow, 1975) confirms the importance of an individual's relative attitude in work progression. According to the theory, each profession demands particular characteristics and skills necessary to advance. Furthermore, the career mobility theory (Sicherman & Galor, 1990) evidences that skills mismatch supports a more comprehensive human capital theory. According to the career mobility theory, firstly, employees take entry level positions that require fewer years of education or a lower level of skills to gain experience and eventually progress in their career; secondly, undereducated/underskilled employees may have less experience, training, and tenure than adequately educated employees.

Additionally, the assignment theory proposed by Sattinger (1993) specifies that the wage rate is determined by employees' human capital as well as the occupational characteristics and that mismatch depends on both employees and the career characteristics. From all the discussed theories, the human capital theory and career mobility theory focus on the supply side, while the job competition theory focuses on the demand side. Assignment theory incorporates both the supply and demand sides, as does this study. As a result, this research is based on the assignment theory to examine the skills mismatch in the agricultural labor market in Benin (Figure 1).

> The assignment theory can be considered a mixture of the human capital and job competition theory. Assignment theory states that workers' income or utility maximization guides them to choose some jobs over others, but of equal importance are jobs or professions available to workers and the mechanism that assigns workers to jobs that need to be considered.

Thus, for a particular job, certain workers will have more advantages (due to their skills acquired through formal training) than others. This theory suggests that productivity (and wages) will depend on the extent of the match between the job requirements and worker skills and that the likelihood of a skills match is dependent on both the skills requirement in a particular occupational group and the supply of workers from the corresponding field. Therefore, employment is allocated based on not only an employee's characteristics but also the profession's characteristics (Figure 1). Thus, the theory effectively predicts that workers with mismatched skills will suffer a wage penalty due to their lower productivity (caused by their lack of field-specific skills) or higher wages (i.e., the need to acquire field-specific skills) than their peers with well-matched skills. A worker with mismatched skills will not be able to use his/her field-specific skills on the job, and their employers will not reward these skills. Mismatched workers are thus expected (and do in general) earn lower salaries when compared with their well-matched peers (Wolbers, 2003; Robst, 2007; McGuinness & Sloane, 2011). Further, assignment theory suggests that the process of allocation of workers to jobs needs to consider both the supply of and demand for workers to understand skill mismatch.

According to this theory, a natural equilibrium will be reached whereby either labour demand (firms) will adjust to available human capital stocks to make full use of skills, or alternatively, labour supply (employees) will refrain from investing in unnecessarily high levels of education, unnecessary fields of study, or undesirable skills (Figure 1).

Figure 1. Conceptual framework of the study

Approaches to investigating skills mismatch

Four approaches can be used to measure skills mismatch: subjective, empirical/statistical, objective, and mixed (Table 3) (Perry et al., 2014; Desjardins, 2014; Kiss & Vandeplas, 2015; Flisi et al., 2017; Kouakou & Yapo, 2019; Kriechel & Vetter, 2019). Each approach's pros and cons have been addressed in the literature. The description and the pros and cons of each approach are detailed below.

The subjective approach is self-declared/self-reported/self-assessed This approach generally relies on information provided by workers and incorporates two types of methods (Table 3). The first is direct self-assessment (DSA) that directly elicit workers' opinion regarding whether their job requirements match or are related to their level of skills. The second method, indirect self-assessment (ISA), asks about the required skills level for a position and the actual skills level to get or do the job. With these measures, there is a lack of the direct information on the demand side, and the job requirements need to be inferred. Therefore, a new method has been proposed to address this problem. Many surveys now include questions on the skills the employer requires for the job (Pellizzari & Fichen, 2017). The question may be about the current requirements or those at the time of hiring (or both). The subjective reports by respondents are particularly susceptible to measurement errors, which can vary from person to person.

For example, individuals may overstate the requirements of their job to inflate the status of their position. They might also be poorly informed about the performance of people with different levels of skills. Further, especially concerning education, workers' answers may simply reproduce current hiring standards, which may cause problems if schooling levels of employees in the labor force increase over time, resulting in employers adjusting hiring standards when the jobs themselves have not changed. On the other hand, the subjective approach has the advantages of being easily observable, specific to the respondent's job, and up-to-date.

The empirical/statistical approach is also known as realized matches (Table 3) and employs two types of sub-methods: the mean and the mode. The mean method sets the mean skills as a hiring standard for all employees within the same profession.

Employees are then classified as over-educated/skilled or under-educated/skilled. Employees with several years of education who are classified within one plus or minus standard deviation of the mean are deemed to be well-matched (Zakariya, 2012).

The mode method uses the mode of the level of skills instead of the mean. Also, it does not consider standard deviations. The realized-matches methods are employed by the human resources departments of enterprises (Flisi et al., 2014; Montt, 2016). The empirical/statistical approach offers the undisputed advantage of being always implementable since measures of mismatch based on this method is computed directly from the data; however, they do present a few drawbacks. First, they tend to be rather sensitive to cohort effects. When considering education, this can be easily seen in the case of a rapid change in the educational level required for a given occupation. For instance, given that younger cohorts generally enter the labor market

with higher qualification than the existing workforce, using the mode/mean educational level of the entire workforce for a given occupation, without age distinction, reflects the qualifications of people hired at different times.

Hence, simply comparing this with the individual educational level can lead to misleading conclusions about the skills mismatch. Moreover, from a more methodological point of view, the choice of, for example, one standard deviation as a threshold is completely arbitrary, and results tend to depend on the level of aggregation necessary to obtain a reliable distribution of education/skills for occupations (identified using the 1 or 2 digits of the International Standard Classification of Occupations – ISCO).

In a similar way, the choice between using the mode and the mean involves some degree of arbitrariness as well, although the former is usually preferred since using the mode as reference point has the advantage of being less sensitive to outliers and technological change.

Finally, another drawback of this approach is that it does not allow more than one educational level as appropriate for particular occupations, especially if they are broadly defined.

The objective approach is defined as normative/ systematic job analysis/ evaluation (Table 3).

It uses the information given by professional analysts regarding the qualifications required for a profession (external assessment measure). The main source of such information is the International Standard Classification of Occupations, which classifies each occupation by the corresponding educational level needed. This is used to measure qualification mismatch by comparing current education with the standard requirements for a given profession. Conceptually, this approach may be superior to the subjective and empirical/statistical approaches as the educational level required for a job is determined by trained job analysts. However, the method relies not only on the assumption that all jobs with the same title have the same educational requirements but also that this is true in all countries following the same occupational classification.

However, implementing this method is very costly, and it is likely to become obsolete quickly if the analysis is not updated on a regular basis. Moreover, since the classifications are based on expert opinion, a certain level of subjectivity persists.

Several mixed methods have also been employed in the literature, combining the above-mentioned methods depending on the availability of data whereby both objective and subjective methods are merged (Cedefop, 2010; OECD, 2013). Thus, Chevalier (2003) and Chevalier & Lindley (2009) mixed the objective approach with the

subjective approach to obtain a more refined measure of overeducation. They used the objective approach to determine whether an individual is overqualified. Then, they posed a subjective question on the "satisfaction regarding the match between education and job" to divide the overqualified into apparently overqualified (the normatively overqualified satisfied with their match) and genuinely overqualified (the normatively overqualified unsatisfied with their match).

Given that measuring skills mismatches is not straightforward and remains controversial,

this research adopts the subjective approach to analyze the mismatch between supply of and demand for skills in the agricultural labor market in Benin, even though such a method has been considered and later rejected by other researchers on the grounds that it is based on individual's perception which is likely to easily overstate their skills level. While this research concedes that this is, strictly speaking, true, it would argue that the seriousness of this problem has been exaggerated, and that, if applied and analyzed with appropriate caution, skills mismatch measures based on this approach yield valid results and provide highly valuable insights. The measure of mismatch used in this study is defined in detail in the next chapter.

Table 3. Summary of mismatch type and measurement method

Approaches	Measurement methods	Type of mismatch
Subjective	Indirect self-assessment	Overskilled/underskilled; overeducated/undereducated; field of study mismatch
	Direct self-assessment	overskilled/underskilled; overeducated/undereducated; field of study mismatch
Empirical	Realized matches	Overskilled/underskilled; overeducated/undereducated; field of study mismatch
Objective	Job evaluation	Overeducated/undereducated; field of study mismatch
Mixed	Alternative method	overskilled/underskilled; overeducated/undereducated; field of study mismatch

Source: *Authors*

III

Research methodology

Population and sampling methods
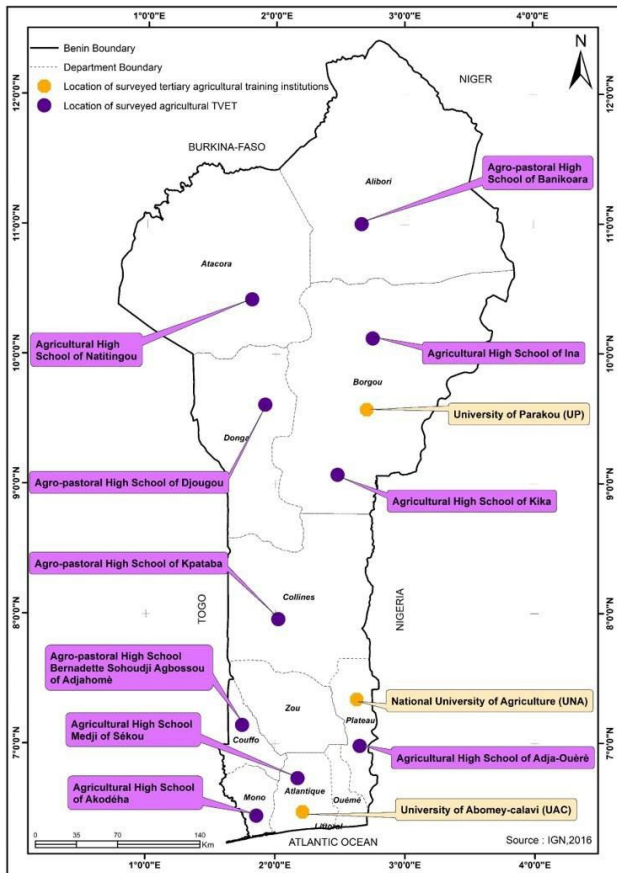
Source: *Authors*

Figure 2. Map of Benin showing the location of the surveyed agricultural training institutions

This study investigates three groups of stakeholders including the public agricultural training institutions (AgTIs) composed of agricultural technical and vocational education and training and agricultural higher education; the employers in the agricultural labor market (AgER); and the employees who graduated from agricultural training institutions (AgEEs).

As for the agricultural training institutions, all those that are formally recognized by the secondary schools and higher education ministries (a total of 29) were included in the sampling and visited. These AgTIs were distributed across the country (Figure 2). The heads and/or human resources officers from each institution were interviewed.

Regarding the employers in the agricultural labor market, the sampling was stratified with the strata indicating the status of employers including public organizations (POrg), private sector (PSect), civil society organizations (CSO), and international organizations (ItOrg). The sample frames were generated using secondary documents and discussions with key informants. For each stratum, a minimum size of 30 employers was fixed, corresponding to the minimum statistically acceptable sample size for accurate estimation (Hogg & Tanis, 2005; Curran-Everett, 2017). About 336 employers in the agricultural labor market were selected and distributed as the following: 60 POrg, 190 PSect, 76 CSO, 09 ItOrg[1] . The surveyed AgERs were distributed across the country in 53 districts (Figure 3).

[1] The expected number of 30 for the category of international organizations were not reached during data collection due to their limited number and the unavailability of some.
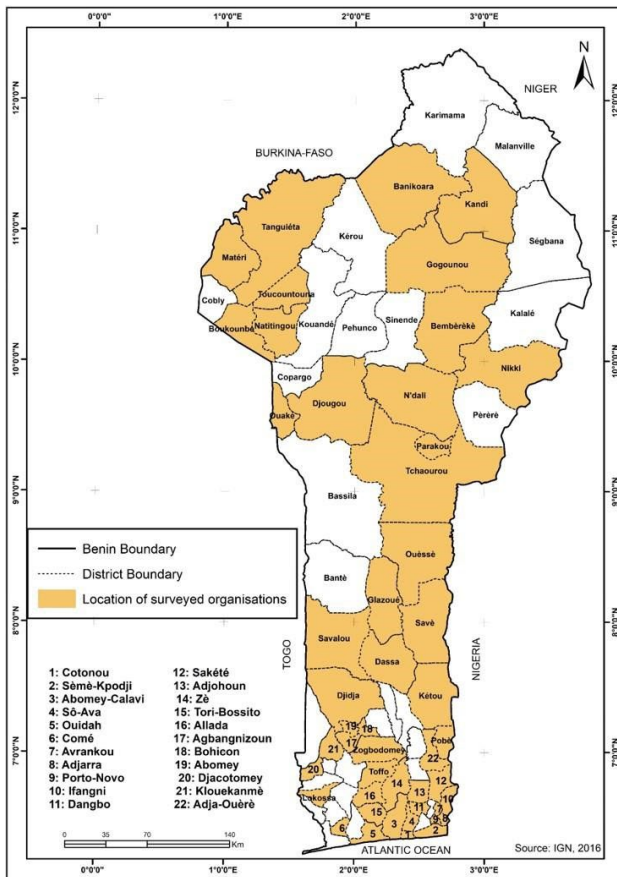
Source: Authors

Figure 3. Map of Benin showing the surveyed districts of organizations employing graduates from agricultural training institutions

Finally, for the employees who graduated from agricultural training institutions, the sampling was aligned with the employers in the agricultural labor market sampling structure to cover the existing variation of employers.

For each selected employer in the agricultural labor market, 1–3 employees were randomly chosen (covering different academic levels whenever possible). Thus, a total of 654 employees in the agriculture sector were selected, including 228 from TVETs[2] and 426 with higher education background.

3.2
Data collection

(i). Supply of skills

Individual interviews were conducted with the staff of the agricultural training institutions on training curricula and skills acquired by students by the end of the training. These skills include hard, soft, digital, and job-search skills. Soft, digital, and job-search skills (appendix 2) were gathered from different studies (Gates et al., 2016; Miroro, 2019) and validated by key informants comprising employers and experienced employees. During the interviews with the staff of the agricultural training institutions, they were asked to give, regarding each skill, their perception (Yes/No) on the delivery of this skill by their training programs.

In the second step, individual interviews were conducted with employees who graduated from these agricultural training institutions. In addition to the socio-demographic characteristics of the employees and their current position, the employees were asked to rate their current level of skills based on the validated lists provided by key informants and the level of skills acquired from the agricultural training institutions using a five-point Likert scale

(1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = very good).

The measurement of both levels of skills is carried out since the level of skills is dynamic and such measurement will make it possible to analyze this dynamism. The Cronbach method was utilized to test the reliability of the instrument used. The instrument showed a good internal consistency reliability with Cronbach's Alpha ranging from 0.82 to 0.87 for each skill group and across academic level (BEAT[3] , DEAT[4] , BSc, MSc, and PhD). The values indicated that the instrument was reliable according to the recommendation of a minimum level of 0.70 by Pallant (2001). Furthermore, respondents were also requested to rate their perception on the matching of their job position with their field of study using a five-point Likert scale

(1 = inadequate, 2 = merely adequate, 3 = adequate, 4 = very adequate, 5 = perfectly adequate).

The last two categories (4 = Very adequate, 5 = Perfectly adequate) were combined into the category of adequate field of study match.

3   Tropical Agricultural Studies Certificate (Brevet d'Etudes Agricoles Tropicales: BEAT). It is the first diploma representing the first academic level at the public agricultural technical high schools (TVETs) in Benin.

4   Diploma of Tropical Agricultural Studies (Diplôme d'Etudes Agricoles Tropicales: DEAT). It is the second diploma representing the second academic level the at public agricultural technical high schools (TVETs) in Benin.

(ii). Demand for skills

Individual interviews were carried out with employers in the agricultural sector, collecting data on the organization *(regarding the sector, legal status, background of business owner, etc., if a PSect)*, the personnel of the organization *(number of employees, the background and position of AgEE, etc.)*, the organization's human resources policy *(need for recruitment and the existence of employees upgrading policy)*, the potential need (in the next 5–10 years) for hard skills and academic levels. Using the same validated list of skills provided by key informants, the perceived level of skills needed (hard, soft, and digital) by agriculture employers for getting a job was also rated using a five-point Likert scale:

1 = not important, 2 = less important, 3 = neutral, 4 = important, and 5 = very important.

The reliability coefficient of the instrument ranged from 0.82 to 0.95 (Cronbach's Alpha) for each skill group, which confirms the instrument's reliability.
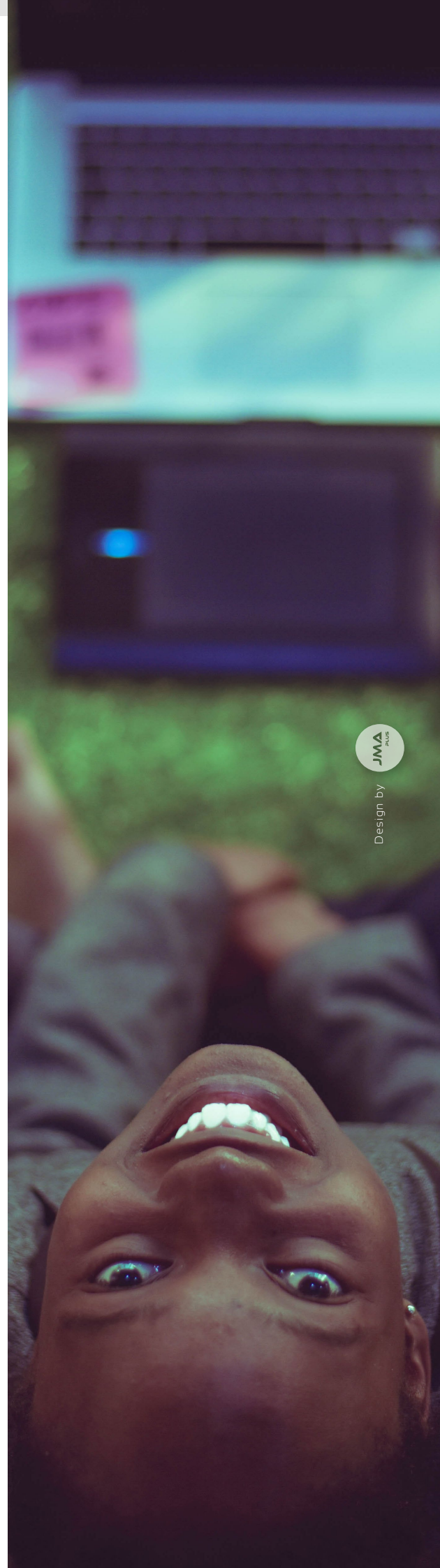
3.3
Data analysis

(i). Identification of skills supply

Relative frequency was used to characterize the profile of graduate employees (including their academic qualification) and the perception of the staff of the agricultural training institutions on the diversity of skills delivered. In addition, the mean score was computed for each skill (hard, soft, digital, and job search) to identify the skills provided by agricultural training institutions and those acquired outside the AgTIs as perceived by graduate employees. For each academic level, a skill was considered as supplied by AgTIs when the mean score was equal to at least 3, the median of the Likert scale used. To this end, the one-sample Wilcoxon test was performed for each specific skill.

(ii). Identification of skills demand

Relative frequency was utilized to characterize organizations employing agriculture graduates and describe potential qualifications in the next 5–10 years. Moreover, the mean score for each skill (hard, soft, and digital) was calculated to identify the skills needed in the agricultural labor market. As a rule of identification, employers consider a skill as demanded when the mean score is equal at least to the median of the Likert scale used (3 in this case). To check this, the one-sample Wilcoxon test was performed for each specific skill. Furthermore, the Kruskal–Wallis test was also conducted to determine the differences between the type of employers concerning the skills identified.

(iii). Identification of skills mismatch

Five types of skills mismatch were analyzed in this study, namely overskilled, underskilled, overeducation, undereducation, and field of study mismatch. The relative frequency was used to analyze overeducation, undereducation, and field of study mismatch types. Graduate employees were considered overeducated when their level of education was higher than that required to perform their job and undereducated when their level of education was lower than that required to perform their job (Flisi et al., 2017; McGuinness, 2018).

Furthermore, to analyze the overskilled and underskilled mismatch types, the mean score for each skill needed and supplied (hard, soft, and digital) was compared among different academic levels (Pitan & Adedeji, 2012; Tsirkas et al, 2020). The mismatch was evaluated for each study level based on the gap between the mean skill demand and the mean skill supply. For each specific skill, the discrepancy between the mean skill supply and the mean skill demand represented the skill mismatch. Accordingly, agriculture graduates were considered underskilled when the level of skills supply was lower than the requirement of the labor market and over-skilled when the level of skills supply was higher than the labor market's requirement. The Mann–Whitney test was performed to check the differences in medians between both groups.

IV

Skills supplied to the agricultural labor market

Agricultural training system

Formal agricultural training in Benin is carried out by agricultural technical high schools (TVETs) and universities.

There are 10 public TVETs in Benin that are spread throughout the country. The training system of agricultural TVETs is presented as follows. At the end of the first four years, students obtain the Tropical Agricultural Studies Certificate (Brevet d'Etudes Agricoles Tropicales: BEAT), and after another four years, they receive the Diploma of Tropical Agricultural Studies (Diplôme d'Etudes Agricoles Tropicales: DEAT) (Figure 4). The conditions for securing entry into

public agricultural technical high schools are as follows: for level 1 (BEAT), the candidate might have the primary school certificate and must complete the second year of junior high school, with an age between 13 and 17; for level 2 (DEAT), the candidate must have the O-level or BEAT and of age between 14 and 20.

At the university level, there is one public university of agriculture in Benin (National University of Agriculture), with many specialized schools, and two public faculties of agriculture under two other universities (University of Abomey-Calavi: UAC and University of Parakou: UP). The conditions for securing

entry to these agricultural training institutions depend on the level of study sought. After completing the scientific A-level (Baccalauréat) or DEAT, some graduates go to university and get their bachelor's degree after three years of study and their master's degree two years after that. However, some spend five years after finishing A-level or DEAT in pursuit of an agricultural engineering degree[5] .

Master's graduates meeting the requirements of the doctoral schools of the universities could undertake PhD studies for a minimum of three years (Figure 4).
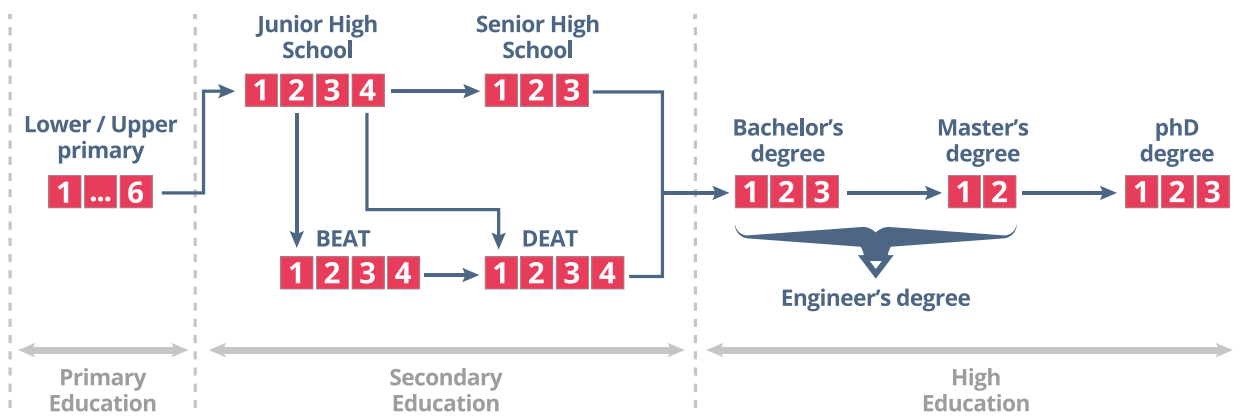
Note: The numbers in each box represent the years of schooling for each academic degree.
Source: Authors

Figure 4. Mapping of the education system in the agricultural sector of Benin

5   We regarded an engineering degree as the equivalent of a master's degree in this report. Besides, most of the surveyed with five years of university education got the master's degree.

4.2
Agricultural training programmes

The public agricultural TVET institutions provide two training programs at the BEAT level: crop production and animal production. In contrast, six agricultural training programs are offered at the DEAT level (Table 4). The training programs are developed and implemented by the Department of Educational Inspection, Innovation and Quality (DIPIQ), which also oversees quality control.

Table 4. Training programs in public agricultural technical high schools (TVETs)

Study levels	Training programs	TVET locations
BEAT	• Crop production • Animal production	Natitingou, Ina, and Adjahomè
DEAT	• Crop production • Animal production • Nutrition and food technology • Fisheries and aquaculture • Forestry • Rural planning and equipment	Akodéha, Adjahomè, Adja-Ouerè, Kika, Banikoara, Ina, Natitingou, Sékou, Kpataba, and Djougou

Source: *Survey data*

The public university and faculties of agriculture offer a diversity of programs for each study level (bachelor's, master's, and PhD) (Table 5). In each university, the Doctoral School of Agricultural and Water Sciences trains PhD students. Furthermore, there are faculties and schools at the University of Abomey-Calavi and the University of Parakou that are not focused on agriculture but offer specific agricultural training programs. These institutions are the Polytechnic School of Abomey-Calavi, the Faculty of Economics and Management, the Faculty of Science and Technology, and the National Water Institute at the University of Abomey-Calavi. At the University of Parakou, the Faculty of Economics and Management has a specific program on the agricultural sector.

The country also has private universities with agricultural departments, offering a diversity of programs at the BSc and MSc level.

Table 5. Training programs offered by main public agricultural higher education institutions

University	Faculty/School	Degree level	Training programs[6]
National University of Agriculture (UNA)	Specialized Schools	BSc	• Horticulture and Development of Protected Areas • Management and Seed Production • Aquaculture • Management and Exploitation of Livestock Systems • Sciences and Techniques of Conservation and Processing of Agricultural Products • Forestry and Wood Engineering • Agricultural Machinery and Mechanical Construction • Agribusiness and Agricultural Policy • Rural Sociology and Agricultural Extension
		MSc	• Plant Biotechnology and Seed Production • Food Science and Technology • Tropical Forestry • Aquaculture • Agricultural equipment • Rural Infrastructure and Sanitation
	Doctoral School of Agricultural and Water Sciences	PhD	• Crop Production and Plant Genetic Resources • Fisheries Sciences and Applications (Fisheries and Aquaculture) • Horticulture, Environment, and Development • Eco-Design and Energetic Valorization in Agriculture, Rural Engineering • Forestry and Wildlife Management • Animal Production and Health • Nutrition and Food Sciences • Rural Economics, Agricultural economics, and Management • Rural Sociology and Agricultural Extension
University of Abomey-Calavi (UAC)	Faculty of Agricultural Sciences	BSc	• Sciences and Techniques of Crop Production • Sciences and Techniques of Animal Production • Nutrition and Science and Food Technology • Rural Economy and Farm Management • Agricultural Entrepreneurship • Rural Engineering and Mechanization in Agriculture, Fisheries and Aquaculture • Forestry and Natural Resource Management
		MSc	• Forest Resource Development and Management • Protected Areas and Natural Paths • Fisheries and Aquaculture Management • Biotechnology and Plant Improvement • Sustainable Tropical Soil Fertility Management • Sustainable Pest Management and Biopesticide Valorization

---

6   In the rest of the report, training programs with the same content but different names have been grouped under the same name to avoid duplication.

University	Faculty/School	Degree level	Training programs[6]
		MSc	• Economics, Sociology, and Rural Extension[7] • Human Nutrition and Food Safety • Agricultural and Food Science and Technology • Animal Production and Biotechnology • Sciences and Techniques of Animal Production • Rural Engineering and Agricultural Mechanization • Food and Nutritional Safety • Management of Forests, Protected Areas, and Natural Grazing Lands • Rural Engineering, Water, Fisheries and Aquaculture • Agricultural Economics • Management of Agricultural Innovations
	Doctoral School of Agricultural and Water Sciences	PhD	• Plant Genetic Resources and Crop Protection • Nutrition and Food Sciences • Development and Management of Natural Resources • Animal Resources Management • Economics and Rural Extension
University of Parakou (UP)	Faculty of Agriculture	BSc	• Sciences and Techniques of Crop Production • Sciences and Techniques of Animal and Fishery Production • Nutrition and Food Science • Rural Economics and Sociology • Development and Management of Natural Resources
		MSc	• Sciences and Techniques of Crop Production • Sciences and Techniques of Animal and Fishery Production • Nutrition and Food Science • Rural Economics and Sociology • Development and Management of Natural Resources • Economics of Natural Resources[8] • Population, Demography, and Natural Environment[8]
	Doctoral School of Agricultural and Water Sciences	PhD	• Economics of Natural Resources • Sociology of Natural Resources • Animal Production • Plant Protection • Development and Management of Natural Resources • Monitoring and Conservation of Biodiversity • Rural Sociology and Extension

Source: *Survey data*

7	The master's in Economics, Sociology and Rural Extension is no longer offered at FSA–UAC since the 2018–2019 academic year. This program has been split into two, namely Agricultural Economics and Agricultural Innovation Management.
8	This program is hosted by the doctoral school at UP.

4.3
Performance of the agricultural training system

Between 2015 and 2019, about 14802 students graduated from public AgTIs in Benin, including 8739 from TVETs and 6063 from universities (Table 6). DEAT graduates constituted the majority of the graduates of public AgTIs between 2015 and 2019 (2015–2019), followed by the bachelor's, master's, BEAT, and PhD levels respectively (Table 6). In addition, each year, male graduates were in the vast majority regardless of level of study (Table 6).

Table 6. Trends of agriculture graduates according to academic levels and sex in Benin

	Study levels	2015		2016		2017		2018		2019		Total
		M	F	M	F	M	F	M	F	M	F	
TVET	BEAT	80	10	120	12	126	31	128	21	107	38	673
	DEAT	777	157	1020	236	1541	403	1742	425	1419	346	8066
University	Bachelor's	644	141	605	178	699	191	535	159	545	200	3897
	Master's	169	37	229	86	323	130	380	144	382	176	2056
	PhD	3	3	20	10	16	6	12	3	29	8	110
TOTAL		1673	348	1994	522	2705	761	2797	752	2482	768	**14802**[9]

Note: *M and F denote male and female respectively.*

Source: *Official records of agricultural training institutions*

There has been a growth in the number of BEAT graduates between 2015 and 2019, with the major crop production in the lead (Figure 5). The number of crop production graduates rose from 2015 (64) to 2017 (105) before declining slightly from 2018 (81) to 2019 (72) (Figure 5). As for the number of graduates who majored in animal production, there has been growth between 2015 and 2019, ranging from 26 in 2015 to 73 in 2019.
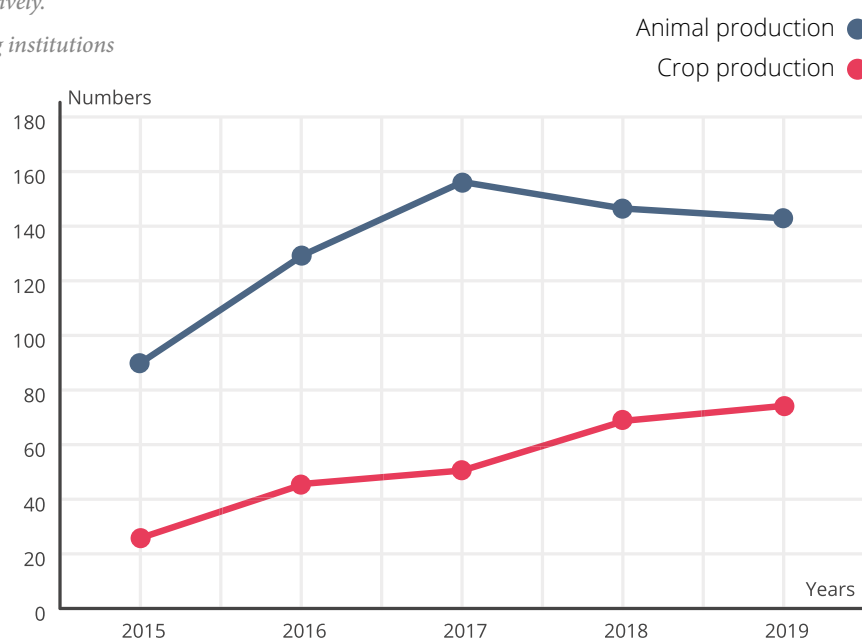
Source: *Official records of agricultural training institutions*

Figure 5. Trends of BEAT graduates based on various majors in Benin

9   This value denotes the number of graduates from agricultural training institutions between 2015 and 2019. It is important to know that some of the graduates transitioned at different acadeùic levels and are therefore counted several times. Taking this into account might lower this value.

Regardless of the major, there was an increase of DEAT graduates from 2015 to 2018, before decreasing in 2019 (Figure 6). The three most popular specialities in terms of the number of graduates were rural planning and equipment, fisheries and aquaculture, and forestry respectively. The major "crop production" was the least represented (Figure 6).
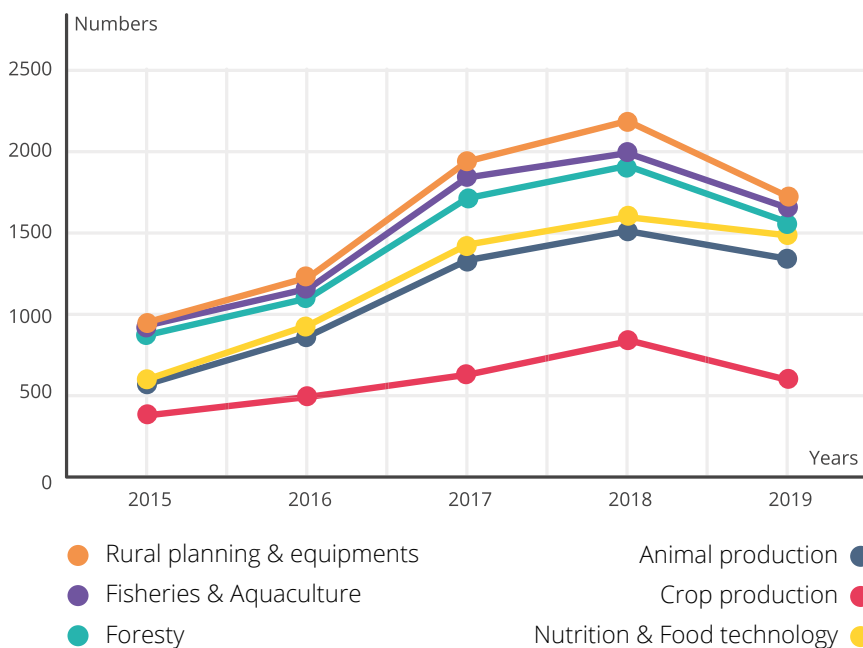
Figure 6. Trend of DEAT graduates based on various majors in Benin

Majors at the bachelor's level in agricultural training institutions can be grouped into mainly eight (Figure 7). There is a non-constant variation each year in terms of the number of graduates produced. The first three majors in 2019 were respectively animal production and related majors (162), crop production and related majors (133), and agricultural economics and extension and related majors (88). From 2015 to 2018, crop production and related majors was the first in terms of the number of graduates released (Figure 7). Agricultural entrepreneurship was the least represented, with 11 graduates produced in 2019 (Figure 7).
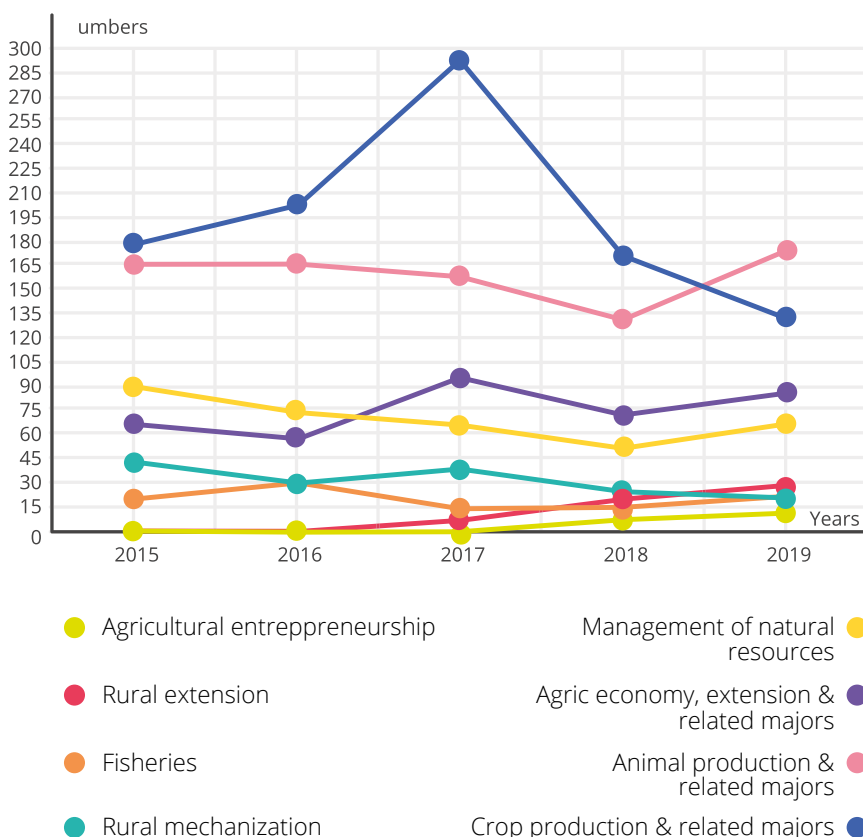
Figure 7. Trends of bachelor's graduates based on various majors in Benin

Majors at the master's level in agricultural training institutions can also be categorized into eight main majors with a non-constant variation in terms of graduates released in the period 2015-2019 (Figure 8). The most popular majors in 2019 were crop production and related majors (122), management of natural resources (104), and agricultural economics and extension and related majors (70), respectively. Rural sociology and extension were the least represented, with four graduates released in 2019.
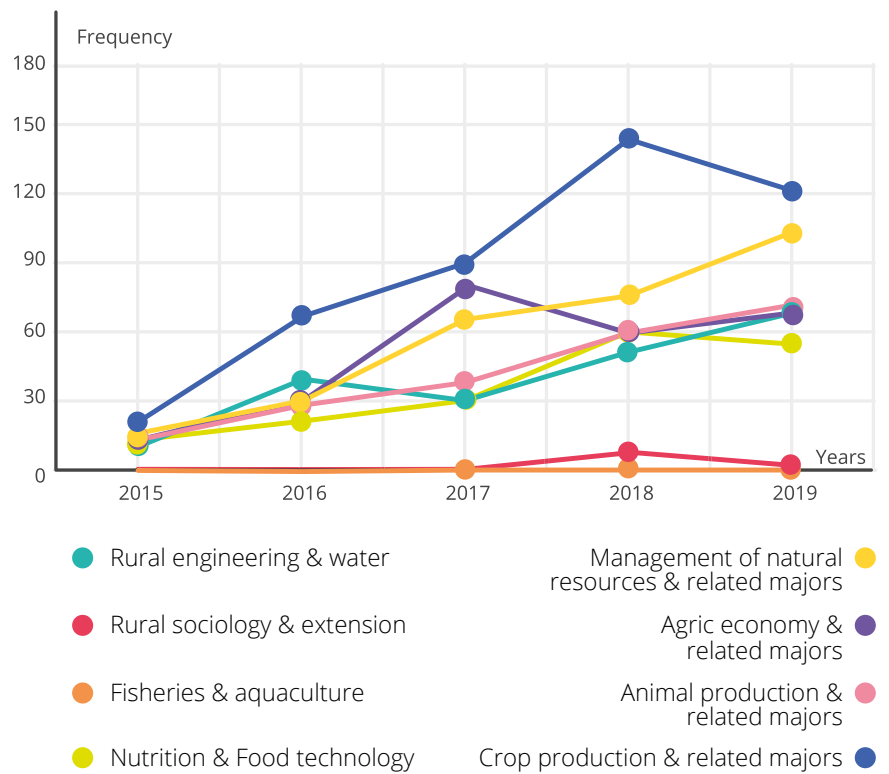
Figure 8. Trends of master's graduates based on various majors in Benin

Among PhD graduates released from agricultural training institutions, the management of natural resources and land use planning was the leading major in terms of numbers during the period 2016-2019 (Figure 9). For the other majors, a non-constant variation was observed each year (Figure 9). Figures from 2019 showed that based on the numbers of graduates, after the management of natural resources and land use planning (10), the following majors are ranked respectively: agricultural economics and extension (9), animal production (8), and nutrition and food sciences (4) (Figure 9).
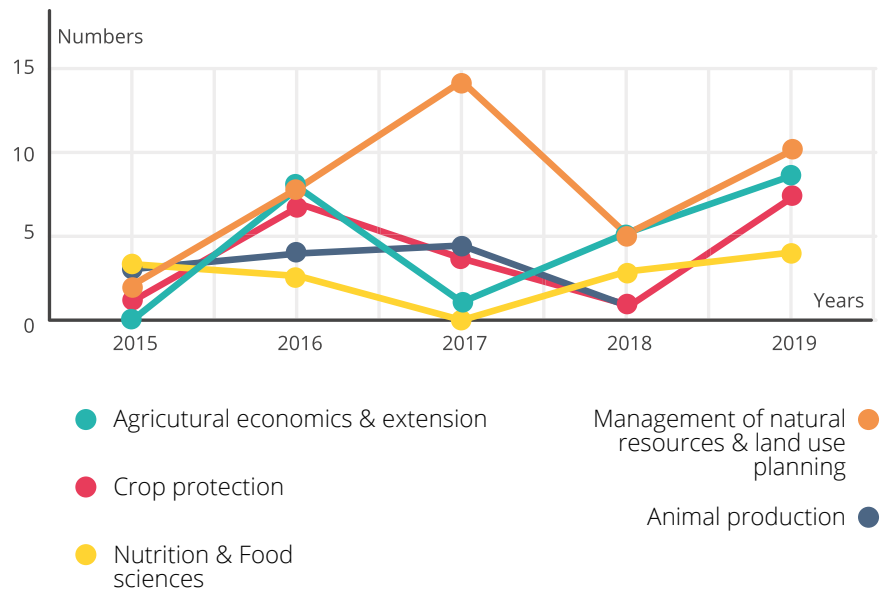
Figure 9. Trends of PhD graduates based on various majors in Benin

Profile of graduate employees in the agricultural sector

Most AgEEs were male regardless of the academic level. For instance, male graduate employees accounted for 82.5%, 78.2%, 75.1%, and 89.2% for BEAT, DEAT, bachelor's, master's, and PhD levels respectively (Table 7). The low representation of female employees in agricultural organizations could be because fewer females graduated from agricultural training institutions (see section 4.3).

The age of graduate employees in agricultural organizations varies according to the academic level. For example, most BEAT, DEAT, and bachelor's graduates were aged between 19 and 29 years, while those with master's and PhD degrees were mostly over 35 years old (Table 7).

The representation of academic levels in organizations that employ agriculture graduates also varies (Table 7). For example, most BEAT graduates were hired by private companies (55%) and public organizations (30%). DEAT graduates, in addition to private enterprises (48.4%) and public organizations (30.3%), were employed to a lesser extent by civil society organizations (21.3%). The proportion of BEAT graduates in various organizations in the agricultural sector was almost the same for DEAT graduates (Table 7). As for master's graduates, they were more represented in public organizations (41.6%) and civil society organizations (36.8%). Public organizations employed most PhD graduates (81.1%) besides, to a lesser extent, international organizations (13.5%).

The majors of crop production and animal production were chosen by respectively 55% and 45% of the BEAT graduate employees surveyed. The proportion of BEAT graduates released by agricultural TVETs followed the same trend for both majors. Those with DEAT surveyed have the same characteristic trends as BEAT graduate employees in terms of main majors with an extremely low representation for majors such as nutrition and food sciences (2.7%) and agricultural machinery/equipment (2.7%). The proportion of DEAT graduates released by TVETs showed a reverse trend according to this finding. This may be a source of these graduates' unemployment or self-employment. Moreover, the major of most bachelor's graduate employees was crop production and related (35.3%) and, to a lesser extent, animal production and related, management of natural resources and land use planning, agricultural economics and extension, and nutrition and food sciences (Table 7). In contrast, agricultural economics and agricultural extension were more prevalent among master's graduate employees. Among PhD graduate employees, there was a diversity of majors with crop production and related (24.3%) and management of natural resources and land use planning (24.3%) being the most common (Table 7).

Most AgEEs, regardless of the academic level, were at their first job (Table 7). The highest flow of AgEEs with the first job was among employees with DEAT (63.8%). On the other hand, about 30% of PhD graduates had worked more than three jobs since graduation (Table 7).

About half of the AgEE surveyed, despite their academic level, got their first job within six months of graduation (Table 7). The duration was quite reasonable. It is evident that it is not too difficult for graduates having the relevant skills and/or social network to find employment. However, it is important to know the role of networking and the right skills that help graduate employees to find employment as well as the way they acquired these skills.

Most AgEE surveyed who were BEAT, DEAT, bachelor's, and master's graduates worked up to two years, indicating a relatively new and transient workforce (Table 7). Moreover, most PhD graduates in agriculture (35.1%) worked up to five years, meaning this group had more work experience. Besides, PhD holders' initial work experience was gained with a lower degree, hence their cumulative work experience when they graduate PhD is considerable.

Table 7. Profile of graduate employees in the agricultural sector by the level of education

Graduate's profile	Academic degree				
	BEAT	**DEAT**	**Bachelor's**	**Master's**	**PhD**
Sex (%)					
Male	82.5	78.2	80.4	75.1	89.2
Female	17.5	21.8	19.6	24.9	10.8
Age (%)*					
19–29	40	54.2	57.8	33	0
30–35	25	21.3	23	30.8	18.9
>35	35	24.5	19	36.2	81.1
Type of employing organization (%)*					
Civil society organization	15	21.3	24.5	36.8	2.7
Private enterprise	55	48.4	42.2	15.1	2.7
Public organization	30	30.3	29.9	41.6	81.1
International organization	0	0	3.4	6.5	13.5

Graduate's profile	Academic degree				
	BEAT	**DEAT**	**Bachelor's**	**Master's**	**PhD**
Graduate employees' major (%)*					
Crop production and related majors	55	47.3	35.3	24.9	24.3
Animal production and related majors	45	30.8	16.2	10.8	8.1
Management of natural resources and land use planning	0	10.1	14.2	18.4	24.3
Agricultural economics and extension	0	0	14.2	30.3	16.2
Nutrition and food sciences	0	2.7	11.3	9.2	16.2
Aquaculture	0	6.4	3.4	2.7	8.1
Agricultural machinery and mechanical building	0	2.7	2	1.1	0
Others[a]	0	0	3.4	2.6	2.8
Employment experiences (%)*					
1 employment	50	63.8	60.8	36.8	43.3
2–3 employments	32.5	24	28.9	43.2	27
More than 3 employments	17.5	12.2	10.3	20	29.7
Lead time till first employment (%)					
Employed before graduation	12.5	12.2	7.8	9.1	16.2
<3 months	20	11.2	11.3	14.6	13.6
3–6 months	15	21.3	23.5	24.9	18.9
7–12 months	20	22.3	20.1	23.8	27
>12 months	32.5	33	37.3	27.6	24.3
Duration of service at current organization (%)					
<1 year	20	31.9	25.5	24.9	8.2
1–2 years	40	39.4	47.5	41.6	24.3
3–5 years	20	18.6	24	22.7	35.1
>5 years	20	10.1	2.9	10.8	32.4

a   Include food security (bachelor's and master's) and biostatistics (master's and PhD)

Note: *** *Chi-square test significant at 1%; ** Chi2 test significant at 5%.*

Source: *Survey data*

Skills supplied to the agricultural labor market

4.5.1 Skills supplied to students as perceived by agricultural training institutions

The perception of agricultural training institutions on the skills they supplied varied according to the type of institutions. Most AgTIs of universities found that training programs provided students with sufficient hard, soft, and digital skills (Figure 10). According to most AgTIs/ TVETs, only intercultural skills (soft skills) and job search skills such as identifying job opportunities, writing cover letters, and job interview techniques were not provided to students (Figure 11).
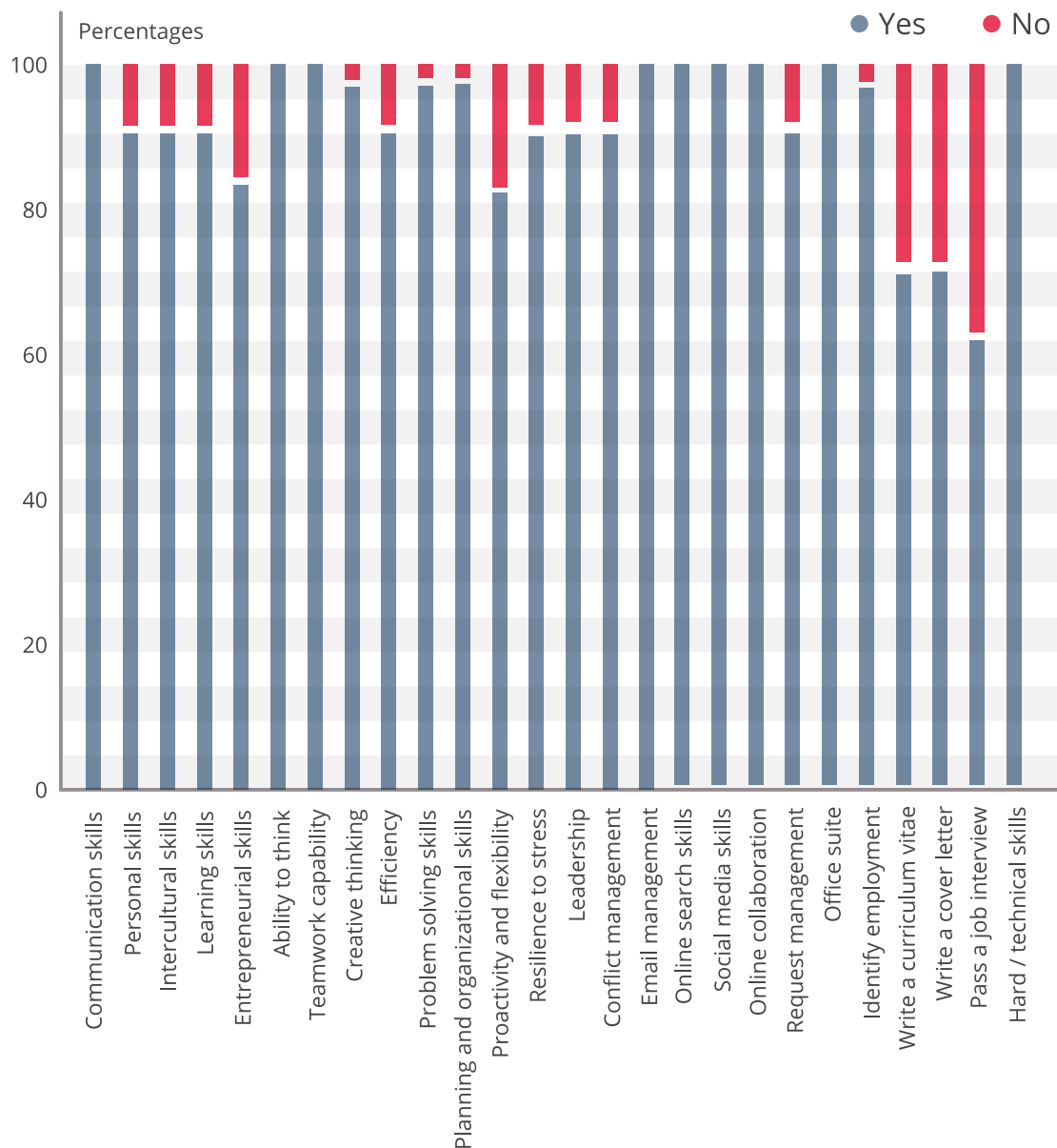
Figure 10. Perception of agricultural higher education training institutions' officials on the skills offered to students
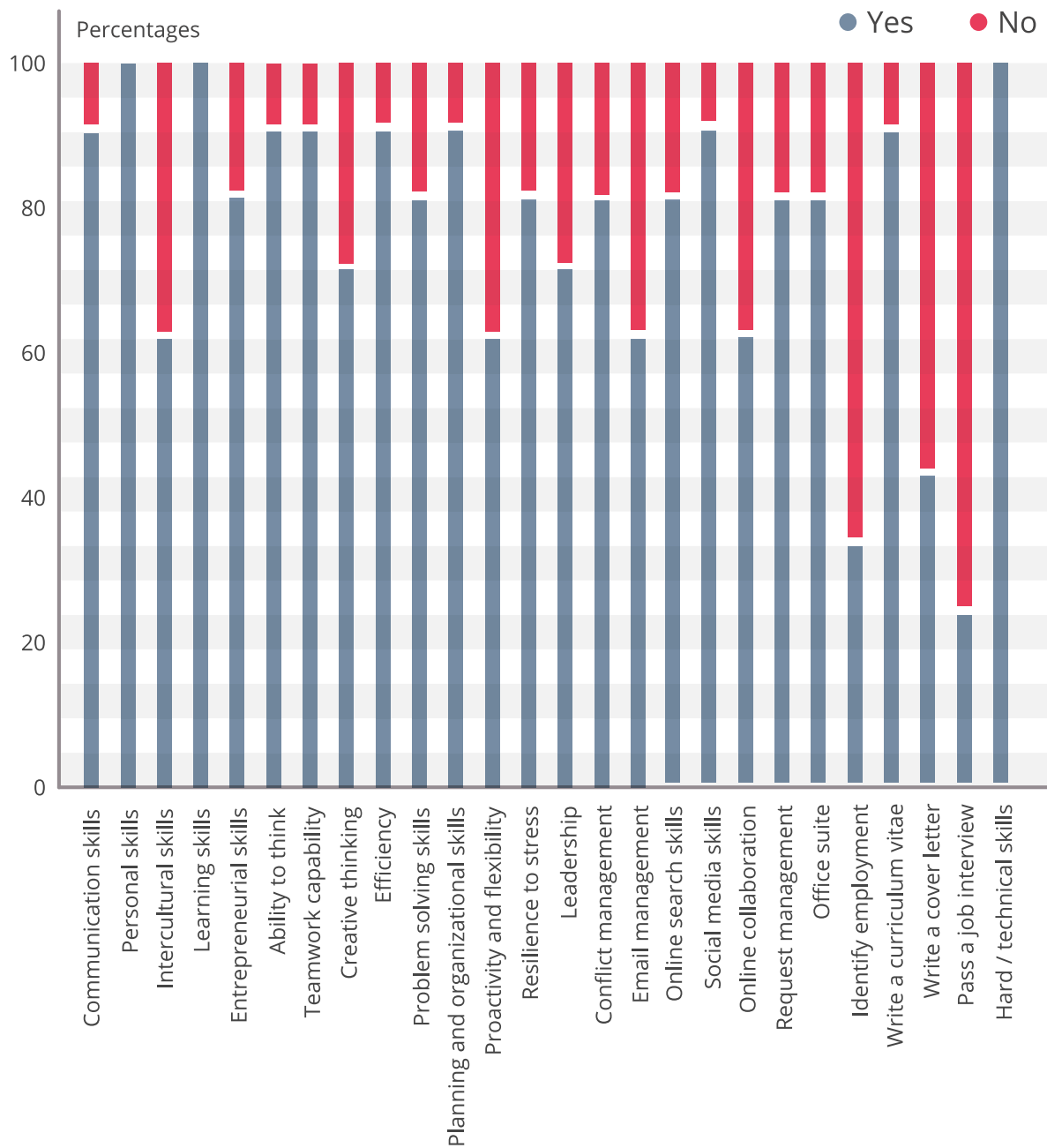
Figure 11. Perception of agricultural TVET officials on the skills offered to students

4.5.2 Skills supplied to the agricultural labor market as perceived by graduates

Overall, the weighted average for soft and digital skills was low for BEAT, DEAT, bachelor's and master's graduates of agriculture. This implies a general poor level of soft and digital skills acquired from agricultural training institutions.

Most employees with BEAT and DEAT found that AgTIs/TVETs do not considerably provide most soft and digital skills necessary for the transition from education to employment (Tables 8 and 9).

They thought these institutions supplied hard skills, and the following soft skills: communication and teamwork capabilities (Tables 8 and 9). This result showed that agricultural TVET institutions were able to provide most hard skills related to the professional field to accomplish specific tasks but failed to equip students with most soft and soft skills. However, graduate employees felt that their current level of the various soft and digital skills under review is satisfactory (Tables 8 and 9).

It is important to highlight that hard skills are specific to the academic level and field of study. A compilation of hard skills, extracted from training curricula, is provided in Appendix 1

according to the academic level and field of specialization.

Bachelor's graduate employees perceived that the hard skills, the soft skills (communication and teamwork capability), and the digital skills (related to online search, social media, use of Microsoft Office Suite, etc.), were offered by the AgTIs in Benin (Tables 8 and 9). In addition to these skills, the master's level additionally includes e-mail management (digital skill) (Tables 8 and 9). These graduates also felt that the other soft and digital skills needed to enhance the employability of graduates were not provided by tertiary agricultural training institutions (Tables 8 and 9). At the same time, regarded their current level of these skills as good (Tables 8 and 9).

From the above results, it was observed that agricultural TVET institutions differed from tertiary institutions in terms of the supply of digital skills. Bachelor's and master's graduates

were equipped with the digital skills pertaining to online search, social media, and Microsoft Office Suite use, as well as e-mail management (only provided to master's graduates), whereas agricultural TVET graduates were not.

PhD graduate employees from agricultural training institutions perceived that they acquired almost all the necessary hard, soft, and digital skills during their training (Tables 8 and 9).

The only skill that they think they had less mastered during their training and they now possess was conflict management (soft skill). Compared with the other academic levels (BEAT, DEAT, bachelor's, and master's), the level of skills (hard, soft, and digital) acquired from their training was higher.

Strategies are required to conduct an effective job search. From this perspective, graduate employees of all academic levels perceived that AgTIs did not equip students with the necessary job search skills, namely the identification of job opportunities, drafting of an impressive curriculum vitae, writing of a good cover letter, and job interview strategies. However, their current level for these skills is good (Table 9).

The above findings (section 4.5) indicate that AgTI and graduate employees have different perceptions concerning most skills (soft, digital, and job search) necessary to enhance the employability of students, whereas AgTIs thought they were doing everything good to ensure the smooth transition of agriculture students to work. This difference in perceptions can be explained by the fact that agricultural training institutions do not yet have a complete understanding of the skills expected from their graduates.

Table 8. Hard and soft skills supplied to the agricultural labor market

Skills	Level of skills/Academic levels									
	BEAT		DEAT		Bachelor's		Master's		PhD	
	School	Actual	School	Actual	School	Actual	School	Actual	School	Actual
Hard skills	**3.42(3.5)***	**3.42(3.5)****	**3.74(4)****	**3.74(4)****	**3.74(4)****	**3.74(4)****	**3.85(4)****	**3.85(4)****	**4.43(5)****	**4.43(5)****
Soft skills										
Communication	3.05(3)	3.80(4)**	3.20(3)*	4.08(4)**	3.31(3)**	4.16(4)**	3.41(4)**	4.26(4)**	3.51(4)*	4.62(5)**
Personal skills	1.48(1)**	3.97(4)**	1.49(1)**	4.23(4)**	1.57(2)**	4.30(4)**	1.54(2)**	4.37(4)**	3.97(4)**	4.70(5)**
Intercultural skills	2.38(2)**	3.80(4)**	2.27(2)**	3.87(4)**	2.21(2)**	3.96(4)**	2.20(2)**	4.02(4)**	3.00(3)	4.43(5)**
Learning	2.33(2)**	3.85(4)**	2.49(3)**	4.15(4)**	2.57(3)**	4.17(4)**	2.57(3)**	4.35(4)**	3.92(4)**	4.59(4)**
Entrepreneurial skills	1.85(1)**	3.67(4)**	1.98(1)**	3.91(4)**	2.09(2)**	4.00(4)**	2.35(2)**	4.18(4)**	3.00(3)	4.27(4)**
Ability to think	2.1(2)**	3.85(4)**	2.18(2)**	4.05(4)**	2.09(2)**	4.13(4)**	2.17(2)**	4.27(4)**	3.49(4)*	4.54(5)**
Teamwork capability	3.33(3)*	4.05(4)**	3.45(3)**	4.23(4)**	3.58(4)**	4.43(4)**	3.64(4)**	4.45(4)**	4.16(4)**	4.76(5)**
Creative thinking	1.88(2)**	3.97(4)**	2.23(2)**	4.15(4)**	2.53(2)**	4.23(4)**	2.56(2)**	4.34(4)**	3.30(3)*	4.54(5)**
Efficiency	2.73(3)	4.20(4)**	2.62(3)**	4.18(4)**	2.67(2)**	4.18(4)**	2.71(2)**	4.28(4)**	3.24(4)	4.49(5)**
Problem solving	2.55(2)*	3.82(4)**	2.67(3)**	4.07(4)**	2.89(3)	4.09(4)**	2.91(3)	4.23(4)**	3.78(4)**	4.54(5)**
Planning and organizational skills	2.73(3)	4.02(4)**	2.67(3)**	4.17(4)**	2.59(2.5)**	4.20(4)**	2.63(2)**	4.33(4)**	3.19(3)	4.70(5)**

Skills	Level of skills/Academic levels									
	BEAT		DEAT		Bachelor's		Master's		PhD	
	School	Actual	School	Actual	School	Actual	School	Actual	School	Actual
Proactivity and flexibility	1.68(1)**	3.95(4)**	1.80(1)**	4.07(4)**	2.01(2)**	4.18(4)**	2.03(2)**	4.30(4)**	3.19(3)	4.27(4)**
Resilience to stress	1.73(1)**	3.85(4)**	2.02(2)**	4.08(4)**	2.09(2)**	4.02(4)**	2.28(2)**	4.19(4)**	3.16(3)	4.43(4)**
Leadership	2.20(2)**	3.97(4)**	2.31(2)**	3.88(4)**	2.33(2)**	3.97(4)**	2.36(2)**	4.11(4)**	3.16(3)	4.30(4)**
Conflict management	2.78(3)	3.90(4)**	2.64(3)**	4.06(4)**	2.73(3)**	4.11(4)**	2.66(3)**	4.25(4)**	2.68(2)	4.30(4)**
Weighted average for soft skills	**2.33**	**3.91**	**2.37**	**4.08**	**2.48**	**4.14**	**2.53**	**4.26**	**3.68**	**4.50**

Note: $X \geq 3$ is good; figures in the table are the mean values based on the Likert scales; the numbers in brackets are median values; the Wilcoxon test ($X: \neq 3$): ** Significant at 1%; * Significant at 5%

Source: Survey data

Table 9. Digital and job search skills supplied in the agricultural labor market

Skills	Level of skills/Academic levels									
	BEAT		DEAT		Bachelor's		Master's		PhD	
	School	Actual	School	Actual	School	Actual	School	Actual	School	Actual
Digital skills										
Email management	1.85(1)**	3.40(3)*	2.07(2)**	3.68(4)**	2.92(3)	4.13(4)**	3.02(3)	4.40(5)**	3.30(3)*	4.76(5)**
Online search skills	1.53(1)**	3.32(3)	1.54(1)**	3.82(4)**	3.56(4)**	4.23(4)**	3.69(4)**	4.44(4)**	3.89(4)**	4.67(5)**
Social media skills	2.85(3)	3.60(3)**	3.16(3)*	3.85(4)**	3.39(4)**	4.02(4)**	3.30(3)*	4.07(4)**	3.08(3)	3.86(4)**
Online collaboration	1.98(2)**	3.15(3)	1.90(2)**	3.60(4)**	2.09(2)**	3.64(4)**	2.03(2)**	3.79(4)**	2.95(3)	4.24(4)**
Request management	2.33(2)**	3.60(4)**	2.38(2)**	3.84(4)**	2.34(2)**	3.86(4)**	2.33(2)**	3.98(4)**	2.95(3)	4.08(4)**
Microsoft Office package	1.75(2)**	2.82(3)	1.95(2)**	3.45(4)**	3.12(3)	3.86(4)**	3.17(3)*	4.05(4)**	3.57(4)**	4.05(4)**
Weighted average for digital skills	**2.05**	**3.32**	**2.17**	**3.71**	**2.90**	**3.96**	**2.92**	**4.12**	**3.29**	**4.28**
Job search skills										
Identifying job opportunities	1.45(1)**	3.37(3.5)*	1.45(1)**	3.65(4)**	1.51(1)**	3.76(4)**	1.61(1)**	3.97(4)**	2.84(3)	4.05(4)**
Drafting curriculum vitae	1.80(2)**	3.35(4)	1.89(2)**	3.96(4)**	2.00(2)**	4.14(4)**	2.05(2)**	4.25(4)**	2.68(3)	4.46(5)**
Drafting cover letter	1.73(2)**	3.4(4)*	1.76(2)**	3.95(4)**	2.16(2)**	4.07(4)**	2.24(2)**	4.20(4)**	2.73(3)	4.43(4)**
Handling a job interview	1.35(1)**	3.52(4)**	1.52(1)**	3.84(4)**	1.59(1)**	4.02(4)**	1.65(1)**	4.11(4)**	1.97(2)**	4.32(4)**
Weighted average for job search skills	**1.58**	**3.41**	**1.66**	**3.85**	**1.82**	**4.00**	**1.89**	**4.13**	**2.56**	**4.32**

Note: $X \geq 3$ is good; figures in the table are the mean values based on the Likert scales; the numbers in brackets are median values; the Wilcoxon test ($X: \neq 3$): ** significant at 1%, * significant at 5%

Source: Survey data

V

Skills required in the agricultural labor market

5.1

Characteristics of organizations employing agriculture graduates

The employers in the agricultural sector include the private sector, civil society organizations, public organizations, and international organizations (Tables 11 and 12).

Private sector

Most private enterprises surveyed were involved in agricultural production (60.53%), followed by agricultural processing (39.47%), and agricultural services (24.74%) (Table 11). About half of these enterprises (56.31%) had the status of sole proprietorship (Etablissement in French) – a type of enterprise that is owned and run by one person where there is no legal distinction between the owner and the business entity. However, 21.58% are part of the informal sector (comprising non-registered enterprises). Moreover, most of these enterprises were run by men (82.11%) who hold diplomas in agronomy (58.42%) and in other sectors (31.58%). In addition, many of the enterprises surveyed had been in business for more than 10 years (42.63%). Less than 3% of the enterprises were young with 1 year of experience (Table 11).

Most PSect-AgERs surveyed (90.53%) were small enterprises employing 1–5 AgEEs as permanent. Most of the positions held by employees of private enterprises had educational levels of DEAT (42.98%) and bachelor's (36.40%) (Table 11).

Table 10. Characteristics specific to private enterprises

Characteristics	Frequency	Percentage (%)
Agribusiness sector		
Production	115	60.53
Processing	75	39.47
Services	47	24.74
Supplies of inputs or materials	27	14.21
Distribution of products	9	4.74
Legal status of the enterprise		
Sole proprietorship	107	56.31
Limited liability company (Ltd)	36	18.95
Corporation	6	3.16
Non-registered company	41	21.58
Background of business owner		
Agriculture graduate	111	58.42
Graduate in field other than agriculture	60	31.58
Not graduate	19	10
Sex of business manager		
Male	156	82.11
Female	34	17.89
Experience of the enterprise		
1 year	5	2.63
2–5 years	50	26.32
6–10 years	54	28.42
>10 years	81	42.63

Source: *Survey data*

Civil society organizations

As for CSO-AgERs, although most of them (53.95%) employed 1–5 AgEEs as permanent employees, some (25%) employed more than 10 graduates. The majority of the positions held by CSO-AgERs belonged to the bachelor's level (38.79%), DEAT (29.09%) and Master's (28.48%) (Table 12).

Public organizations

Most public organizations surveyed (63.93%) had more than 10 employees who graduated from AgTIs. Moreover, the public sector had positions that were occupied by employees of all academic levels. The highest academic levels among them were DEAT (35.86%) and master's (24.47%) (Table 12).

International organizations

About half of ItOrg-AgERs surveyed employed more than 10 graduates from AgTIs, while some organizations employed 1–5 graduates. Moreover, the majority of the positions of Itorg-AgERs were of the master's level (62.50%) (Table 12).

Table 11. Characteristics of organizations employing agriculture graduates

Characteristics	Employers			
	Private enterprise (n = 190)	Civil society organization (n = 76)	Public organization (n = 60)	International organization (n = 09)
Agricultural graduates (%)***				
1–5 graduates	90.53	53.95	19.67	44.44
6–10 graduates	7.37	21.05	16.40	0
>10 graduates	2.10	25	63.93	55.56
Education level for employees' position (%)**				
BEAT	10.53	3.64	13.50	0
DEAT	42.98	29.09	35.86	4.17
Bachelor's	36.40	38.79	15.61	29.17
Master's	10.09	28.48	24.47	62.50
PhD	0	0	10.56	4.16

Note: *** Chi-square test significant at 1%; ** Chi2 test significant at 5%*

Source: *Survey data*

5.2

Types of employment for agriculture graduates

There was a wide range of employment positions in various sectors of the economy wherefrom a graduate from agricultural training institutions can find jobs (Table 13). Agriculture graduates employed by government agencies typically conduct research, provide consultancy services to farmers, and manage agricultural projects. In the private sector, graduates are typically farm supervisors, sales representatives, agricultural technicians, or consulting service providers. On the other hand, in civil society organizations and international organizations, graduates of agricultural training institutions are usually employed in the management and implementation of agricultural projects. Thus, it is clear that due to the multidisciplinary nature of an agriculture degree, graduates can find employment in a range of sectors of the economy.

Table 12. Employment opportunities for agriculture graduates

Study levels	Type of employments[10]
BEAT	Enterprise managers, salespersons, sales representatives, production assistants, etc.
DEAT	Enterprise managers, salespersons, laboratory technicians, sales representatives, extension workers, production managers, specialists in the fabrication and maintenance of agricultural machinery, etc.
Bachelor's	Enterprise managers, food processing specialists, agricultural extension workers, agricultural high school teachers, agricultural microfinance officers, laboratory technicians, environmental specialists, ground game wildlife forestry and fisheries managers, agricultural technologists, salespersons, technical assistants, agricultural technicians, financial officers, production managers, etc.
Master's	Enterprise managers, food processing specialists, research assistants, agricultural high school teachers, consultants, fisheries managers, monitoring and evaluation officers, program/project officers, forestry officers, executive directors, financial officers, agricultural microfinance officers, etc.
PhD	Researchers, teacher-researchers, consultants, program/project administrators, monitoring and evaluation officers, executive directors, etc.

Source: *Adapted from Tuning Africa (2018)*
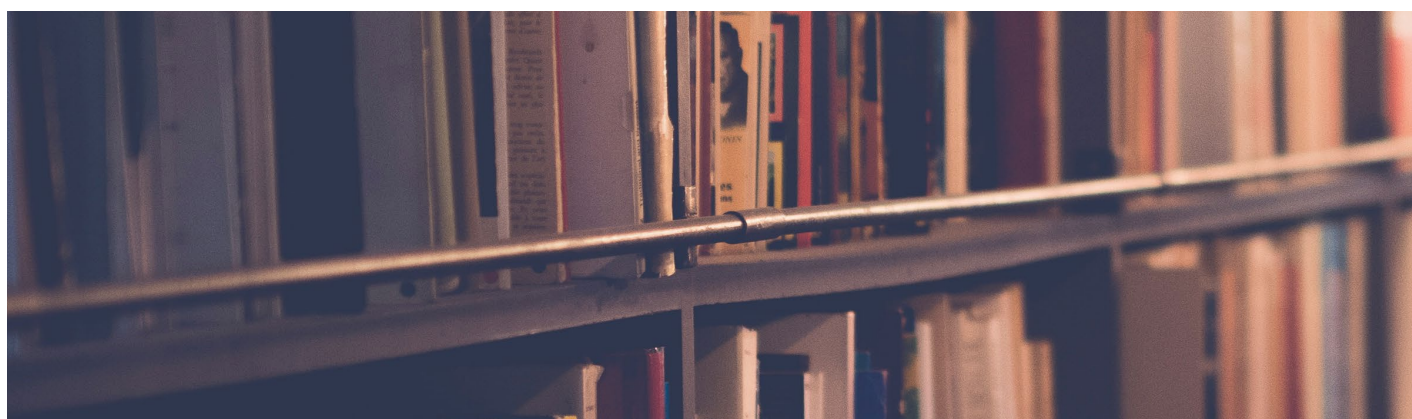
10   We do not claim to have prepared an exhaustive list of all types of employments in the agricultural sector. It is also important to know that these employments vary according to the major and the employing organization.

Skills demanded by employers in the agricultural sector

Regarding the skills needed, agricultural employers across all types of organizations surveyed agreed that all skills under review (hard, soft, and digital skills) are important to consider when recruiting agriculture graduates despite their academic levels. The mean value of perception for each soft and digital skill was high and significant (one-sample Wilcoxon test), revealing that those skills are important for employers in the agricultural labor market (Table 14).

The high average weight of about 4 obtained for soft and digital skills regardless of the employer type implies that the labor market had not been asking for a "Perfect," "Excellent," or "Very good" score for these skills but a "Good" score. Even though hard skills (with mean scores of about 3)

were also important and significant, employers favored soft and digital skills. Among these skills (soft and digital), team-working appeared to be the most sought in combination with hard skills by all types of employers.

Furthermore, there was a significant difference (Kruskal–Wallis test) between the level of hard skills sought by employers in the agricultural sector, and a higher level required by international and public organizations (Table 14).

Based on this finding, one can say that these institutions are seeking graduates with high academic degrees. Among digital skills, e-mail

management is more in demand in international and public organizations, while mastery over the Microsoft Office package is less in demand among private enterprises (Table 14, Kruskal–Wallis test). The need of private enterprises for their employees to be adept with the Microsoft Office package could also vary according to the type of private enterprises.

However, the study further showed that there is no significant difference between the level of skills (hard, soft, and digital) sought by various sub-sectors of private enterprises in the agricultural sector (Figure 12). Although the overall level of hard skills does not vary across subsector, there are specific preferences in the types of skills sought.
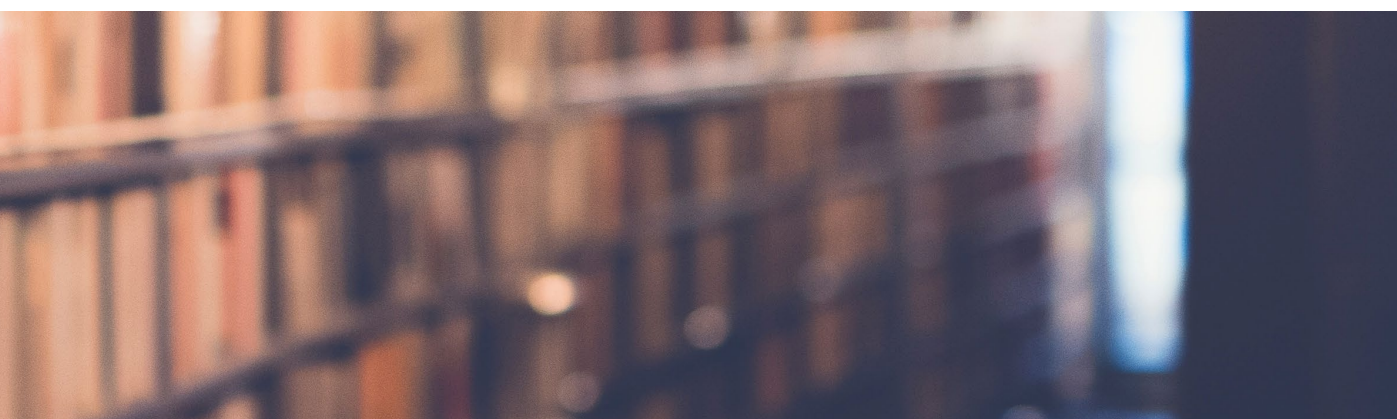
Table 13. Skills required by employers in the agricultural sector

Skills	Type of employers			
	Civil Society Organizations	Private Enterprises	Public Organizations	International Organizations
Hard skills	**3.30 (3.00)**	**3.14 (3.00)**	**3.59 (4.00)**	**3.44 (4.00)**
Soft skills				
Communication skills	4.36 (4.50)	4.08 (4.00)	4.21 (4.00)	4.67 (5.00)
Personal skills	4.54 (5.00)	4.32 (4.00)	4.38 (5.00)	4.78 (5.00)
Intercultural skills	4.32 (4.00)	3.97 (4.00)	3.97 (4.00)	4.67 (4.00)
Learning skills	4.37 (5.00)	4.26 (4.00)	4.23 (4.00)	4.67 (5.00)
Entrepreneurial skills	4.16 (4.00)	4.11 (4.00)	4.07 (4.00)	4.67 (5.00)
Ability to think	4.36 (5.00)	4.23 (4.00)	4.20 (4.00)	4.67 (5.00)
Teamwork capability	4.58 (5.00)	4.44 (5.00)	4.49 (5.00)	4.78 (5.00)
Creative thinking	4.45 (5.00)	4.26 (4.00)	4.33 (4.00)	4.78 (5.00)
Efficiency	4.49 (5.00)	4.35 (5.00)	4.26 (4.00)	4.44 (5.00)
Problem solving skills	4.39 (4.50)	4.25 (4.00)	4.26 (4.00)	4.67 (5.00)
Planning and organizational skills	4.50 (5.00)	4.43 (5.00)	4.34 (5.00)	4.78 (5.00)
Proactivity and flexibility	4.45 (5.00)	4.29 (4.00)	4.23 (4.00)	4.78 (5.00)
Resilience to stress	4.47 (5.00)	4.25 (4.00)	4.30 (4.00)	4.67 (5.00)
Leadership	4.17 (4.00)	3.99 (4.00)	4.03 (4.00)	3.67 (4.00)
Conflict management	4.42 (4.50)	4.27 (5.00)	4.20 (4.00)	4.33 (5.00)
Weighted average for soft skills	**4.40**	**4.23**	**4.24**	**4.60**

Skills	Type of employers			
	Civil Society Organizations	Private Enterprises	Public Organizations	International Organizations
Digital skills				
Email management*	4.24 (4.00)	3.95 (4.00)	4.36 (5.00)	4.78 (5.00)
Online search skills	4.38 (5.00)	4.11 (4.00)	4.46 (5.00)	4.67 (5.00)
Social media skills	4.16 (4.00)	3.96 (4.00)	4.05 (4.00)	3.89 (4.00)
Online collaboration	4.25 (4.50)	4.21 (4.00)	4.36 (5.00)	4.67 (5.00)
Request management	4.26 (4.00)	4.17 (4.00)	4.13 (4.00)	4.67 (5.00)
Mastery over microsoft Office package*	4.42 (5.00)	4.16 (4.00)	4.59 (5.00)	4.67 (5.00)
Weighted average for digital skills	**4.29**	**4.09**	**4.33**	**4.56**

Note: *Figures in the table are the mean scores based on Likert scales; X ≥ 3 is important; values in the brackets are medians; one-sample Wilcoxon test: all skills are significant at 1%; Kruskal–Wallis test: **significant at 1%; *significant at 5%*

Source: *Survey data*

Communication skills
Hard/technical skills 5.00 Personal skills
Microsoft office package 4.50 Intercultural skills
4.00
Request management 3.50 Learning skills
3.00
Online collaboration Entrepreneurial skills
2.50
2.00
Social media 1.50 Ability to think
1.00
Search online Teamwork
Email management Creative thinking
Conflict management Efficiency
Leadership Problem solving skills
Resilience to stress Planning &…
Proactivity & flexibility

Production Inputs supply Services provider
Processing Distribution of products

Note: *X ≥ 3 is important; values in the figure are the mean scores based on the Likert scales; one-sample Wilcoxon test: all skills are significant at 1%; Kruskal–Wallis test: no significant difference for all skills.*

Source: *Survey data*

Figure 12. Skills required by the sub-sectors of private enterprises in the agricultural sector

53

5.4

Potential qualifications to be sought by employers in the next 5–10 years

Based on the changing environment of the labor market in Benin's agricultural sector, the future needs (5–10 years from now) of employers in terms of graduates' academic level has been identified. Most in the agricultural production sector (crop and animal production) estimated that DEAT (75.65%) and bachelor's (66.96%) graduates will be more in demand in the coming years (Figure 13). Most private enterprises in the agricultural processing sector and those in the sector of input or material supply predicted the same trend as the production sector. Employers in the distribution of agricultural products, besides the need for DEAT and bachelor's graduates, also mentioned their future preference for BEAT graduates (Figure 13). Most private enterprises in the services sector are expected to prefer master's graduates (55.32%) in addition to DEAT and bachelor's graduates in the next 5–10 years.
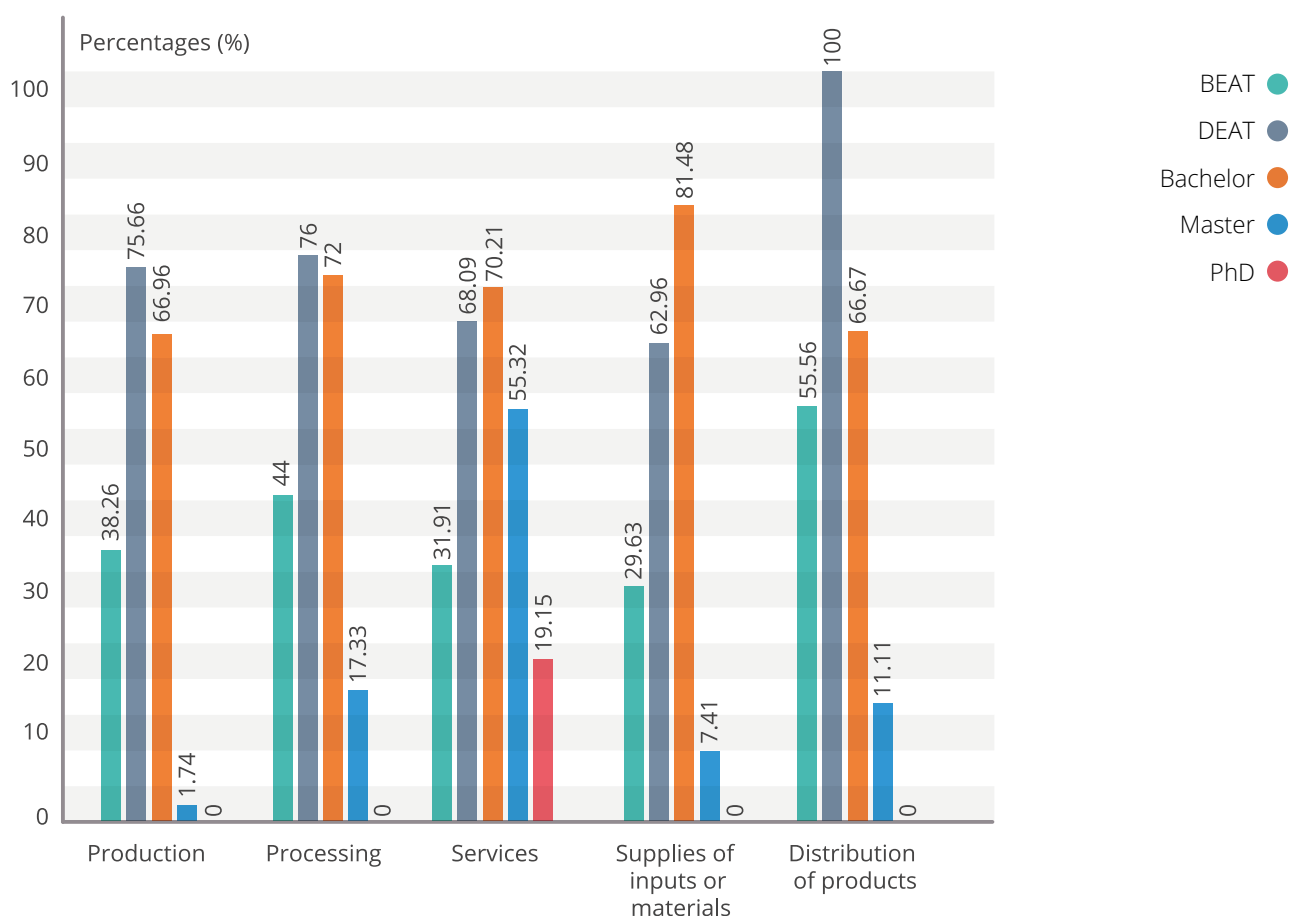
Source: *Survey data*

Figure 13. Academic levels to be sought by private enterprises in the next 5–10 years

Civil society organizations stated that DEAT (75.26%), bachelor's (69.47%), and master's (42.11%) graduates will be in demand in the coming years (Figure 14). Public organizations expressed the same future needs as private companies, with fewer graduates having DEAT (37.7%). As for international organizations, they opined that PhD graduates (77.78%) will be more in demand in the future in addition to bachelor's (66.67%) and master's graduates (100%).

From the above findings, it can be observed that PhD graduates will generally be more sought in the following years by international organizations and, to a lesser extent, public organizations.

However, this profile includes criteria such as publication record, project management, and grant proposal writing. Public organizations' future demand for PhD graduates is justified by the fact that the National University of Agriculture with many majors requires a qualified workforce to train students. However, the uptake capacity of national organizations is low given the yearly increase in the number of PhD graduates and candidates in the pipelines of agricultural PhD schools. The data collected confirms this by reporting a release of 6 PhD graduates in 2015 and 27 PhD graduates in 2019. Moreover, in 2019, only 10 PhD holders, all majors included, were recruited by the National University of Agriculture.

With such a low uptake capacity of national universities or agriculture faculties, PhD graduates cannot necessarily expect to find a job at these national institutions. However, those who are well-skilled are likely to find employment in international organizations across the world. Moreover, BEAT graduates will be less sought after by employers other than private enterprises in the next 5-10 years (Figure 14).
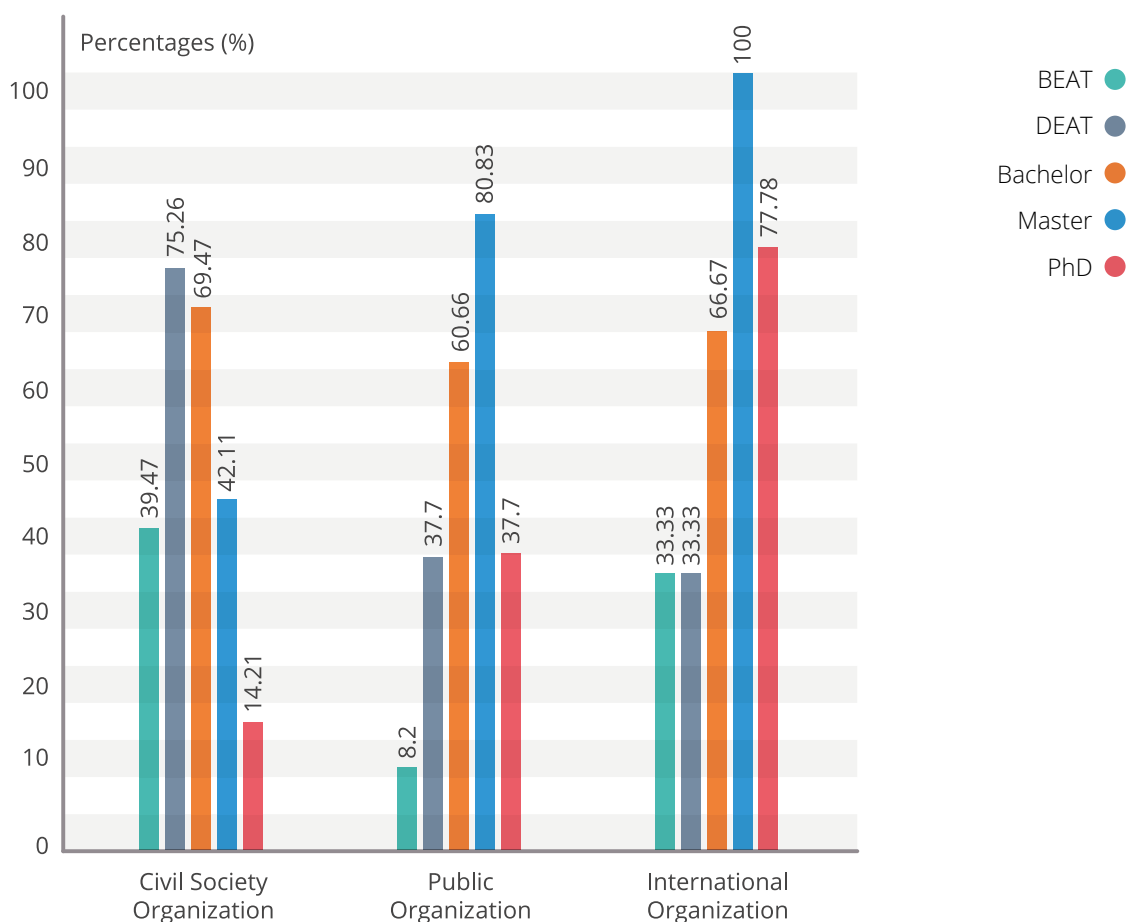
Figure 14. Academic levels to be sought by employers other than private enterprises in the next 5–10 years

In 5–10 years, the potential hard skills most desired by private agribusiness enterprises included the management of agribusiness enterprises (51.05%), business plan formulation (51.05%), agricultural production techniques (including crop and animal production, processing techniques, and marketing services) (68.95%), project conception (51.58%), and other skills such as digital skills (5.79%) (Figure 15). These skills correspond to BEAT/DEAT holders (except for project conception), bachelor's holders, and very few master's holders.

Civil society organizations expressed the need for monitoring and evaluation of agricultural projects (65.79%), the management of agricultural projects (63.16%), agricultural production techniques (63.16%), project conception (73.68%), and other skills such as digital skills and the drafting of terms of references (3.95%). These skills correspond to master's graduates and experienced bachelors' holders. The difference between private companies and civil society organizations was the management of agricultural projects, monitoring and evaluation, and the drafting of terms of references (Figure 15). The potential needs of public organizations for hard skills in the next 5–10 years follow the same trend as that of civil society organizations
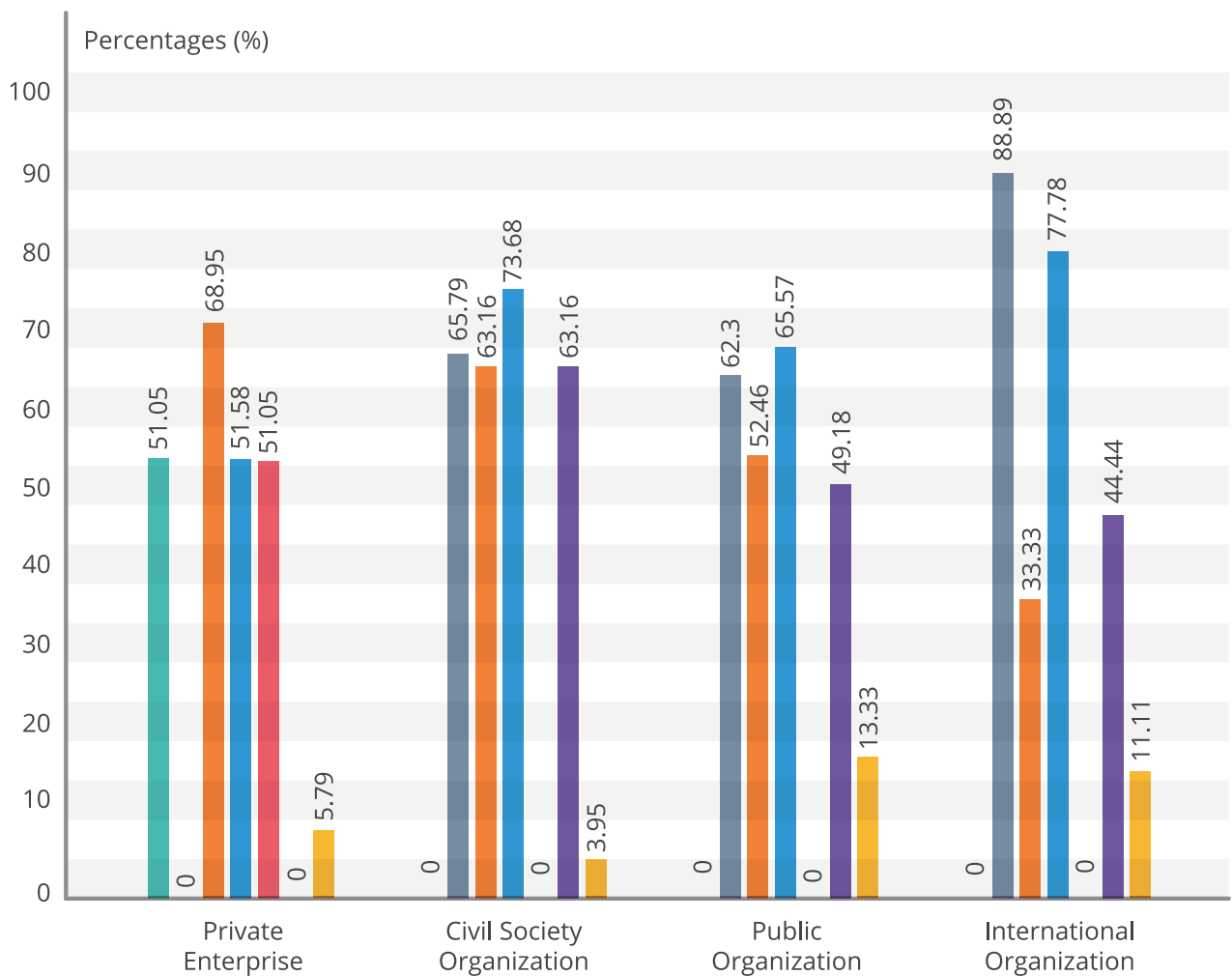
Public organizations' potential needs for hard skills include the monitoring and evaluation of agricultural projects (62.3%), management of agricultural projects (49.18%), agricultural production techniques (52.46%), project conception (65.57%), and other skills such as Information and Communication Technologies (ICT) for agriculture and the drafting of terms of references (13.33%).

These skills correspond to DEAT, bachelor's, master's, and PhD holders. On the other hand, international organizations express a high need for the monitoring and evaluation of agricultural projects/programs (88.89%), the drafting of agricultural projects (77.78%), and, to a lesser extent, the management of agricultural projects (44.44%) and other skills such as ICT for agriculture and the drafting of terms of references (11.11%) (Figure 15). The corresponding academic level for these set of skills are master's and PhD. Agricultural training institutions should consider this potential need for hard skills to enhance their training by improving their curricula. Furthermore, ICT for agriculture is not focused in agricultural training institutions and should be developed through new programs to meet the requirements of the future agricultural labor market.

Hard skills such as business plan formulation, agribusiness enterprises management, monitoring and evaluation, project proposal writing, project management, and term of references drafting are focused in the major "agricultural economics and extension." This major is not offered in agricultural TVET institutions. However, some of these skills such as business plan drafting, and agricultural production techniques are provided through cross-cutting/cross-disciplinary lectures/courses for all majors of agricultural TVET institutions. Furthermore, the hard skills concerning agricultural production can be acquired from the majors such as crop production, animal production, nutrition and food sciences, and aquaculture and fish farming.

Percentages (%)

Legend:
- Business plan writing
- Monitoring-Evaluation
- Agricultural production techniques
- Project proposal writing
- Management of agribusiness enterprises
- Project management
- Others

Private Enterprise: 51.05 · 0 · 68.95 · 51.58 · 51.05 · 0 · 5.79

Civil Society Organization: 0 · 65.79 · 63.16 · 73.68 · 0 · 63.16 · 3.95

Public Organization: 0 · 62.3 · 52.46 · 65.57 · 0 · 49.18 · 13.33

International Organization: 0 · 88.89 · 33.33 · 77.78 · 0 · 44.44 · 11.11

Figure 15. Potential hard skills to be desired by employers in the next 5–10 years

Based on the above analysis, in terms of the share of the future market demand for agriculture graduates,

the major "agricultural economics and extension" will be the most required by employers in the next 5–10 years.

This major is followed by animal production, crop production, fisheries and aquaculture, and nutrition and food sciences (Table 15). However, majors such as natural resources management and land use planning will be less in demand in the coming years (Table 15). The potential profiles and characteristics to be sought after in the future labor market are summarized in Table 15.

Table 14. Summary of the future demand for agriculture graduates

Main majors	Relevant potential characteristics		
	Employing organizations	**Academic levels**	**Hard skills**
Agricultural economics and extension	Private enterprises (production, processing, inputs supply, product distribution, etc.)	BSc	Farm/enterprise management; ICT for agriculture, etc.
	Private enterprises (Service providers)	MSc & PhD	Monitoring and evaluation of agricultural projects, management of agricultural projects, project conception, ICT for agriculture, conception of terms of references, etc.
	Civil society organization	BSc & MSc	Monitoring and evaluation of agricultural projects, management of agricultural projects, agricultural production techniques, project conception, ICT for agriculture, conception of terms of references, etc.
	Public organization	BSc, MSc, & PhD	Monitoring and evaluation of agricultural projects, management of agricultural projects, agricultural production techniques, project conception, ICT for agriculture, conception of terms of references, etc.
	International organization	MSc & PhD	Monitoring and evaluation of agricultural projects/programs, drafting of agricultural projects, management of agricultural projects; ICT for agriculture, conception of terms of references, etc.
Animal production	Private enterprises (production, processing, inputs supply, product distribution, etc.)	DEAT & BSc	Agricultural production techniques
	Public organizations	MSc & PhD	

Main majors	Relevant potential characteristics		
	Employing organizations	**Academic levels**	**Hard skills**
Crop production	Private enterprises (production, processing, inputs supply, product distribution, etc.);	DEAT & BSc	Agricultural production techniques
	Public organizations	MSc & PhD	
Fisheries and aquaculture	Private enterprises (production, processing, inputs supply, product distribution, etc.)	DEAT & BSc	Agricultural production techniques
	Public organizations	MSc & PhD	
Nutrition and food sciences	Private enterprises (production, processing, inputs supply, product distribution, etc.)	DEAT & BSc	Agricultural production techniques
	Public organizations	MSc & PhD	
Management of natural resources and land use planning	International organization & Public organization	MSc & PhD	

<u>**Source:**</u> *Survey data*

VI

Mismatch between skills supply and demand in the agricultural sector

6.1

Mismatch between graduates employees' current job and academic level

The educational level of most agriculture graduate employees surveyed matched the level demanded by the job (Figure 16). However, about a quarter of bachelor's (27.94%), master's (28.11%), and PhD (29.73%) graduate employees had taken jobs that required a lower level of study (known as overeducation) (Figure 16). The same remark was valid for less than 10% the of employees with DEAT as the highest level of study.

Percentages (%)

● Over education　● Match　● Under education
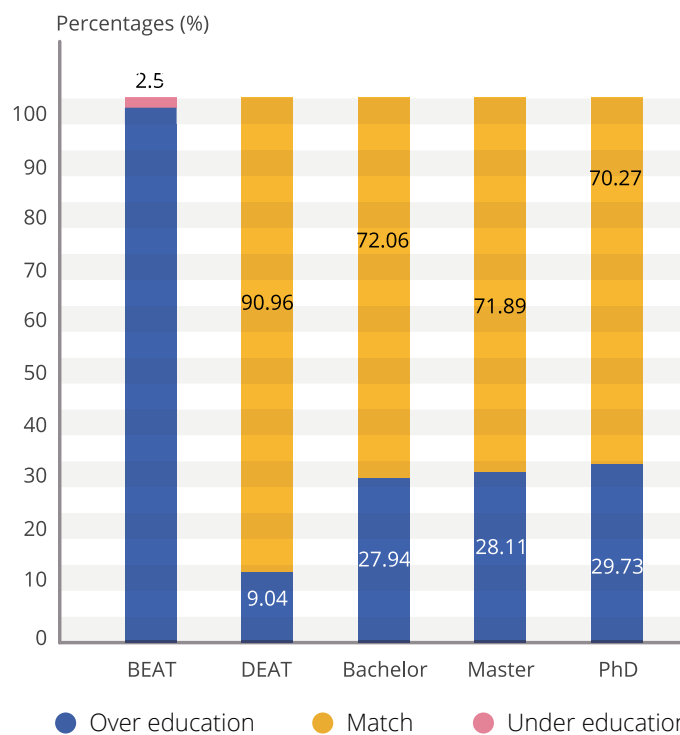
Source: *Survey data*

Figure 16. Mismatch between agriculture graduate employees' educational level and job designation

6.2

Mismatch between graduates employees' current job and field of study

The majority of BEAT (87.5%), DEAT (86.7%), bachelor's (87.25%), master's (92.43%), and PhD (91.89%) graduate employees reported that their current employment was relevant to their field of study (Figure 17). These findings showed that most employers in agricultural sector recruits agriculture graduates with appropriate profile in terms of their field of study.

Percentages (%)
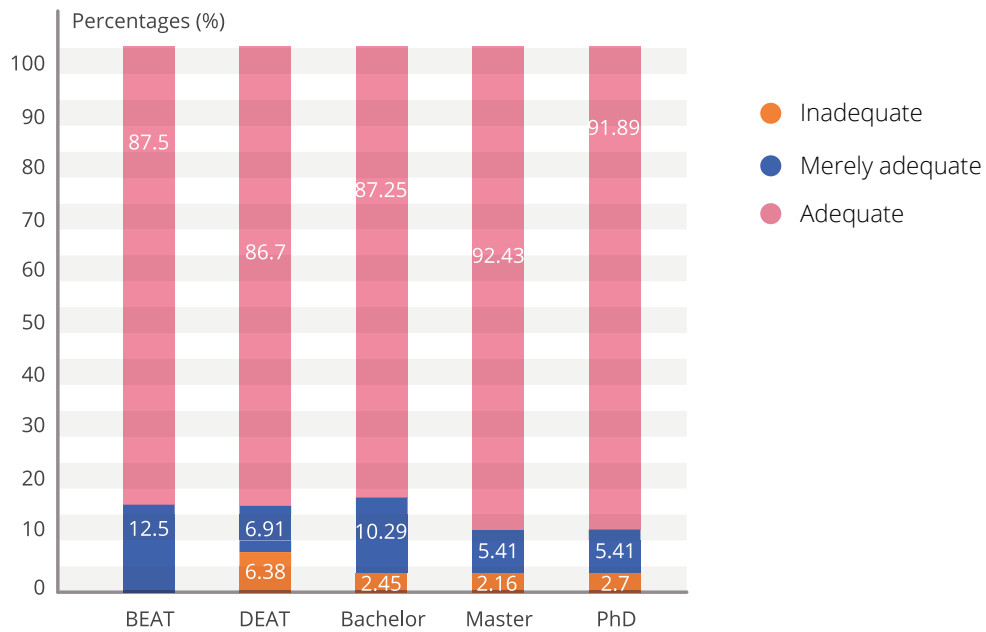
Source: *Survey data*

Figure 17. Mismatch between fields of study and job position

Skills gap between supply and demand in the agricultural sector

The level of hard skills supplied by agricultural training institutions as perceived by each category of agriculture graduates (BEAT, DEAT, bachelor's, master's, and PhD) was higher than the level of demand in the labor market (Figures 18, 19, 20, 21, and 22). This means overskilling regarding hard skills, i.e., the level of hard skills offered by agricultural training institutions is higher than that required by employers.

Even though graduate employees, in spite of the academic level, acquired a good level for some soft and digital skills from agricultural training institutions (mean score ≥ 3), it appeared that the demand for all soft and digital skills in the labor market was higher than those provided by agricultural training institutions (Figures 18, 19, 20, 21, and 22). This reflects a mismatch between the supply of and demand for soft and digital skills in the agricultural sector, indicating that agriculture graduates are under-equipped in these skills. The major weaknesses in the soft skills possessed by the graduates pertained to personal skills, learning skills, entrepreneurial skills, ability to think, creative thinking, proactivity and flexibility, leadership, efficiency, problem-solving skills, intercultural skills, planning and organizational skills, resilience to stress (for BEAT,

DEAT, bachelor's, and master's), and conflict management (for BEAT, DEAT, bachelor's, master's, and PhD). Meanwhile, the major weaknesses in digital skills include email management (BEAT and DEAT), online search (BEAT and DEAT), online collaboration (BEAT, DEAT, bachelor's, and master's), and the use of Microsoft Office package (BEAT and DEAT).

Moreover, while the level of soft and digital skills required by employers at work were generally at a higher level than that provided by agricultural training institutions, despite the academic levels, the findings also showed that the current levels of agriculture graduate employees in soft and digital skills are higher than those supplied at school (Figures 18, 19, 20, 21, and 22).

Communication skills
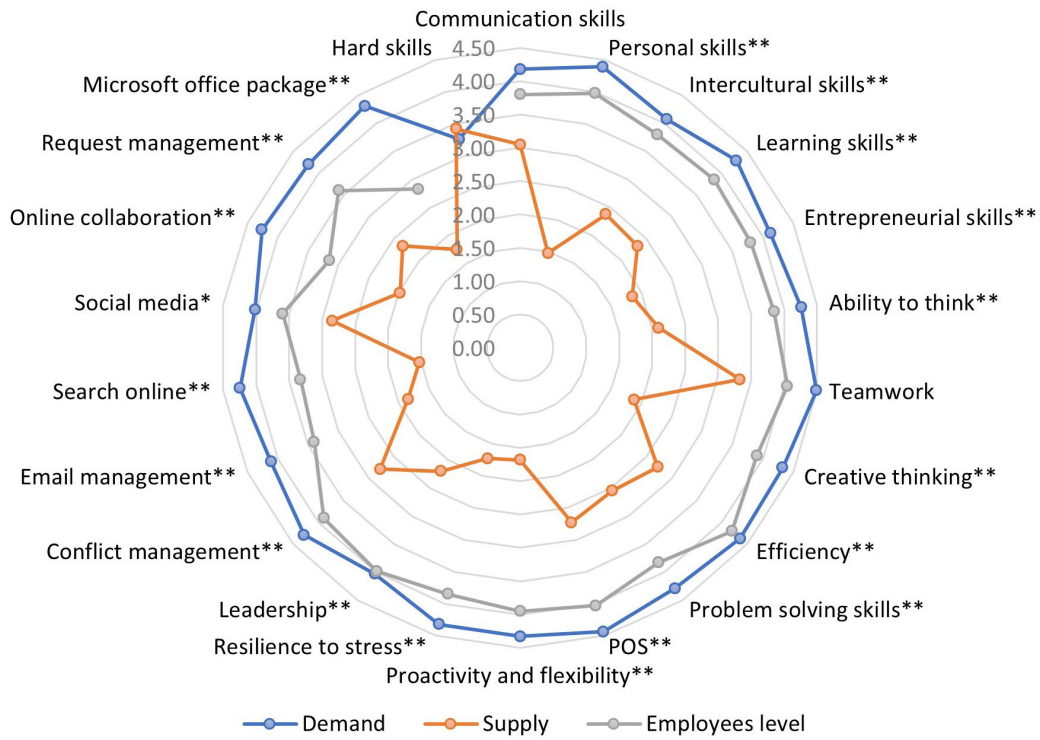
Note: 1 – lowest level; 5 – highest level; Mann–Whitney U test comparing demand and supply of skills: **significant at 1%; *significant at 5%; POS = planning and organizational skills

Source: Survey data

Figure 18. Mismatch between demand and supply of skills for BEAT graduates
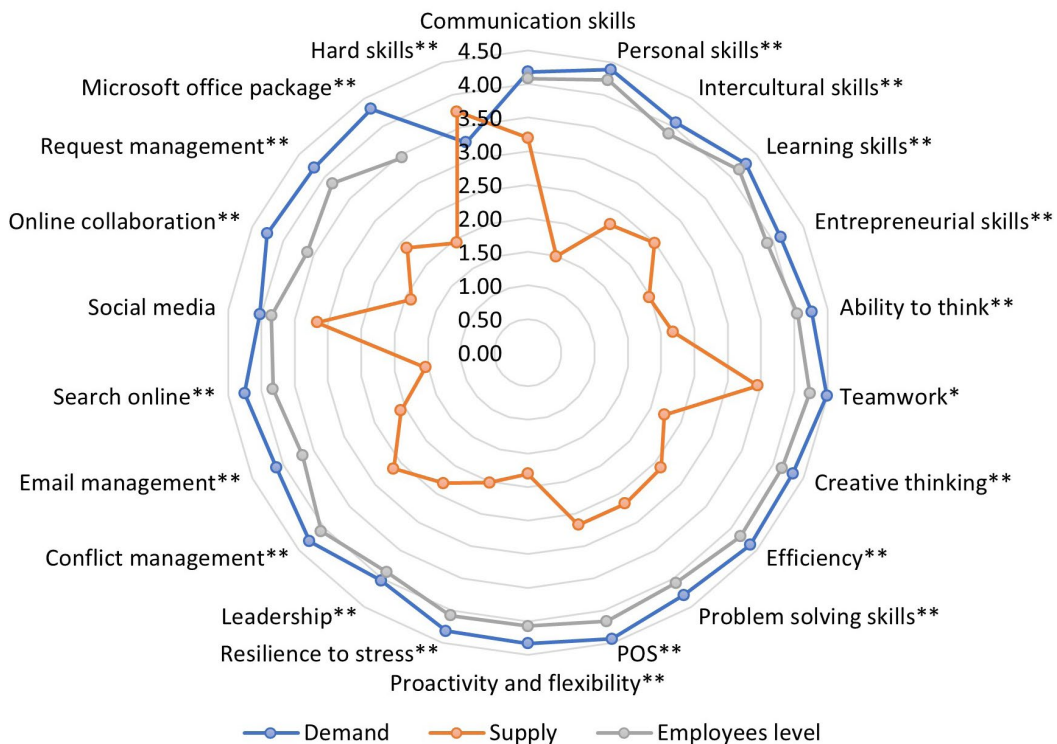
Note: 1 – lowest level; 5 – highest level; Mann–Whitney U test between demand and supply of skills: **significant at 1%; *significant at 5%; POS= planning and organizational skills

Source: Survey data

Figure 19. Mismatch between demand and supply of skills for DEAT graduates

Note: 1 – lowest level; 5 – highest level; Mann–Whitney U test between demand and supply of skills: **significant at 1%, *significant at 5%; POS = planning and organizational skills

Source: Survey data

Figure 20. Mismatch between demand and supply of skills for bachelor's graduates

Note: 1 – lowest level; 5 – highest level; Mann–Whitney U test between demand and supply of skills: **significant at 1%; *significant at 5%; POS = planning and organizational skills

Source: Survey data

Figure 21. Mismatch between demand and supply of skills for master's graduates

Note: 1 – lowest level; 5 – highest level; Mann–Whitney U test between demand and supply of skills: **Significant at 1%; *Significant at 5%; POS = planning and organizational skills
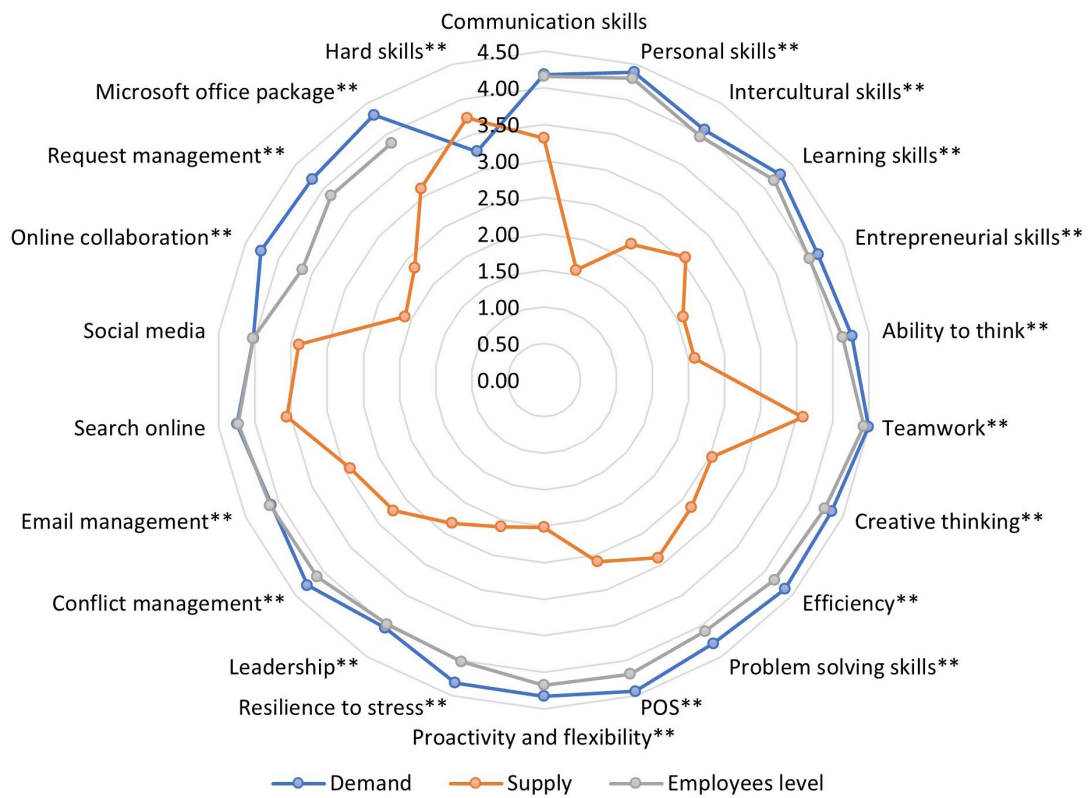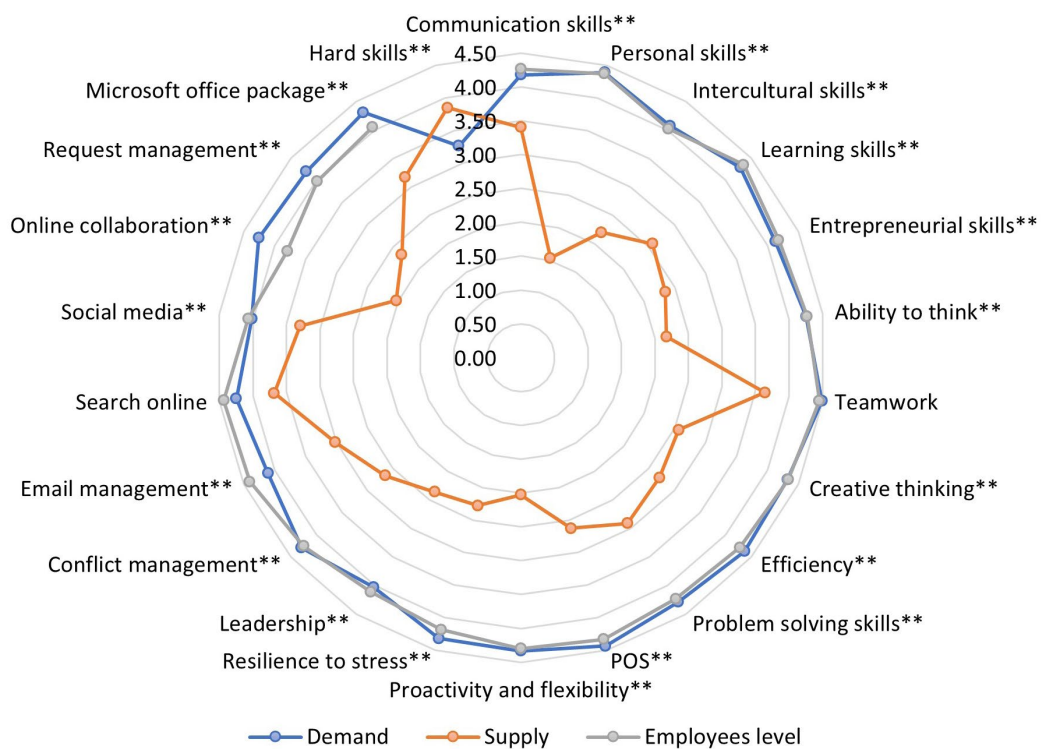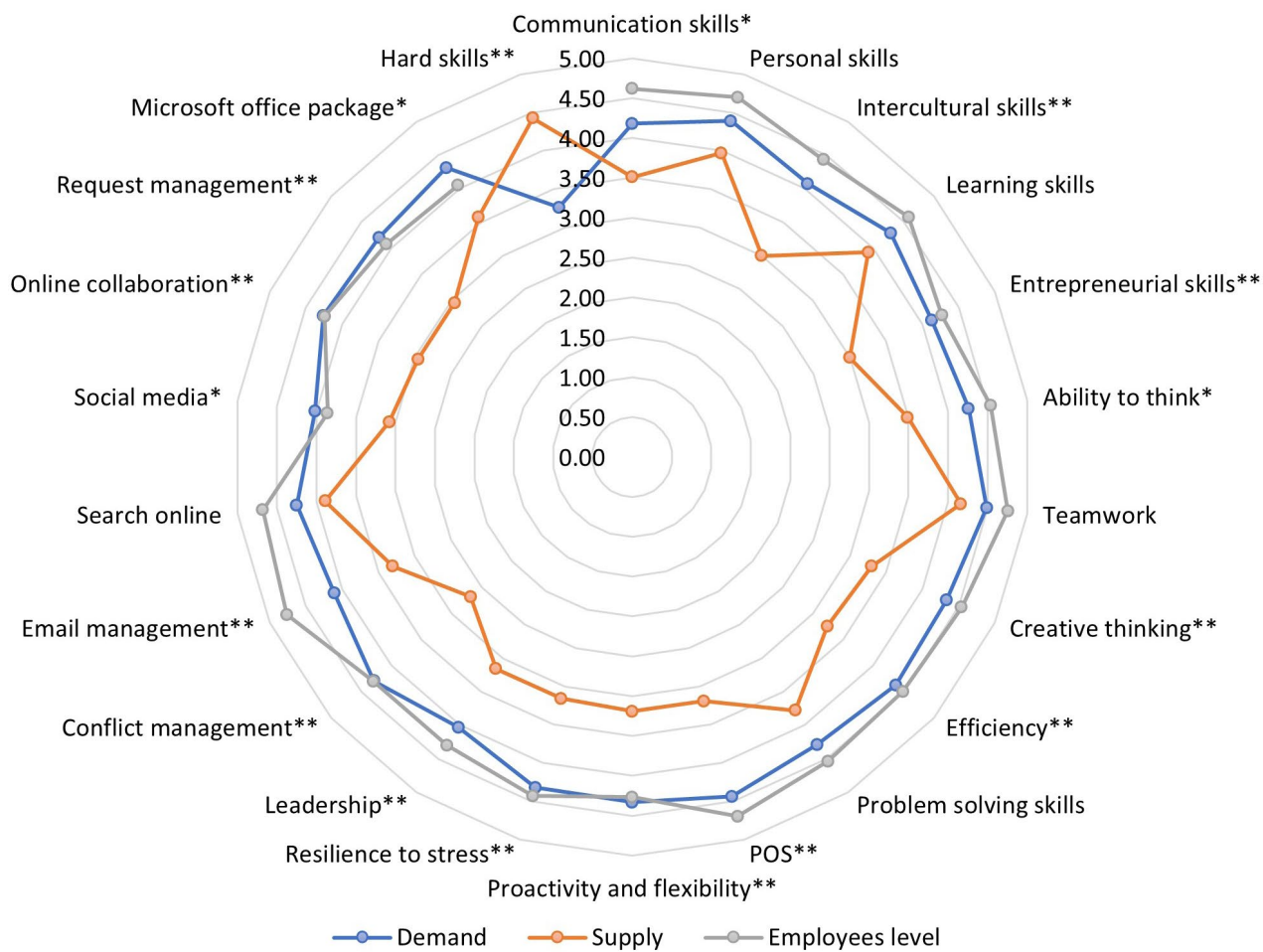
Source: Survey data

Figure 22. Mismatch between demand and supply of skills for PhD graduates

VII

Discussion of main findings and implications for policy and practice

Discussion of main findings

7.1.1 Skills supply to the agricultural labor market

The number of agriculture graduates released from agricultural training institutions has increased in the period 2015-2019. This tendency is the result of the policy implemented by the government that included increasing the number of agricultural training institutions, from two to ten agricultural TVET institutions, and the creation of the University of Agriculture. The rise in the production of agriculture graduates may benefit the country by contributing to economic growth and an increase of jobs. However, the only increase in the number of agriculture graduates is not enough to ensure jobs. Therefore, for the labor market to absorb the growing number of agriculture graduates, agricultural training institutions need to focus on the labor market needs.

Agriculture graduate employees regarded the level of soft and digital skills supplied by agricultural training institutions as poor among BEAT, DEAT, bachelor's and master's graduates. Surprisingly, even with the students' use of digital tools in preparing their take-home assignments, seminars, and dissertations, these graduates perceived that they did not yet master digital skills, with a serious deficiency in online search skills among BEAT and DEAT graduates and online collaboration among bachelor's and master's graduates. This situation may be explained by the fact that access to the Internet is expensive for students in the country. Students will therefore be more familiar with digital tools and be better equipped with their application if they have access to the Internet. This could be achieved by providing free internet access to school students.

There was a deficiency in soft skills among agriculture graduates, who seriously lacked personal skills regardless of the academic level. Personal skulls include self-confidence, a positive attitude, and a strong work ethic. The adequate display of these skills would reduce the rate of unemployment, allowing graduates to find decent employment in the agricultural sector.

The level of hard, soft, and digital skills PhD graduates acquired from agricultural training institutions by the end of their training was higher. This can be attributed to the fact that PhD graduates, during their training, go through a long mentoring process with their supervisor, during which they acquire the necessary skills to be employable.

Moreover, agriculture graduate employees of all academic levels felt that agricultural training institutions did not equip students with the necessary job-search skills, namely the identification of job opportunities, drafting of a good curriculum vitae, drafting of an impressive cover letter, and job interview strategies. Finding a job requires strong search skills to successfully identify employers' vacancies. The job search skills are thus important for agriculture graduates to secure a decent employment. For example, a job search intervention

in Australia resulted in an increase in job-find rates and the quality of job matches (Briscese et al., 2020). Besides, an intervention that delivered training on job search skills to a group of young jobseekers with low educational qualification in Mauritius showed a positive impact on job-search behaviors among youth (Castaneda et al., 2020). Therefore, Benin's agriculture students should be equipped with job search skills in addition to hard, soft, and digital skills to make them more competitive in the labor market.

Such initiatives should focus on specific aspects such as practical training on how to apply for jobs and prepare for interviews, the explanation of the realities of the job search process, etc. This finding indicates that AgTIs alone cannot be responsible for enhancing agriculture graduate's employability as well as their access to employment. A commitment from various stakeholders is also required to guarrantee the agricultural graduates' access to decent employments.

To this end, an example of a good practice for enhancing graduates' employability access to employment is the mentoring program that was considered a success in the literature. Mentoring helps build confidence and expand one's network besides occasionally providing practical training in employability skills (Raposa et al., 2019). More specifically, Kluve et al. (2016) stress that effective

approaches combine multiple approaches, such as skills training, mentoring, etc. Therefore, it is crucial for organizations working on youth employment to initiate employment-oriented mentoring programs for agriculture graduates.

The National Agency for Employment (ANPE) that acts as a mediator between the supply and demand of skills could undertake such an initiative. In fact, the finding gives credit to what the ANPE is already doing in its agenda including sponsoring graduates' internships in enterprises so that they acquire experience.

The study identified a difference in perception between agricultural training institutions and graduate employees in the agricultural sector regarding the skills (soft, digital, and job search) needed to enhance agriculture graduates' employability and access to employment. AgTIs thought they equipped agriculture students with most necessary skills (soft, digital, and job search) to ensure their smooth transition to work, while agriculture graduate employees thought the contrary. The difference in perception can be explained by the fact that AgTIs do not yet have a complete understanding of the skills expected from their graduates. The

graduate employees' perception can be explained based on their experience in the agricultural labor market, and this perception is shared by the employers. The latter often express concerns about the capabilities of graduates, whereas AgTIs feel that employers do not fully recognize the skills these graduates possess. According to the Solutions for Youth Employment (S4YE) coalition (Glick et al., 2015), which conducted a systematic review of the role of the private sector in promoting youth employment worldwide, demand-driven training interventions that closely involve employers in curriculum development are more likely to be successful than those that do not include employers.

Therefore, employers in the agriculture sector have an important role to play. Opportunities and incentives need to be increased to encourage collaboration between employers and agricultural training institutions by developing collaborative platforms and further involving employers in curriculum design, evaluation, and innovation.

7.1.2 Skills required in the agricultural labor market

The findings showed a low female representation among graduate employees in agricultural organizations.

This could be because few women enrolled in agricultural training institutions. Meanwhile, the women who attended agricultural training institutions face difficulties in securing a job after graduation. Most agricultural employments corresponding to TVET graduates' levels are physically demanding due to current lack of use of technology in Benin's agricultural sector, so women cannot perform them easily. The literature reports that the unemployment rate in Africa is higher for women than it is for men (Baah-Boetend, 2016).

Indeed, women are considered the "weaker" sex, which explains the physical, psychological, and sexual exploitation to which they are frequently subject (Hamel, 2011). Prejudice toward women negatively affect several aspects, such as self-confidence and credibility.

They therefore find themselves undervalued regarding the requirements for applying for decent jobs (Villeneuve, 2015). However, the specific constraints on the employment of women graduates from AgTIs in Benin remain unknown. The next study by our research team will investigate gender constraints in the process of obtaining employment in the agricultural sector in Benin.

Most private enterprises surveyed (90.53%) employed 1–5 agriculture graduates. Following the nomenclature suggested by Badou and Bierschenk (2019), these enterprises were considered small enterprises as they employed fewer than 20 employees. Notably, many employers, especially the private enterprises complain that they struggle to hire enough qualified job candidates. These employers could make more profit if they hired human resources, but they instead express dissatisfaction that most of today's agriculture graduates do not possess the necessary skills for achieving career success although many are unemployed. It is therefore the responsibility of agricultural training institutions to ensure that the skills needed in the labor market are incorporated in the various training programs.

The findings demonstrated that all skills considered in this study (hard, soft, and digital skills) are important and sought by all types of agricultural employers. Teamworking skills were the most desired in combination with hard skills. The reasons for the preference may vary from one individual or organization to another, but organizations will essentially grow if workers are skilled at team-working (the most sought-after skills), which is the ability to effectively collaborate with other people, both face to face and virtually. This is, of course, achievable with a little more concerted demand-directed effort by AgTIs. The high demand for soft and digital skills also suggests that these skill categories are critical to the agricultural labor market. In other words, there is a great demand for ready-made or ready-to-perform agriculture graduates who exhibit these skills. This scenario does not refer solely to Benin. Many empirical studies across the world

(Pitan & Adedeji, 2012; Pitan, 2015; Nashash, 2015) have observed an increased demand for soft skills such as critical thinking, communication, problem-solving, analytical skills, entrepreneurial skills, decision-making, self-directed learning, interpersonal skills, and digital skills. However, there is a disparity in the importance of these skills in various countries.

For instance, Pitan and Adedeji (2012) claimed that analytical skills were the most demanded skill in Nigeria, followed by entrepreneurial skills. Digital skills such as information technology skills and numeracy came 6th and 11th respectively. Though all the skills (hard, soft, and digital) addressed in this study are important to all types of employers, the degree to which hard skills and digital skills such as email management and Microsoft Office package usage are important differs across different employer types. These differences exist because not all jobs require all skills to the same extent, which implies that all employees are not expected to demonstrate all skills to the same extent.

This serves as an addition to the existing body of knowledge (Murdoch-Eaton & Whittle, 2012) that suggests the context-dependency of skills.

The implication of this result is that all skills are essential, but they are simultaneously context specific. It is hence important that students prepare themselves generally and more specifically for a particular workplace.

The study further revealed that except for a few majors such as agricultural economics and extension, animal production, crop production, fisheries and aquaculture, and nutrition and food sciences, other majors would be less in demand in the next 5–10 years regarding employment in the agricultural sector. The major "agricultural economics and extension" is expected to be most demanded in the coming years. This could be because graduates with this major have cross-disciplinary knowledge and can work in all sub-sectors and areas of the agricultural sector. In addition, nowadays, agricultural projects and programs deal with socio-economic aspects, which requires the use of skilled labor in this field. Moreover, the majors like nutrition and food sciences, fisheries and aquaculture, crop production, and animal production will be relatively in demand because the successful agribusinesses supported by the current entrepreneurship programs require a skilled labor force. Further, there are many programs/projects hiring agriculture graduates with these majors, and this trend is likely to continue in the future. However, there will be a weak demand for the major "forestry" in the following years as the government is the main employer of candidates with profile and recruitment has been rare in recent years. To avoid a rise in unemployment among agriculture graduates, agricultural training institutions may prioritize the development of training programs by considering the potential needs of the agricultural labor market.

7.1.3 | Gap between the supply and demand of skills in the agricultural sector

The findings showed that even though most graduate employees were well-matched by their academic level, the incidence of overeducation was substantially higher than undereducation for DEAT, BSc, MSc, and PhD graduates.

The qualification mismatch along with the more pronounced overeducation rate (about one quarter) implies that graduates face difficulties finding employment that match their educational level are thus compelled to accept jobs that require a lower educational level. This could be due to the fact that the educational system is creating more agriculture graduates with higher qualifications willing to take the same job, leading to employers (especially private enterprises and civil society organizations) exploiting them without necessarily increasing

their wages. More importantly, labor markets in developing countries are often characterized by a large proportion of employment in the informal sector. Generally, this sector does not require high levels of qualification, causing higher overeducation among employees (Chua & Chun, 2016). The findings are consistent with those by Jote (2017), who reported a vertical education-job mismatch among a third of engineering graduates in Ethiopia. Therefore, agricultural training institutions should prioritize the implementation of training programs based on the market demand in terms of academic level.

Regarding the mismatch based on field of study, most agriculture graduate employees surveyed, regardless of their educational level, declared that their current

employment was relevant to their field of study. Only about 2% of bachelor's, master's, and PhD holders and 6.38% of DEAT holders expressed that their employment was irrelevant to their field of study.

These graduates did not voluntarily choose mismatched jobs but were instead driven into it because they couldn't find work in their field since agricultural training institutions produce a larger number of graduates in those disciplines, which are relatively less in demand in the labor market. A sound occupational-specific education would ensure the matching of fields of study with jobs. Therefore, there is a need for agricultural training institutions to prioritize the implementation of training programs based on the market demand concerning field of study.

The findings further identified a mismatch regarding soft and digital skills among agriculture graduates regardless of the academic level. The demand for hard skills is lower than the level supplied (overskilling); however, the demand for soft and digital skills is higher than the level of skills provided by agricultural training institutions to students of any academic level (underskilling). The matching between the supply of and demand for hard skills is not consistent with Pitan and Adedeji (2012), whose study reported an underskilled mismatch type for hard skills in Nigeria.

Many situations can explain the gap in these findings. The study by Pitan and Adedeji (2012) considered all the sectors in the labor market in their analysis, instead of a particular sector. In addition, there may be a difference in the educational system and labor market of both countries. The areas of major mismatch in soft skills related to personal skills, learning skills, entrepreneurial skills, ability to think, creative thinking, proactivity and flexibility, leadership, efficiency, problem-solving skills, intercultural skills, planning and organizational skills, resilience to stress (for BEAT, DEAT, bachelor's, and master's) and conflict management (BEAT, DEAT, bachelor's, master's, and PhD); while the major areas of mismatch for digital skills pertain to email management (BEAT and DEAT), online search skills (BEAT and DEAT), online collaboration (BEAT, DEAT, bachelor's, and master's), and the use of Microsoft Office package (BEAT and DEAT). These soft and digital skills are among the top 10 skills needed in in the 2025 labor market according to the World Economic Forum's Future of Jobs report (WEF, 2020). Changes in the structure of work should have major implications for the changing nature of the skills acquired in training institutions (Brown et al., 1997).

The mismatch between soft and digital skills supplied and required signifies a serious deficiency in the relationship between the agricultural labor market and the agricultural training institutions, which would consequently reduce graduates' productivity and increase unemployability. This mismatch is explained by the absence of a training system closely linked to the needs of the labor market. In fact, recruiters of agricultural graduates do not usually work with agricultural training institutions to discuss the inclusion of soft and digital skills in the curriculum.

Therefore, the training supplied by agricultural training institutions does not allow its beneficiaries to develop soft and digital skills. In this context, Moussa (2017) argued that Benin's education and employment spheres have worked disconnectedly for a long time while waiting for each other's achievements to have a greater impact. Consequently, graduates are less employed by employers, especially private enterprises, who consider them less skilled. The mismatch between the supply of and demand for soft and digital skills is consistent with Pitan and Adedeji (2012) who reported underskilling for the following soft and digital skills in Nigeria: analytical skills, entrepreneurial skills, critical thinking, communication, decision-making, information technology skills, interpersonal skills, problem solving, self-directed learning, technical skills, and numeracy skills. Therefore, it should be the responsibility of ANPE and other similar agencies to integrate this in their agenda to offer support to the graduates.

Moreover, the current levels of agriculture graduate employees in soft and digital skills were higher than the level acquired at school. This is because the graduates improved the essential soft and digital skills at the workplace or through self-learning.

Therefore, the changing agricultural labor market wherein employers prefer already skilled graduates again raises the need for employment-oriented mentoring programs or work-based learning through internship placement programs. The COVID-19 pandemic also presents an opportunity for transformative change. Emerging opportunities in the digital economy are providing

new economic perspectives for young people. The ability to buy and sell goods and services online has transformed markets and has been in high demand since the crisis began, as well as delivery services. Traditional jobs are being transformed, and new forms of work are being created. This is the case, for example, with teleworking, characterized by online meetings, organizing webinars, or working with digital tools. Anyone who can work with digital tools today and play a role in the digital transformation will continue to reap the benefits tomorrow. These changes in the labor market could result in increased opportunities for graduates to innovate or work in digital jobs servicing. Therefore, it is crucial to invest in the youth's digital skills development to accelerate digital transformation for effectively responding to the additional challenges posed by the COVID-19 pandemic and any similar future challenges.

7.2
Implications for policy and practice

Based on the above conclusions, actions are required to be made on the part of stakeholders to produce a more effective outcome for agriculture graduates. They have been discussed below:

What roles can agricultural training institutions undertake?

The training institutions should update their curricula to integrate the skills that are lacking. These skills include digital skills (email management, online search skills, online collaboration, the use of Microsoft Office package, etc.), soft skills (transformative leadership, team-working, creative thinking, proactivity and flexibility, personal skills, learning skills, entrepreneurial skills, thinking ability, efficiency, problem-solving skills, intercultural skills, planning and organizational skills, stress resilience, and conflict management), and job search skills (identification of job opportunities, drafting of a good curriculum vitae, drafting of an impressive cover letter, and job interview strategies). This can be achieved by introducing these skills either in existing subjects or as cross-cutting subjects in the curricula (with a time allocation and evaluation of the learners).

The institutions should increase opportunities and incentives to promote their collaboration with employers. This is possible through the development of collaborative platforms between employers and agricultural training institutions for the former's involvement in the development of curriculum and training programmes, and support in providing lectures.

They should prioritize the implementation of training programs based on the agricultural labor market's demands in terms of academic level and field of study.

The agricultural institutions should also support job search through dedicated units. The same units should provide assistance to the alumni/student associations.

What can youth employment services (such as ANPE, DagriVest, etc) achieve?

The implementation of employment-oriented mentoring programs that integrate practical trainings in the process of securing a job in the agricultural labor market.

The implementation of internship placement programs that match the academic profile of the graduates.

What can ministries of education implement?

They should encourage cooperation with the industry sector by creating advisory councils that bring together the government, training institutions, and industries.

The statistical offices at the central level or the statistical offices of the ministries in charge of education should create an integrated education and labor market information system. This system should be based on the approach of collecting reliable data on agricultural education and employment (such as data on entries, enrolments, graduates, etc.), making projections involving meaningful, informing decisions on reorienting an existing training offer or creating a new one, updating data on employment of graduates, and collecting data on out-migration of graduates.

What can students in agronomy undertake?

Agronomy students should be encouraged to form associations of former students (alumnis).

What can the various stakeholders together achieve?

The reforms that need to be integrated into the practices of training institutions require a lot of resources in terms of human (administrative and teaching staff), material (classrooms, access to the Internet, etc.), and financial. A synergy of resources from all the associated stakeholders (political decision-makers, training institutions, professionals, graduates, etc.) will be required for the effectiveness of agricultural education and the performance of the agricultural sector.

7.3
Limitations and future research

Despite the value of this research, there are still some limitations that should be taken into consideration for future research. The current study emphasized the importance of technical and non-technical skills, as they determine an applicant's employability, job performance and career prospects. However, attempting to evaluate skills mismatch is difficult. Evidence suggests that methods of assessing non-technical skills, are reliable while technical skills are more difficult to assess as they are affected by various external factors (Laajaj and Macours, 2017). Similarly, technical skills do not represent a homogeneous set, but differ considerably depending on the specific job function and workplace. Therefore, future research should be conducted in detail for technical skills.

References

Ackah-Baidoo, P. (2016). Youth unemployment in resource-rich Sub-Saharan Africa: A critical review. *The Extractive Industries and Society,* 3(1), 249–261.

AfDB (African Development Bank). (2018). *African economic outlook 2018.* Abidjan: AfDB.

African Union. (2006). *African Youth Charter.* Seventh Ordinary Session of the Conference of Heads of States and Government. Report. Banjul, The Gambia.

Altbeker, A., & Storme, E. (2013). *Graduate unemployment in South Africa: A much exaggerated problem.* Johannesburg: The Centre for Development and Enterprise.

Awad, A. (2020). From school to employment; The dilemma of youth in Sub–Saharan Africa. *International Journal of Adolescence and Youth,* 25(1), 1–20.

Baah-Boateng, W. (2016). Determinants of unemployment in Ghana. *African Development Review,* 25(4), 385–99.

Baba-Moussa, A. R. (2017). La prise en compte de la relation entre formation et emploi dans la réforme de l'éducation au Bénin : Contribution à l'élaboration d'un nouveau modèle éducatif. *International Review of Education,* 63(5), 631–656.

Badou, A., & Bierschenk, T. (2019). *Les défis du secteur privé au Benin et les paradoxes de sa promotion*. Documents de travail du département d'anthropologie et d'études africaines de l'université Johannes Gutenberg de Mayence. https://www.ifeas.uni-mainz.de/files/2019/11/AP-189.pdf, le 15/03/2021.

Bawden, D. (2001). Information and digital literacies: A review of concepts. *Journal of Documentation,* 57, 218–259.

Becker, G. S. (1975). *Human capital: A theoretical and empirical analysis, with special reference to education* (2nd ed.). New York: National Bureau of Economic Research.

Bol, T., Eller, C. C., van de Werfhorst, H. G., & DiPrete, T. A. (2019). School-to-work linkages, educational mismatches, and labor market outcomes. *American Sociological Review*, 84(2), 275–307.

Briscese, G., Zanella, G., & Quinn, V. (2020). *Improving job search skills: A field experiment on online employment assistance* IZA Discussion Papers, No. 13170. Institute of Labor Economics (IZA), Bonn.

Broekhuizen, H., & Van der Berg, S. (2013). *How high is graduate unemployment in South Africa? A much-needed update;* RESEP (Research on socio-economic policy), Department of Economics, University of Stellenbosch.

Brown, P., Halsey, A. H., Lauder, H., & Wells, A. S. (1997). *The transformation of education and society: An introduction*, UK: O.U.P., 165.

Castaneda, J. L., Gaddis, I., Ranzani, M., & Sousa L. J. (2020). *Supporting job search for Mauritian youth with little education. Poverty and Equity Notes*. No. 32. World Bank, Washington, DC. © World Bank. Retrieved February 3, 2021, from https://openknowledge.worldbank.org/handle/10986/34312.

Cedefop. (2010). *The skill matching challenge: Analysing skill mismatch and policy implications.* Luxembourg Publications Office.

Cedefop (Centre Européen pour le Développement de la Formation Professionnelle). (2010). *The skill matching challenge: Analyzing skill mismatch and policy Implications*. Publications Office of the European Union.

Chevalier, A., & Lindley, J. (2009). Overeducation and the skills of UK Graduates. *Journal of the Royal Statistical Society: Series A (Statistics in Society),* 172(2), 307–37, doi:10.1111/j.1467-985X.2008.00578.x.

Chevalier, A. (2003), Measuring Over-education. *Economica,* 70(279), 509–31. doi:10.1111/1468-0335.t01-1-00296.

Chua, K., & Chun, N. (2016). *In search of a better match: Qualification mismatches in developing Asia.* ADB Economics Working Paper Series, No. 476, Manila.

Coovi, G., & Noumon, C. R. (2020). Insertion socioprofessionnelle des jeunes au Bénin: Entre employabilité publique, privée ou personnelle. *Revue Africaine de Sociologie,* 24(1),105–130.

Curran-Everett, D. (2017). Explorations in statistics: The assumption of normality. *Advances in Physiology Education,* 41(3), 449–453, doi:10.1152/advan.00064.2017.

Daud, S., Abidin, N., Sapuan, N. M., & Rajadurai, J. (2012). Efficient human resource deployment technique in higher education: A standpoint from Malaysia. *African Journal of Business Management,* 6(25), 7533–7547.

Desjardins, R., & Rubenson, K. (2011). *An analysis of skill mismatch using direct measures of skills.* OECD Education Working Papers, No. 63, Paris: OECD.

Desjardins, R. (2014). *Rewards to skill supply, skill demand and skill match-mismatch: Studies using the Adult Literacy and Lifeskills survey*. Department of Economics, Lund University, from https://portal.research.lu.se/ws/files/4336185/4350629.pdf.

Dharam, G. (2003). Travail décent : Concept et indicateurs. *Revue internationale du Travail,* 142(2), 122–157.

Dib, Z. C. (1988). *Formal, non-formal and informal education: Concepts and applicability, cooperative networks in physics education*. Interamerican Conference on Physics Education American Institute of Physics: New York, pp 300-315.

DTDA (Danish Trade Union Development Agency). (2018). *Benin labour market profile.* Retrieved September 15, 2020, from https://www.ulandssekretariatet.dk/wp-content/uploads/2020/02/Benin_lmp_2018.pdf.

Ebaidalla, E. M. (2016). Analysis of youth unemployment in Sub-Saharan Africa: Determinants and possible ways forward. *African Journal of Economic and Sustainable Development,* 5(4), 302–317.

ETF, ILO, & Cedefop (2016). *Using labour market information – Guide to anticipating and matching skills and jobs.* Retrieved July 3, 2020, from https://www.ilo.org/skills/areas/skills-training-for-poverty-reduction/WCMS_534314/lang--en/index.htm.

Farooq, S. (2011). The utilization of education and skills: Incidence and determinants among Pakistani graduates. *The Pakistan Development Review,* 50(3), 2019-244.

Farooq, S. (2011). *Mismatch between education and occupation: A case study of Pakistani graduates.* Islamabad: NUST.

Filmer, D., & Fox, L. (2014). *Youth employment in sub-Saharan Africa.* The World Bank.

Flisi, S., Goglio, V., Meroni, E. C., Rodrigues, M., & Vera-Toscano, E. (2017). Measuring occupational mismatch: Overeducation and overskill in Europe—Evidence from PIAAC. *Social Indicators Research,* 131, 1211–1249, https://doi.org/10.1007/s11205-016-1292-7.

Flisi, S., Goglio, V., Meroni, E., Rodrigues, M., & Vera-Toscano, M. (2014). *Occupational mismatch in Europe: Understanding overeducation and overskilling for policy making.* Science and Policy Report, Research Centre of the European Commission.

Fox, L., & Thomas, A. (2016). Africa's got work to do: A diagnostic of youth employment challenges in Sub-Saharan Africa. *Journal of African Economies,* 25(1), 16–36.

Fox, L., Senbet, L. W., & Simbanegavi, W. (2016). Youth employment in Sub-Saharan Africa: Challenges, constraints and opportunities. *Journal of African Economies*, 25(1), 3–15.

Gates, S., Lippman, L., Shadowen, N., Burke, H., Diener, O., & Malkin, M. (2016). *Key soft skills for cross-sectoral youth outcomes.* Washington, DC: USAID's YouthPower: Implementation, YouthPower Action.

Giotis, G. (2018). Skills and their impact on labor market performance using European cross-country evidence. *International Journal of Language, Translation and Intercultural Communication,* 7, 45–63.

Glick, P. J., Huang, C., Mejia, N. (2015). *The private sector and youth Skills and employment programs in low- and middle-income countries.* World Bank, Washington. Retrieved December

20, 2020, from https://openknowledge.worldbank.org/bitstream/handle/10986/23260/The0private0se0dle0income0countries.pdf?sequence=1&isAllowed=y.

Gordon, B. (1992). Are Canadian firms under investing in training? *Canadian Business Economics,* 1(1), 25–33.

Gorusch, R. L. (1983). *Factor Analysis* (2nd Ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Graham, J., & Graham, S. (2013). *Literature review exploring job mismatch and income, and labor market outcomes for people with disabilities.* Human Ressources and Skills Development Canada (HRSDC). Retrieved April 15, 2020, from http://deep.idrc.ocadu.ca/wpcontent/uploads/2013/10/Literature_Review_Final_2.pdf.

Grow Africa (2017). *Country overview: Benin.* Retrieved November 20, 2019, from https://www.growafrica.com/country/benin.

Green, F., & McIntosh, S. (2007). Is there a genuine under-utilization of skills amongst the overqualified?. *Applied Economics,* 39(4), 427–439.

Grow Africa (2017). *Country overview: Benin.* Retrieved November 20, 2019, from https://www.growafrica.com/country/benin.

Hamel, C. (2011). *Enquête Violences et rapports de genre : Contextes et conséquences des violences subies par les femmes et les hommes.* Descriptif du projet d'enquête, Paris, INED. Retrieved February 2, 2020, from http://www.ined.fr/fichier/s_rubrique/21423/document_travail_2014_212_genre_violenc   e.fr.pdf.

Hogg, R. V., & Tanis, E. A. (2005). *Probability and statistical Inference (Seventh Ed.)*. Pearson.

ILO (International Labour Organization). (2008). *ILO declaration on social justice for a fair globalization*. ILO, Geneva. Retrieved February 15, 2020, from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/documents/genericdocument/wcms_371208.pdf.

ILO (International Labour Organization). (2020). *Global employment trends for youth 2020: Africa.* Retrieved January 1, 2021, from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_737670.pdf.

INSAE & BIT (Institut National de la Statistique et de l'Analyse Economique & Bureau international du Travail). (2013). *Transition de l'école vers la vie active des jeunes femmes et hommes au Bénin.* Work4Youth Publication series, No.7, Genève. Retrieved July 15, 2018, from https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/publication/wcms_232791.pdf.

INSAE (Institut National de la Statistique et de l'Analyse Economique). (2015). *Benin Socio Economic Database.* Retrieved August 15, 2019, from http://benin.opendataforafrica.org/BJSECD2015/socio-economic-database-2015.

INSAE (Institut National de la Statistique et de l'Analyse Economique). (2016). *Les tendances de la pauvreté au Bénin sur la période 2007 – 2015.* Cotonou: Bénin

INSAE (Institut National de la Statistique et de l'Analyse Economique). (2011). *Enquête modulaire intégrée sur les conditions de vie des ménages.* Cotonou: Bénin

Jote, T. (2017). Exploring employment status and education–Job match among engineering graduates in Ethiopia: Policy implications. *International Journal of African Higher Education,* 4(1), 41-65, https://doi.org/10.6017/ijahe.v4i1.10249.

Kato, T., & Kodama, N. (2017). *Women in the workplace and management practices: Theory and evidence. IZA – Institute of Labor Economics,* No. 10788. Retrieved November 12, 2020, from http://ftp.iza.org/ dp10788.pdf.

Kechagias, K. (2011). *Teaching and assessing soft skills.* MASS project report. Retrieved October 9, 2020, from http://research.education.nmsu.edu/files/2014/01/396_MASS-wp4-final-report-part-1.pdf.

Kiss, A. & Vandeplas, A. (2015). *Measuring skills mismatch.* Analytical Web Note 7, Employment, Social Affairs & Inclusion, European Commission, https://www.researchgate.net/publication/308927565_Measuring_skills_mismatch.

Kluve, J., Puerto, S., Robalino, D., Romero, J. M., Rother, F., Stöterau, J., Weidenkaff, F., & Witte, M. (2016). *Interventions to improve the labour market outcomes of youth: A systematic review of training, entrepreneurship promotion, employment services and subsidized employment interventions.* Retrieved November 29, 2020, from http://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_508938.pdf.

Kothari, C. R. (2004). *Research methodology: Methods and techniques.* Delhi: New Age International Publishers, 179–180.

Kouakou, K. C., & Yapa, A. R. V., (2019). *Mesures et déterminants de l'inadéquation compétences-emploi en Côte d'Ivoire.* Papiers de Recherche AFD, no. 117, Novembre.

Kouh, B. (2013). *An evaluation of the environmental internship programme (2005–2013) and its prospects for improved graduate employability: The case of interns in the city of Cape Town,* Master's thesis, University of the Western Cape, Cape Town.

Kriechel, B., & Vetter, T. (2019). *Skills mismatch measurement in ETF partner countries.* European Training Foundation, ISBN 978-92-9157-705-7, doi:10.2816/664496.

Laajaj, R. & Macours, K. (2017). *Measuring skills in developing countries,* Policy Research Working Paper, No. 8000 (Washington, DC, Banque mondiale).

Lees, D. (2002). *Graduate employability: Literature review.* Retrieved September 5, 2020, from http://www.ltsn.ac.uk/application. asp?app=resources.asp&process=full_ record&section=generic&id=190.

Maertz, C. P., Stoeberl, P. A., & Marks, J. (2014). Building successful internships: Lessons from the research for interns, schools, and employers. *Career Development International*, 19, 123–142.

Mahuteau, S., Mavromaras, K., Sloane, P., & Wei, Z. (2014). *Horizontal and vertical educational mismatch and wages.* University of Aberdeen, Aberdeen. Paper presented at the New Research in the Economics of Educational and Skills Mismatch, Retrieved January 16, 2020, from https://melbourneinstitute.unimelb.edu.au/ assets/documents/hilda-bibliography/other- publications/2014/Mahuteau_etal_educational_ mismatch_and_wages_SloanePaper.pdf.

Manuti, A., Pastore, S., Scardigno, A. F., Giancaspro, M. L., & Morciano, D. (2015). Formal and informal learning in the workplace: A research review. *International Journal of Training and Development,* 19(1), 1–17, doi:10.1111/ijtd.12044.

Mavromaras, K., Sloane, P., & Wei, Z. (2012). The role of education pathways in the relationship between job mismatch, wages and job satisfaction: A panel estimation approach. *Education Economics*, 20(3) 303–321, https:// doi.org/10.1080/09645292 .2012.672556.

McGuinness, S., & Sloane, P. (2011). Labour market mismatch among UK graduates: An analysis using REFLEX data. *Economics of Education Review,* 30, 130–145.

McGuinness, S., Pouliakas, K., & Redmond, P. (2018). Skills mismatch: Concepts, measurement and policy approaches. *Journal of Economic Surveys,* 32(4), 985–1015, https://doi.org/10.1111/ joes.12254.

Miroro, O. (2019). *How can we tackle youth employment challenges? Revisiting the evidence base for soft skills in Africa.* INCLUDE. Retrieved December 15, 2020, from https://includeplatform.net/ downloads/tackle-youth-employment-challenges- revisiting-evidencebase-soft-skills-africa/.

Misko, J. (2008). *Combining formal, non-formal and informal learning for workforce skill development.* Australian Industry Group. Retrieved February 3, 2021, from https://files.eric.ed.gov/fulltext/ ED503360.pdf.

Montt, G. (2015). *The causes and consequences of field-of-study mismatch: An analysis using PIAAC.* OECD Social, Employment and Migration Working Papers, No. 167, OECD Publishing, Paris.

Montt, G. (2017). Field-of-study mismatch and overqualification: Labour market correlates and their wage penalty. *IZA Journal of Labor Economics,* 6(1).

Moreau, M., & Leathwood, C. (2006). Graduates' employment and the discourse of employability: A critical analysis. *Journal of Education and Work,* 19(4), 305–324.

Morsy, H., & Mukasa, A. N. (2019). *Youth jobs, skill and educational mismatches in Africa,* Working Paper Series, No. 326, African Development Bank, Abidjan, Côte d'Ivoire.

Murdoch-Eaton, D., & Whittle, S. (2012). Generic skills in medical education: Developing the tools for successful lifelong learning. *Medical Education,* 46(1), 120–8, DOI: 10.1111/j.1365-2923.2011.04065.x.

Nashash, H. M. (2015). The extent of skills mismatch among childhood education graduates of Princess Alia University College. *Journal of Education and Practice,* 17(6), 180–189.

OCDE. (2013), *OECD Skills Outlook 2013: First results from the survey of adult skills.* OCDE Publishing. http://dx.doi.org/10.1787/9789264204256-en.

OECD. (2012). *Education at a glance: OECD indicators.* OECD Publishing. http://dx.doi.org/10.1787/eag-2012-en.

Pallant, J. (2001). *SPSS survival manual – A step by step guide to data analysis using SPSS for Windows (version 10).* Buckingham Open University Press.

Pauw, K, Oosthuizen, M., & van der Westhuizen, C. (2008). Graduate unemployment in the face of skills shortages: A labour market paradox. *The South African Journal of Economics,* 76(1), 45–57.

Pellizzari, M., & Fichen, A. A. (2017). A new measure of skill mismatch: Theory and evidence from PIAAC. *IZA Journal of Labor Economics,* 6(1), https://doi.org/10.1186/s40172-016-0051-y.

Perry, A., Wiederhold, S., & Ackermann-Piek, D. (2014). How can skill mismatch be measured? New approaches with PIAAC. *Methods, data, analyses,* 8(2), 137–174, DOI: 10.12758/mda.2014.006.

Pieters, J. (2013). *Youth employment in developing countries.* Institute for the Study of Labor. IZA Research Report No. 58.

Pitan, O., & Adedeji, S. O. (2012). Skills mismatch among university graduates in the Nigeria Labor Market. *US-China Education Review,* 1, 90–98.

Pitan, O. S. (2015). An assessment of generic skills demand in five sectors of the Nigerian labor market. *Public and Municipal Finance,* 4(1), 28–36.

PNE-Bénin (2011). *Document de la Politique Nationale de l'Emploi sur la période 2012–2016.* Retrieved from August 2, 2020, https://www.skillsforemployment.org/edmsp1/groups/public/documents/6006/cdff/mtm3/~edisp/edmsp1_137403.pdf.

Raposa, E. B., Rhodes, J., Stams, G. J. J. M., Card, N., Burton, S., Schwartz, S., Sykes, L. A. Y., Kanchewa, S., Kupersmidt, J., & Hussain, S. (2019). The effects of youth mentoring programs: A meta-analysis of outcome studies. *Journal of Youth Adolescence,* 48, 423–443, https://doi.org/10.1007/s10964-019-00982-8.

Robst, J. (2007). Education and job match: The relatedness of college major and work. *Economics of Education Review,* 26, 397–407.

Sattinger, M. (1993). Assignment models of the distribution of earnings. *Journal of Economic Literature,* 31(2), 831–880.

Sicherman, N., & Galor, O. (1990). A theory of career mobility. *Journal of Political Economy,* 98(1): 169-192

Sloane, P. J. (2014). *Overeducation, skill mismatches, and labor market outcomes for college graduates.* IZA World of Labor.

Stoevska, V. (2018). *Measurement of qualification and skill mismatches of persons in employment.* ICLS/20/2018/Room document 15, 20th International Conference of Labour Statisticians, Geneva, 10–19 October 2018. Retrieved December 5, 2020, from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/meetingdocument/wcms_636052.pdf.

Teichler, U. (2009). *Higher education and the world of work: Conceptual frameworks, comparative perspectives, empirical findings.* Rotterdam: Sense Publishers.

Thurow, L. C. (1975). *Generating inequality. Mechanisms of distribution in the U.S. economy.* New York: Basic Books.

Tsirkas, K., Chytiri, A-P., & Bouranta, N. (2020). The gap in soft skills perceptions: A dyadic analysis. *Education + Training,* 62(4), 357–377, DOI 10.1108/ET-03-2019-0060.

Tuning Africa (2018). *Conception et mise en oeuvre de Programmes d'Études en Sciences de l'Agriculture. K. Boodhoo (Ed.).* Bibao, Espagne: Université de Deusto Press. Retrieved February 8, 2021, from http://www.deusto-publicaciones.es/deusto/pdfs/tuning/tuning130.pdf.

UN DESA (United Nations Department of Economic and Social Affairs). (2015). *Youth population trends and sustainable development.* Population facts 2015, 1. Retrieved March 5, 2021, from https://www.un.org/en/development/desa/population/publications/pdf/popfacts/PopFacts_2015-1.pdf.

Vallera, F. L., & Bodzin, A. M. (2016). Knowledge, skills, or attitudes/beliefs: The contexts of agricultural literacy in upper-elementary science curricula. *Journal of Agricultural Education,* 57(4), 101–117, https://doi.org/10.5032/jae.2016.04101.

Verhaest, D., Sellami, S., & Van der Velden, R. (2017). Differences in horizontal and vertical mismatches across countries and fields of study, *International Labour Review,* 156(1), 1–23.

Wanberg, C., Abdifatah, A., & Borbala, C. (2020). Job seeking: The process and experience of looking for a job. *Annual Review of Organizational Psychology and Organizational Behavior,* 7, 315–337, https://doi.org/10.1146/annurev-orgpsych-012119-044939.

WEF (World Economic Forum). (2020). *The future of jobs.* Retrieved February 2, 2021, from http://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf.

Wolbers, M. (2003). Job mismatches and their labour-market effects among school-leavers in Europe. *European Sociological Review,* 19, 249–266.

Word Bank. (2019). *Agriculture, valeur ajoutée (% du PIB).* Retrieved July 31, 2020, from https://donnees.banquemondiale.org/indicateur/NV.AGR.TOTL.ZS.

World Bank (2012). *World Development Report 2013: Job.* New York: Oxford University Press

World Bank. (2017). *Doing business 2017: Equal opportunity for all.* Washington, DC: World Bank.38

World Bank (2019). *Youth unemployment (modeled ILO estimate).* International Labour Organization, ILOSTAT database. Retrieved September 20, 2019, from https://data.worldbank.org/indicator/sl.uem.1524.zs.

Yorke, M., & Knight, P.I. (2004). Employability through the curriculum, skills plus: Turning the undergraduate curriculum. *Tertiary Education and Management,* 8(4), 261–276.

Zakariya, Z. (2012). *Overeducation and overskilling in Malaysia.* University of Aberdeen.
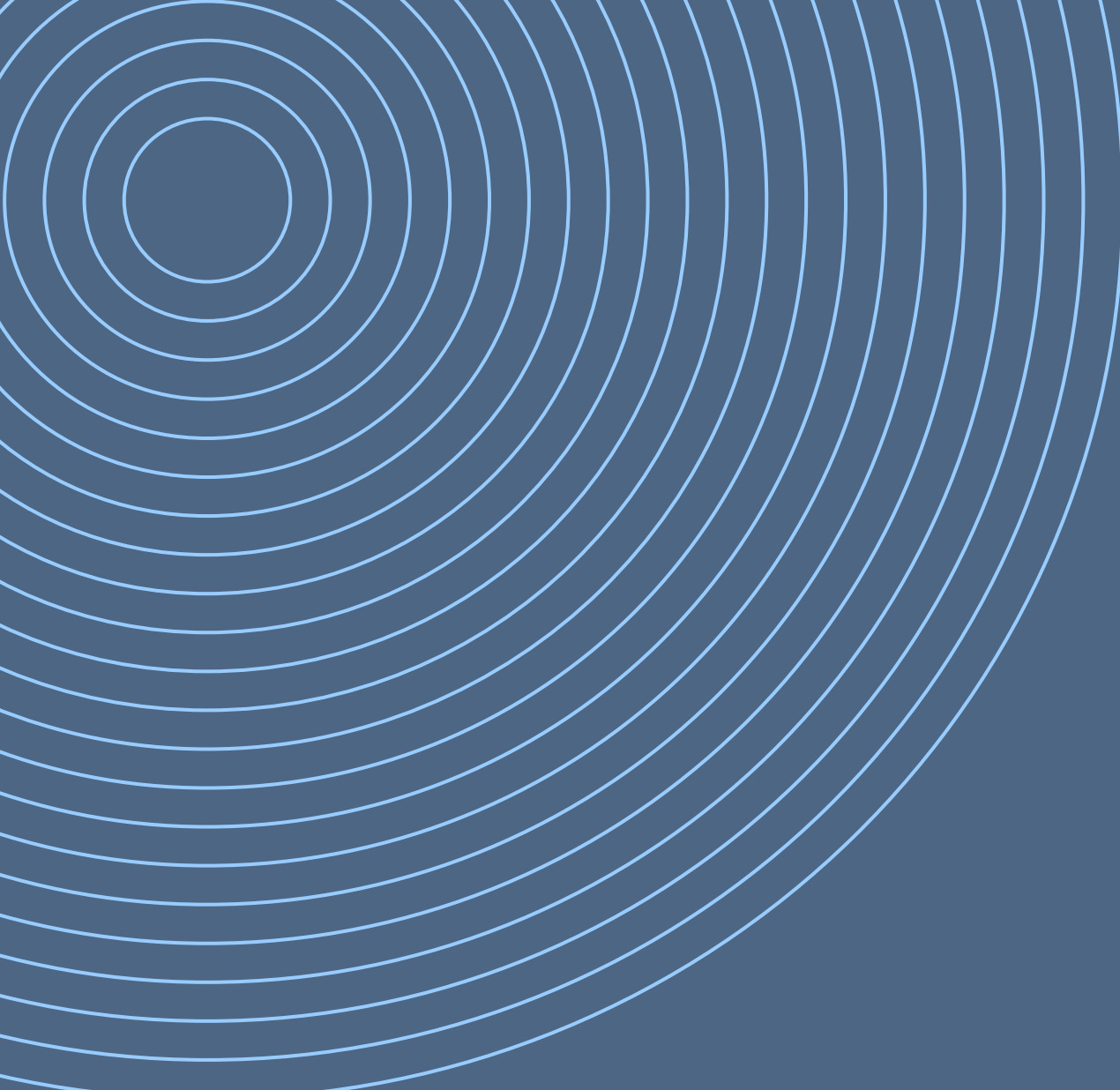
Appendixes

Appendix 1

Hard skills based on academic level and major

Tropical Agricultural Studies Certificate (BEAT)

Major	Skills
Crop Production and Animal Production	• Initiate, organize, lead, and manage microfarms • Realize agricultural production • Carry out the conservation, primary processing, and packaging of the products of their farm for ensuring good marketing • Rationally manage the natural resources and valorize the by-products of the farm • Serve as a reference in terms of quantitative and qualitative improvement of agricultural production • Understand agro-ecological data and climatological data of its related environment for adapting its production • Conduct common crop production • Handle the breeding of common animal species • Handle the rearing of aquatic species • Organize diversified productions in an integrated system rationally • Develop and implement a campaign plan for a microfarm and determine the outcome • Implement harnessed cultivation and use the common agricultural machinery • Handle the basic maintenance of agricultural equipment and infrastructure • Design and carry out small-scale rural management and equipment activities of a microfarm • Administer the conservation of plant and animal products • Apply the techniques of primary processing and packaging of plant and animal products • Commercialize the farm production • Handle the basic accounting system of a microfarm and use the data • Plan the budget for a micro-farm • Elaborate microfarm creation projects • Handle fundraising for microfarming projects.

Source: _Extracted from training curricula_

Diploma of Tropical Agricultural Studies (DEAT)

Major	Skills
Basic skills	• Understand the applications of life and earth sciences in agriculture • Know the cultivated and farmed species, their morphology, and physiology • Sustainably manage the soil and its fertility • Conduct all stages of a survey • Apply planning and financial management techniques • Know land-use and water management techniques • Manage farm motorization • Handle harnessed cultivation on a farm • Design a breeding system • Understand the functioning of ecosystems • Manage water usage adequately for the benefit of crops and domestic animals • Understand and apply the basics of fishing and aquaculture • Implement agricultural, forestry, and agroforestry production techniques • Apply food processing and preservation techniques • Know the main pests and diseases affecting crops
Crop production	• Use the soil rationally • Produce beans, roots, tubers, fruit, and leaf and root vegetables sensibly and recognize the methods of plant multiplication • Grow crops according to market needs and requirements • Utilize agricultural innovations to increase production • Apply integrated management techniques for soil fertility, pests and diseases, and crop stocks • Employ production technique sheets • Develop a professional project
Animal production	• Apply advanced techniques of domestic animal husbandry • Diagnose and properly treat diseases in domestic animals • Implement marketing and commercialization techniques for agricultural products • Apply managerial techniques • Mobilize funding • Apply extension techniques adequately • Administer a farm/farm business effectively

Major	Skills
Nutrition and food technology	• Evaluate food quality and suitability to processing • Implement a nutritional program • Administer a farm/agri-enteprise effectively • Utilize financial management techniques • Mobilize funding • Manage an agro-food processing unit • Apply techniques of marketing and commercialization for agro-food products • Control food sanitary quality • Conduct a nutritional survey • Apply the adequate extension techniques
Forestry	• Know the advanced notions of ecosystems' functioning • Employ the appropriate techniques of forest farming, production of non-timber forest products, and management of forest stands. • Apply forest and wildlife resource assessment techniques
Fisheries and aquaculture	• Understand and apply the basics of fishing and aquaculture • Use production techniques in fishing and aquaculture units • Apply marketing and commercialization techniques • Mobilize funding • Administer a farm/agri-enterprise effectively • Implement financial management techniques • Utilize planning techniques • Apply techniques for managing units of aquaculture and processing of aquaculture products • Implement fisheries and aquaculture legislation • Apply agricultural extension techniques

Major	Skills
Rural planning and equipment	• Administer a farm/agri-enterprise effectively • Employ financial management techniques • Mobilize funding • Adopt planning techniques • Carry out small infrastructure management • Manage properly working materials • Apply agricultural extension techniques • Supervise the implementation of construction sites • Utilize marketing techniques

Source: Extracted from training curricula

Bachelor's

Major	Skills
Sciences and techniques of crop production	• Conduct a training session in agriculture • Apply the techniques of crop and animal production and agri-food processing • Adopt post-harvest crop preservation techniques • Exercise managerial skills • Handle nagociations • Apply crop fertilization techniques • Identify the pests of the main crops • Employ pest management techniques • Analyze the functioning of a farm/agricultural enterprise

Major	Skills
Sciences and technology of animal production	• Apply agricultural production techniques • Design domestic animals' feeding plan • Manage animal production units • Develop business plans for animal production • Conduct a training session in agriculture • Negotiate with agricultural value chain agents
Human nutrition, food science, and technology	• Describe agri-food products' processing techniques • Recognize malnutrition and food insecurity situations • Identify food and nutritional monitoring indicators • Transform agri-food products into quality edible foods • Provide nutrition education in local communities • Rehabilitate moderately malnourished children • Implement food and nutrition security interventions • Manage agro-food processing and dietetics units • Conduct a training session on nutrition and food sciences • Administer viable agricultural and agri-food production units
Agricultural economics, sociology, and rural Extension	• Carry out participatory diagnostics of agricultural and agri-food units • Develop business plans for agricultural and agri-food units • Implement production, processing, and marketing activities for agricultural and agri-food products • Conduct promotional campaigns for new agricultural and agri-food technologies • Advise promoters of agricultural and agri-food production units • Understand how agricultural markets work • Negotiate with agents of agricultural value chains • Apply economic and marketing tools in the management of farms and agricultural enterprises.

Major	Skills
Management of forests and natural rangelands	• Employ animal and crop production techniques • Apply agri-food processing techniques • Utilize post-harvest preservation techniques • Conduct a training session on agriculture • Manage an agricultural, agro-pastoral, or agro-forestry farm and a protected area or reserved forest • Exercise managerial skills • Perform agricultural tasks especially in the forestry and related sectors for a better management of natural resources
Rural engineering, fisheries, and aquaculture	• Conduct a training session on agriculture • Apply animal and plant production techniques • Use agri-food processing techniques • Implement post-harvest conservation techniques • Drive tractors and harness animals • Manage an agricultural or agroaquaculture farm and a fisheries or aquaculture production unit • Exercise managerial skills.

Source: Extracted from training curricula

Major	Skills
Sustainable management of tropical soil fertility	• Analyze the conditions of plant development • Explain the variability of climatic phenomena • Apply methods relating to statistical analyzes • Identify crop pests • Adopt pest management methods • Elaborate and map soil conservation techniques • Apply soil analysis techniques • Carry out pedological studies and land assessments • Apply sustainable crop fertilization strategies according to soil types • Utilize soil fertility management systems • Develop innovations related to the integrated management of soil fertility in partnership with stakeholders
Biotechnology and plant breeding	• Analyze plant development conditions • Explain the variability of climatic phenomena • Employ statistical analysis methods • Identify crop pests • Apply pest management methods • Use plant-variety creation techniques • Manage plant genetic resources • Handle crop associations • Apply the requirements of seed control and conservation • Follow good phytosanitary practices • Analyze the functioning and transmission mechanisms of genes • Describe plant polymorphism • Implement soil fertility management systems; • Conduct a research program on biotechnology and plant breeding • Analyze data from a study on biotechnology and plant breeding

Major	Skills
Sustainable management of pests and valorization of biopesticides	• Identify plant pathogens • Assess the spread of pathogens • Quantify plant pathogens • Assess plant diseases • Identify insects, mites, nematodes, weeds, and other enemies of plants and stored food • Recognize the pests of crops, stocks, and seeds • Describe the biology of pests of plants and stocks • Detail the biology of pathogens and mycotoxins • Describe the biology of parasitic angiosperms • Assess the damage caused by pests to stocks • Describe weeds' reproduction and propagation modes • Use observation and sampling techniques for crop pests • Utilize data from observations and sampling of crop pests • Design biological or chemical control strategies against crop and stock pests • Develop biological or chemical control programs against crop and stock pests • Implement biological or chemical control programs against crop and stock pests effectively • Manage integrated pest control programs • Identify good agricultural practices and good phytosanitary practices • Apply phytosanitary regulations • Use phytosanitary products against crop pests adequately • Assess the impact of chemicals and/or biopesticides used against pests • Identify the impact of phytosanitary products for the operator, environment, and consumer • Evaluate the residues of plant protection products in food products

Major	Skills
Agricultural and food sciences and technologies	- Manage the technical operation of an agri-food business and its human resources; - Handle internal flows and the quality of processed products - Identify potential disruptions in the production chain - Propose technical solutions for the resolution of distortions in the production chain - Develop a quality insurance manual - Implement a quality insurance system - Identify improvement needs (related to processes, equipment, and products) - Develop product development techniques (process design and optimization) - Create a business plan - Use modern food characterization techniques
Agricultural economics	- Design and evaluate agricultural policies - Conduct economic analyses of agricultural production systems - Provide expertise on international trade of agricultural products - Offer management expertise to businesses, institutions, and agricultural research organizations - Analyse agricultural and rural problems for sustainable development - Create and develop agricultural, rural development, and marketing enterprises, considering gender, the environment, and climate change - Develop a diversified and job-creating economy - Identify technologies and socio-economic measures aimed at overcoming constraints encountered by producers and entrepreneurs, such as agricultural mechanization and soil fertility management, as well as other innovations
Management of agricultural innovations	- Identify the technology demands from agricultural producers - Facilitate the planning of agricultural extension and advisory services - Monitor the implementation of agricultural innovations - Analyze the constraints to innovation and agricultural extension - Strengthen institutional capacity for innovation - Evaluate the innovations implementation process for innovations - Conduct a participatory diagnosis - Lead a multi-stakeholder innovation platform - Assess the impact of participatory management of agricultural innovations.

Major	Skills
Development and management of forest resources	• Conduct forest inventory • Design, elaborate, and implement forest management plans • Follow support research protocols • Manage forest sectors
Development of wildlife and natural trails	• Conduct wildlife inventory • Design, elaborate, and implement rangeland management plans; • Follow support research protocols • Manage natural rangelands
Rural engineering and water resources mobilization	• Handle the design and implementation of rural infrastructure • Develop technical drawings and the implementation of different constructions • Develop tender documents and participate in the selection of contractors • Supervise construction sites • Support producers in the proper use of agricultural machinery for profitability • Provide support in the choice of mechanization equipment and techniques • Develop and handle the technical files of consulting offices and companies • Develop microprojects.
Fisheries and aquaculture management	• Administer fisheries management professionally and sustainably • Supervise the establishment and management of an aquaculture farm in a professional manner • Design techniques for the construction and management of aquariums

Source: Extracted from training curricula

Appendix 2

Meaning of soft, digital, and job search skills

Type of skills	Skills	Meaning
Soft skills	Communication and interpersonal skills	Ability to articulate, convey, and effectively defend arguments, ideas, feelings, or information through verbal and non-verbal messages
	Personal skills	Self-confidence, positive attitude, strong work ethic, etc.
	Intercultural skills	Proficiency in more than one language, ability to work in culturally diverse teams, etc.
	Learning skills	Ability to learn independently, curiosity and desire for continuous learning, etc. Identify ways to learn from mistakes for the benefit of the employer and oneself
	Entrepreneurial skills	Flexibility, proactive approach toward opportunities, risk-taking, etc.
	Ability to think	Critical, analytical, and strategic thinking
	Teamwork	Ability to collaborate with other people, both face to face and virtually
	Creative thinking	Ability to think differently to find new ideas to solve problems or seek solutions to a particular issue
	Efficiency	Ability to achieve results with limited resources
	Problem-solving skills	Ability to understand a problem by breaking it down into smaller parts and to identify key questions, implications, and solutions
	Planning and organizational skills	Ability to plan work to meet deadlines and objectives and monitor the progress of the work to ensure that one is on the right track to meet a deadline
	Proactivity and flexibility	Ability to anticipate situations and respond easily to changing circumstances and expectations of the hierarchy
	Resilience to stress skills	Ability to deal with stress, manage stress related to deadlines and make sure they are met
	Leadership	Ability to influence others
	Conflict management	Ability to manage conflicts in your professional environment

Type of skills	Skills	Meaning
Digital skills	Email management	Handle/manage emails
	Search online	Ability to exploit search engines
	Social media	Ability to make oneself visible on social networks
	Online collaboration	Ability to collaborate remotely
	Request management	Ability to formulate and execute requests
	Office suite	Proficiency in Microsoft Word, Excel, PowerPoint, etc.
Job search skills	Identify employment opportunities	Ability to recognize job opportunities
	Write a curriculum vitae	Ability to write down personal data and professional experiences in an impressive style
	Draft a cover letter	Ability to write to recruiters
	Pass a job interview skills	Ability to conveniently respond to questions during a job interview

Appendix 3

Data collection tools[11]

| **3.1** | **Questionnaire for employers in the agricultural sector** |

This survey is being conducted as part of the project "Mentoring young men and women agricultural graduates in the search for decent jobs in the labour market", led by the University of Abomey-Calavi and DagriVest. It aims to collect information on the use of talent in the agricultural sector on the one hand and the current and future needs on the other.

The interview should take about 30 minutes. All your answers and observations are strictly confidential. They will be analyzed anonymously and used solely for this survey.

We thank you in advance for your availability and cooperation.

Code or Name of Investigator:

Date: [Automatic]

A. General information on the surveyed organization

N°	Questions	Codes /Filling Instructions
A.1.	Location of the structure	Specify the municipality
A.2.	Location of the investigation	1 = Location of the organization; 2 = Other (Specify municipality)
A.3.	Industry [Multiple choice option]	1 = Research; 2 = Education; 3 = Research and teaching; 4 = Administration; 4 = Agricultural production; 5 = Provision of agricultural inputs/materials; 6 = Provision of agricultural services; 7 = Processing of agricultural products; 8 = Distribution of agricultural products; 9 = Other (specify)
A.4.	Type of organization	1 = Civil society organization (CSO); 2 = Private enterprise; 3 = Public organization; 4 = International organization; 5 = Professional agricultural organization (OPA[12]); 6 = Other (specify)
A.5.	If a private enterprise, what is its legal status?	1 = Sole proprietorship; 2 = Limited liability company (Ltd); 3 = Limited company; 4 = Non-registered company

---

| 11 | The data collection tools were digitized on the KoboCollect platform and the data collection was carried out using the mobile tools |
| 12 | OPA refers to cooperatives, associations, unions, federations, confederations, foundations, trade unions, or any group of natural or legal persons with an agricultural vocation who decide to defend their common interests with public services. |

N°	Questions	Codes /Filling Instructions
A.6.	How many years has your organization been active in this sector(s)?	Enter the number of years (e.g., 10)
A.7.	How many people does your organization employ?	Enter the total number of employees
A.8.	How many employees (by level) come from agricultural training institutions?	<table><tr><td>*Levels of study*</td><td>*Number*</td></tr><tr><td>BEAT</td><td></td></tr><tr><td>DEAT</td><td></td></tr><tr><td>Bachelor's</td><td></td></tr><tr><td>Master's/Engineering</td><td></td></tr><tr><td>PhD</td><td></td></tr></table>
A.9.	Are all positions for graduates of agricultural training institutions in your institution filled?	1 = Yes; 2 = No
A.10.	If yes, how many are yet to fill?	Write the number (e.g., 5)
	If not, why not?	1 = profile not sought; 2 = Other (specify)
A.11.	What is the positioning of agronomy graduates at your institution?	3 = Position below their qualification 2 = Position in line with their qualification 1 = Position above their qualification
A.12.	In the last five years, how many employees from agricultural training institutions have been recruited by your organization?	Write the number (e.g., 5)
A.13.	What is the distribution by level of education of these graduates recruited in the last 5 years?	<table><tr><td>*Levels of study*</td><td>*Number*</td></tr><tr><td>BEAT</td><td></td></tr><tr><td>DEAT</td><td></td></tr><tr><td>Bachelor's</td><td></td></tr><tr><td>Master's/Engineering</td><td></td></tr><tr><td>PhD</td><td></td></tr></table>

N°	Questions	Codes /Filling Instructions	
A.14.	What is the distribution according to the majors of the graduates recruited?	**Majors**	**Number**
		Crop Production	
		Animal Production	
		Development and Management of Natural Resources	
		Agricultural Economics and Sociology	
		Nutrition and Food Sciences	
		Agricultural Entrepreneurship	
		Aquaculture	
		Others (Specify)	
A.15.	Referring to these past or current recruitments of qualified candidates from agricultural training institutions, what are the difficulties graduates face in filling the positions?	1 = None; 2 = Training inadequate for the profile sought; 3 = Lack of skill sought; 4 = Lack of professional experience; 5 = Other (to be specified)	
A.16.	On a scale of 1 to 5, how satisfied are you with the performance of the graduates you have recruited?	1 = Not at all satisfied; 2 = Not satisfied; 3 = No opinion; 4 = Satisfied; 5 = Very satisfied	
A.17.	How do you think your employees acquired the skills needed for their jobs?	1 = Work experience; 2= Basic training; 3 = Other (specify)	
A.18.	In your opinion, how well equipped do your employees feel they are to meet the demands of their jobs in the coming years?	1 = Not at all equipped; 2 = Not equipped; 3 = No opinion; 4 = Equipped; 5 = Highly equipped	

B. Skills sought from agriculture graduates

B.1. To what extent do you consider that the technical skills received by graduates during their training are useful for securing and carrying out a job?

1 = Not at all.
2 = Weakly
3 = Moderately
4 = Greatly
5 = Exceptionally

B.2. How important are the skills you are looking for in graduates from agricultural training institutions to ensure decent employment? Specify your expectations for each attribute using the following assessment grid:

1. Not important.
2. Not quite important
3. Neutral
4. Important
5. Very important

N°	Skills	Level of importance	Explanation
Soft skills			
1	Communication and interpersonal skills		Ability to effectively articulate, covney, and defend arguments, ideas, feelings, or information through verbal and non-verbal messages.
2	Personal skills		Self-confidence, positive attitude, strong work ethic, etc.
3	Intercultural skills		Proficiency in more than one language, ability to work in culturally diverse teams, etc.
4	Learning skills		Ability to learn independently, curiosity and desire for continuous learning, etc. Identify ways to learn from mistakes for the benefit of the employer and oneself.
5	Entrepreneurial skills		Flexibility, proactive approach toward opportunities, risk-taking, etc.
6	Ability to think		Critical, analytical, and strategic thinking
7	Teamwork		Ability to collaborate with others, both face to face and in an online environment
8	Creative thinking		Ability to think differently to find new ideas to solve problems or seek solutions to a particular situation
9	Efficiency		Ability to achieve results with limited resources
10	Problem-solving skills		Ability to understand a problem by breaking it down into smaller parts and to identify key issues, implications, and solutions
11	Planning and organizational skills		Be organized and methodical, able to plan work to meet deadlines and objectives. Track progress to ensure that one is on track to meet a deadline.
12	Proactivity and flexibility		Ability to anticipate situations and respond easily to changing circumstances and management expectations
13	Resilience to stress skills		Ability to not succumb to stress, managing and meeting deadline stress
14	Leadership		Ability to influence others
15	Conflict management		Ability to manage conflicts in your professional environment

N°	Skills	Level of importance	Explanation
Digital skills			
16	Email management		Ability to handle e-mails
17	Online research		Ability to utilize search engines
18	Social media		Ability to be visible on social networks
19	Online collaboration		Ability to collaborate remotely
20	Query management		Ability to formulate and execute requests
21	Microsoft Office Suite usage		Proficiency in Mircosoft Word, Excel, and Powerpoint.

C. Your future needs for agricultural graduates (next 5–10 years)

N°	Questions	Codes /Filling Instructions
C.1.	In your opinion, what are the technical skills that will be in demand in the coming years in your field? [Multiple Choice Option]	1 = Drafting of a business plan; 2 = Monitoring and evaluation of agricultural interventions; 3 = Agricultural production techniques; 4 = Drafting of development and/or research project; 5=Other (specify)
C.2.	Are these skills currently offered by local training institutions?	1 = Yes; 2 = No
C.3.	Which levels of education will you need most in the coming years? [Multiple Choice Option]	1 = BEAT; 2 = DEAT; 3 = Bachelor's; 4 = Master's/Engineering; 5 = PhD

D. Profile of employer or manager (respondent)

N°	Questions	Codes /Filling Instructions
D.1.	Last and first names	Enter full name
D.2.	Sex	1 = Male ; 2 = Female
D.3.	What is your position in the company/ organization?	1 = Head of Human Resources; 2 = Director General; 3 = Other (specify)
D.4.	How long have you been in this position?	1 = Since the creation of the organization; 2 = Other (specify number of years)
D.5.	What is the highest degree you hold?	1 = None; 2 = CEP; 3 = BEPC; 4 = BAC; 5 = BEAT; 6 = DEAT; 7 = Bachelor's; 8 = Master's/Engineering; 9 = PhD
D.6.	Your e-mail address, if you would like a copy of the study report	Enter e-mail address
D.7.	Phone	Enter phone number

3.2 Questionnaire for agricultural graduate employees

This survey is being conducted as part of the project "Mentoring young men and women agricultural graduates in the search for decent jobs in the labour market", led by the University of Abomey-Calavi and DagriVest. It aims to collect information on your employment situation, and your current and future needs.

The interview should take about 30 minutes. All your answers and observations are strictly confidential. They will be analyzed anonymously and used for the sole purpose of this survey.

We thank you in advance for your availability and cooperation.

Code or Name of Investigator:
Date: [Automatic]

A. Respondent (employee) profile

N°	Questions	Codes /Filling Instructions
A.0.	Place of Investigation	Specify the name of the municipality
A.1.	Your name	Write full name (Last name and First name)
A.2.	Age	Enter age in number of years (e.g., 27)
A.3.	Sex	1 = Male; 2 = Female
A.4.	What is the highest degree you currently hold?	1 = BEAT; 2=DEAT; 3 = Bachelor's; 4 = Master's/Engineering; 5 = PhD
A.5.	How long have you had this degree?	Enter the number of years (e.g., 3)

N°	Questions	Codes /Filling Instructions
A.6.	What is your major?	1 = Crop Production/Plant Production and Management - Seed/ Horticulture; 2 = Animal Production/ Livestock System Management and Operation; 3 = Natural Resource Planning and Management/ Forestry and Timber Engineering/ Protected Area Management; 4 = Rural Economy and Sociology/ Management of Rural and Agricultural Enterprises; 5 = Nutrition and Food Science/ Science and Techniques of Conservation and Processing of Agricultural Products; 6 = Farm Entrepreneurship; 7 = Aquaculture; 8 = Agricultural Machinery and Mechanical Construction; 9 = Other (Specify)
A.7.	What was your degree when you were hired by the organization?	1 = BEAT; 2 = DEAT; 3 = Bachelor's; 4 = Master's/Engineering; 5 = PhD
A.8.	How long have you had this degree? (Continued A.8.)	Enter the number of years (e.g., 3)
A.9.	What is the type of organization that employs you?	1 = NGO; 2 = Private enterprise; 3 = Public organization; 4 = International organization; 5 = Professional agricultural organization (OPA[13]); 6 = Other (specify)
A.10.	Is this your first job?	1 = Yes; 2 = No
A.11.	If not, how many jobs have you had previously?	Write the number
A.12.	What is your second activity?	1 = Entrepreneurship; 2 = Other (please specify).
A.13.	How long was the transition from graduation to your first employment in the agricultural sector?	Enter the duration in number of months

[13] OPA refers to cooperatives, associations, unions, federations, confederations, foundations, trade unions or any group of natural or legal persons with an agricultural vocation who decide to defend their common interests with public services.

B. Your employment status (respondent)

N°	Questions	Codes /Filling Instructions
B.1.	What is your role in the organization?	1 = Programme officer; 2 = Monitoring-evaluation officer; 3 = Project coordinator; 4 = Director; 5 = Technical assistant; 6 = Research assistant; 7 = Technician; 8 = Community animator; 9 = Consultant; 10 = Teacher of an agricultural high school; 11 = Monitoring-evaluation assistant; 12 = Other (specify)
B.2.	Describe your role in your working organization	1= Internship, 2 = Job offer, 3 = Capacity building: 4 = Other (specify)
B.3.	How long have you been in this position?	Enter in number of months
B.4.	Does the position you currently hold match your qualification in terms of field of study?	1 = Inadequate; 2 = Merely adequate; 3 = Adequate; 4 = Very adequate; 5 = Exceptionally adequate
B.5.	Is the position you currently hold a good match with your education in terms of academic level?	1 = Inadequate; 2 = Merely adequate; 3 = Adequate; 4 = Very adequate; 5 = Excellent adequation
B.6.	Did you do any capacity building in addition to your academic training to get your current position?	1 = Yes ; 2 = No
B.10.	This capacity strengthening was a personal choice or was it part of the company/ organization's policy.	1 = personal choice; 2 = company/organizational policy

C. Graduate employees' level of skills

C.1. To what extent do you feel that your agricultural training has provided you with technical skills that have been useful in obtaining and carrying out your current job?

1 = Not at all
2 = Weakly
3 = Moderately
4 = Greatly
5 = Exceptionally

C.2. What technical skills were missing from your agricultural training that are very useful for your current job? [Multiple choice option]

1 = Drafting of a business plan;
2 = Monitoring and evaluation of agricultural interventions;
3 = Agricultural production techniques;
4 = Drafting of development and/or research projects;
5 = Other (specify)

C.3. What is your current level for the following skills, and what was your level immediately after your training as a result of your academic background?

1 = Very poor
2 = Poor
3 = Average (neither poor nor good)
4 = Good
5 = Very good

N°	Skills	Now	After training	Explanation
Soft skills				
1	Communication and interpersonal skills			Ability to effectively articulate, covney, and defend arguments, ideas, feelings, or information through verbal and non-verbal messages.
2	Personal skills			Self-confidence, positive attitude, strong work ethic, etc.
3	Intercultural skills			Proficiency in more than one language, working in culturally diverse teams, etc.
4	Learning skills			Ability to learn independently, curiosity and willingness to learn continuously, etc, Identify ways to learn from mistakes for the benefit of the employer and oneself
5	Entrepreneurial skills			Flexibility, proactiveness toward opportunities, risk-taking, etc.

N°	Skills	Now	After training	Explanation
6	Ability to think			Critical, analytical, and strategic thinking
7	Teamwork			Ability to work collaboratively with others, both face to face and in an online environment.
8	Creative thinking			Ability to think differently to bring new ideas to solve problems or seek solutions to a particular situation.
9	Efficiency			Ability to achieve results with limited resources
10	Problem-solving skills			Ability to understand a problem by breaking it down into smaller parts and to identify key issues, implications and solutions.
11	Planning and organizational skills			Be organized and methodical, able to plan work to meet deadlines and objectives, track progress to ensure that you one is on track to meet a deadline
12	Proactivity and flexibility			Ability to anticipate situations and to respond easily to changing circumstances and management expectations.
13	Resilience to stress skills			Ability to not succumb to stress, managing and meeting deadline stress
14	Leadership			Ability to influence others
15	Conflict management			Ability to manage conflicts in your professional environment

N°	Skills	Now	After training	Explanation
Digital skills				
16	Email management			Ability to handle e-mails
17	Online Research			Ability to manipulate search engines
18	Social Media			Ability to be visible on social networks
19	Online Collaboration			Ability to collaborate remotely
20	Query management			Ability to formulate and execute requests
21	Microsoft Office Suite			Proficiency in Microsoft Word, Excel, and Powerpoint.
Job search skills				
22	Identify job opportunities			Ability to recognize job opportunities
23	Writing a resume			Ability to write down personal data and professional experiences in a specific style
24	Writing a cover letter			Ability to write to recruiters
25	Job interview skills			Ability to respond conveniently to questions during a job interview

3.3 Questionnaire for the heads of agricultural training institutions

This interview is conducted within the framework of the project "Mentoring young men and women agricultural graduates in the search for decent jobs in the labour market", led by the University of Abomey-Calavi and DagriVest. It aims to collect information on training offers and the technical and non-technical skills acquired (or supposedly acquired) at the end of the said training on the one hand and information on the number of graduates released into the labor market in the last five years on the other hand.

The interview should take about 40 minutes. We thank you in advance for your availability and cooperation.

Name of investigating officer:
Date:

A. General information

N°	Questions	Codes /Filling Instructions
A.1.	Name of training institution	
A.2.	Type of institution	1 = School/University ; 2 = TVET
A.3.	Last and first names of respondent	
A.4.	Function of the respondent	

B. About your institution

B.1. What is the mission and objectives of your institution?

B.2. What training programmes are offered by your institution?

N°	Name of the programme	Academic level	Since when?	Technical skills
1				
2				
3				
4				
5				
6				
7				

B.3. For each of your different training programmes, which of the following non-technical skills are acquired by the learners?

N°	Skills	Aquired or Not	Explanation
Soft skills			
1	Communication and interpersonal skills		Ability to effectively articulate, covney, and defend arguments, ideas, feelings, or information through verbal and non-verbal messages.
2	Personal skills		Self-confidence, positive attitude, strong work ethic, etc.
3	Intercultural skills		Proficiency in more than one language, ability to work in culturally diverse teams, etc.
4	Learning skills		Ability to learn independently, curiosity and desire for continuous learning, etc, identify ways to learn from mistakes for the benefit of the employer and oneself
5	Entrepreneurial skills		Flexibility, proactive approach toward opportunities, risk-taking, etc.
6	Ability to think		Critical, analytical, and strategic thinking

N°	Skills	Aquired or Not	Explanation
Soft skills			
7	Teamwork		Ability to collaborate with others, both face to face and in an online environment
8	Creative thinking		Ability to think differently to find new ideas to solve problems or seek solutions to a particular situation
9	Efficiency		Ability to achieve results with limited resources
10	Problem-solving skills		Ability to understand a problem by breaking it down into smaller parts and to identify key issues, implications, and solutions
11	Planning and organizational skills		Be organized and methodical, able to plan work to meet deadlines and objectives, track progress to ensure that one is on track to meet a deadline
12	Proactivity and flexibility		Ability to anticipate situations and respond easily to changing circumstances and management expectations
13	Resilience to stress skills		Ability to not succumb to stress. Managing and meeting deadline stress
14	Leadership		Ability to influence others
15	Conflict management		Ability to manage conflicts in your professional environment
Digital skills			
16	Email management		Ability to handle e-mails
17	Online research		Ability to utilize search engines
18	Social media		Ability to be visible on social networks
19	Online collaboration		Ability to collaborate remotely
20	Query management		Ability to formulate and execute requests
21	Microsoft Office Suite usage		Proficiency in Mircosoft Word, Excel, and Powerpoint.

N°	Skills	Aquired or Not	Explanation
Job search skills			
22	Identify job opportunities		Ability to recognize job opportunities
23	Writing a resume		Ability to write down personal data and professional experiences in a specific style
24	Writing a cover letter		Ability to write to recruiters
25	Job interview skills		Ability to respond conveniently to questions during a job interview

B.5. What is your perception of the adequacy between your training offers and the needs of the market?

1 = Do not know;
2 = No match;
3 = few matches;
4 = Good match

Explain your perception

B.6. Are you in contact with the employers of the graduates you train?

1 = Yes ;
2 = No

If yes, which ones?

B.7. What is the nature of employer feedback on the quality of the graduates you train?

1 = No feedback;
2 = Not satisfied;
3 = Satisfied;
4 = Very satisfied

B.8. What is the nature of your skill's co-construction relationships with employers of the graduates you train?

1 = None;
2 =Placement for academic and/or professional internships;
3 = Job offer;
4 = Other (Specify)

C. About the number of graduates released in the last 5 years

C.1. For your different training programmes, how many graduates have you released over the last five years?

N°	Name of the programme	Academic level	2015		2016		2017		2018		2019	
			H	F	H	F	H	F	H	F	H	F
1												
2												
3												
4												
5												

SKILLS MISMATCH IN THE AGRICULTURAL
LABOR MARKET IN BENIN

SEPTEMBER 2021