LABOR MARKET INTELLIGENCE STUDY ON THE FRUITS AND VEGETABLES PROCESSING SECTOR OF THE PHILIPPINES

Executive Summary

This labor market intelligence (LMI) report offers a general look at the status of the Fruits and Vegetable Processing (F&VP) sector in the Philippines. The report examines a number of factors such as the supply of skills, demand from the industry, and where the possible gaps could be. It also includes constraints that affect the sector's growth. Using various methods such as focus group discussions, survey questionnaires, and in-depth research, the LMI aims to contribute to the sector's roadmap development.

In the second part of the study, there are options for students, employers, and employees to take if they want to progress and improve in the F&VP sector. Finally, a human resource training plan is included to address the skills gap at the individual levels of the students, employers, and employees.

Keywords: fruits and vegetables, fruits and vegetable processing, food processing sector, agriculture, agri-business, Philippines

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List of acronyms

AFW	A Future That Works
DFAT	Department of Foreign Affairs and Trade
DOST	Department of Science and Technology
DTI	Department of Trade and Industry
F&VP	Fruits and Vegetables Processing
FGD	Focus Group Discussion
HEI	Higher Education Institution
LMI	Labor Market Intelligence
MSME	Micro, small, medium enterprises
NC	National Certificate
PCCI HCCRDF	Philippine Chamber of Commerce and Industry Human Resources Development Foundation
PSA	Philippine Statistics Authority
PSF	Philippine Skills Framework
PBEd	Philippine Business for Education
R&D	Research and Development
SSC	Sector Skills Council
TESDA	Technical Education and Skills Development Authority

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Background

About the LMI Study

Philippine Business for Education (PBEd) is currently implementing A Future That Works (AFW), a two-year program by the Australia Department of Foreign Affairs and Trade (DFAT) to reduce the job-skills mismatch and ensure the competitiveness of Philippine industries by forming Sector Skills Councils (SSCs).

PBEd's broader agenda is workforce development; making education and training responsive to the needs of the economy. Together, PBEd and DFAT are tackling high quality and accessible training and education programming, involving industry and private sector partners, and enabling policy environments. The program draws lessons from both the Australia and other international models, and takes into account European vocational tools. The initiative and partnerships hope to create and implement roadmaps for skills, develop sector-focused labor market reports, and contribute to re-starting the economy as the Philippines emerges from COVID-19 pandemic. PBEd is currently facilitating key industry players in targeted sectors to get shared and clear understanding of evolving skills needs and to properly identify and address challenges in training and education.

To further the viability of the project, a comprehensive Labor Market Intelligence (LMI) system is applied, wherein findings of the study will assist and capacitate the newly established SSCs by providing them with the right information for guidance in their involvement with stakeholders like the government, educational institutions, and the industry.

One of DFAT's identified target sectors is the Agribusiness Sector. PBEd is working with the Philippine Chamber of Commerce and Industry Human Resources Development Foundation (PCCIHRDF) to establish the Sector Skills Council for the Fruits and Vegetables Processing (F&VP) sector, a subsector of Agribusiness.

The SSC in the F&VP sector was formed through research of different businesses under the Agribusiness sector. These businesses showed interest in pursuing and contributing to the development of their sector by sharing their own acquired related skills, commitment, accountabilities, and agreed to responsibilities as a member of the council. The six SSC members are derived from the MSMEs in different regions of the country, in order to ensure a wide geographical representation

Through a mixed-methods research, this LMI brings relevant information specifically for the SSC, but also to the F&VP sector was a whole. It can also bring together people and groups for interventions and policy-making, and effective, sustainable implementation.

The Fruits and Vegetable Processing Sector

Overview of the Sector

In the discussion of the Fruits and Vegetable Processing sector, it is necessary to touch on the two major industries where it belongs: the first one being Agriculture, and the second Manufacturing. The discussion of the fruit and vegetable processing in the context of the two major industries would help establish the scope, reach, and potential of this subsector.

The Fruits and Vegetable Industry

Fruits and Vegetables is a sub-sector of the agriculture sector in the Philippines, comprising a large share of it. In 2009, the Philippine Institute for Development Studies reported that the sub sector accounted for 31% of the agricultural output, with a known growth rate of 2.8% for the last three decades. Despite this however, fruits and vegetables are considered only as a minor component of agriculture compared to traditional crops (i.e. rice, corn, coconut, sugarcane), and only 1/10 agricultural area is planted with fruits and vegetables (Briones, 2009).

Constraints in fruits and vegetables production

There are three known major constraints in the production of fruits and vegetables in the Philippines. Climate and the changing weather play a big role in the stability of growing fruits and vegetables hence, as a classified tropical country, the hot, humid, and lowland climate is generally unsuitable for growing, especially with vegetables. Even many fruits exhibit climatic sensitivity and seasonality. A second constraint is the limitations in technology and methodology in the fruits and vegetables production. A part of this includes greenhouses, drip irrigation, farm mechanization, training of staff members on improved agronomic technologies to produce for and supply clients, as well as the local markets. Lastly, the availability of trained people to move the sector forward in terms of value chains, and upgrading to the next level of productivity remains to be a big issue in the development of the industry. To add to this, the issues related to security of these jobs has also been a concern as some personnel are only hired on a per-order basis specifically for micro, small, and medium enterprises (MSMEs).

Other long-standing problems of the F&VP sector include:

1. Weak growth of agricultural output;
2. Low income of producers;
3. Declining labour supply;
4. Deteriorating resource base;
5. Lack of inputs and finance, especially for small farmers and fisherfolk;
6. Poor logistics infrastructure;
7. Disconnect between small farmers and fisherfolk (SFF) and the value chain;
8. High cost of nutritious food; and
9. Dependence on concentrated distribution points (urban areas) – this has been highlighted by the pandemic and is not known as a long-standing problem.

10. Skills of its current personnel, specifically with the digital penetration starting to come to the sector.

Some of these issues will be discussed further along in the study, and some recommendations in order to further develop the sector will be presented towards the end.

Agricultural products' performance in the regions

A report released by the Philippine Statistics Authority (2021), showed that in 2020, Western Visayas gained the highest annual growth in agricultural production at 4.7%, while Caraga followed at 3.6%. However, more regions recorded a drop in production. Among the regions that recorded negative growth were Cagayan Valley with -0.5%, Zamboanga Peninsula with -1.1%, Davao Region with -1.9%, Bicol Region with -2.1%, MIMAROPA with -2.8%, CAR with -2.8% and Cagayan Valley with -6.6%. CALABARZON was the least performing region getting a -8.0% drop in production. (Figure 1)

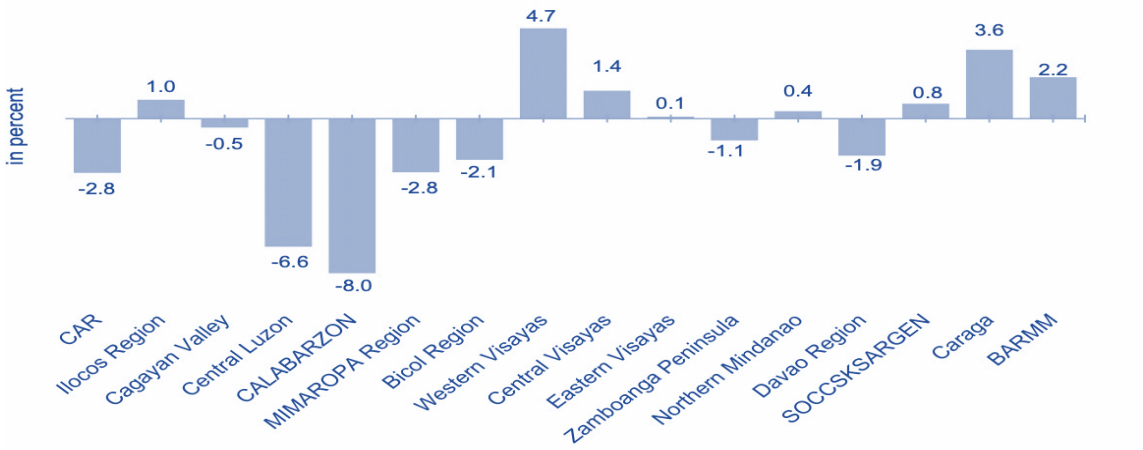

Figure 1: Growth rates of value of production in Agriculture at constant 2018 prices, by region 2019 to 2020, Philippines Statistics Authority (April 2021, p.1)

The growth in the top-performing regions is notably attributed to their higher production for crops. In the same report, Western Visayas had the biggest crop production growth rate, at 10.2%. This is again followed by Caraga at 8.1%. Furthermore, the report shows that big deductions in crop production took place in CALABARZON, which had the lowest growth rate at -6.5%. (Figure 2)

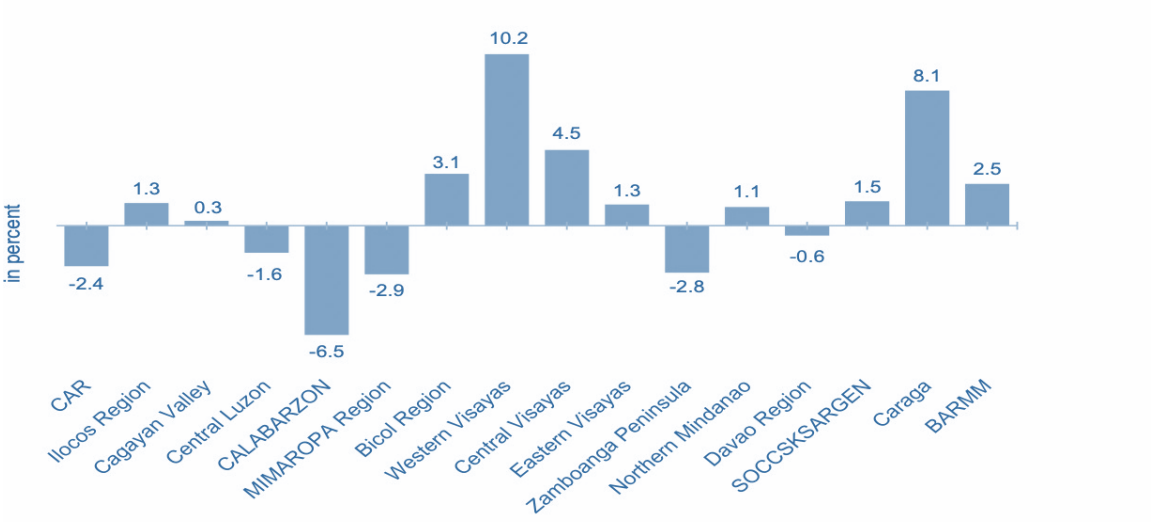

Figure 2: Growth rates of value of production in crops at constant 2018 prices, by region from 2019 to 2020. Philippines Statistics Authority (April 2021, p. 2)

Meanwhile, in a separate report published by Statista Research Department (2021), it was revealed that sugarcane was the leading crop produced in the Philippines in 2020. It recorded a total volume of production at 24.4 million metric tons. This was followed by *palay* or rice with a production volume of 19.3 million metric tons. Joining the list of top agricultural products produced were coconut, banana, corn, pineapple, cassava, mango, sweet potato and cacao.

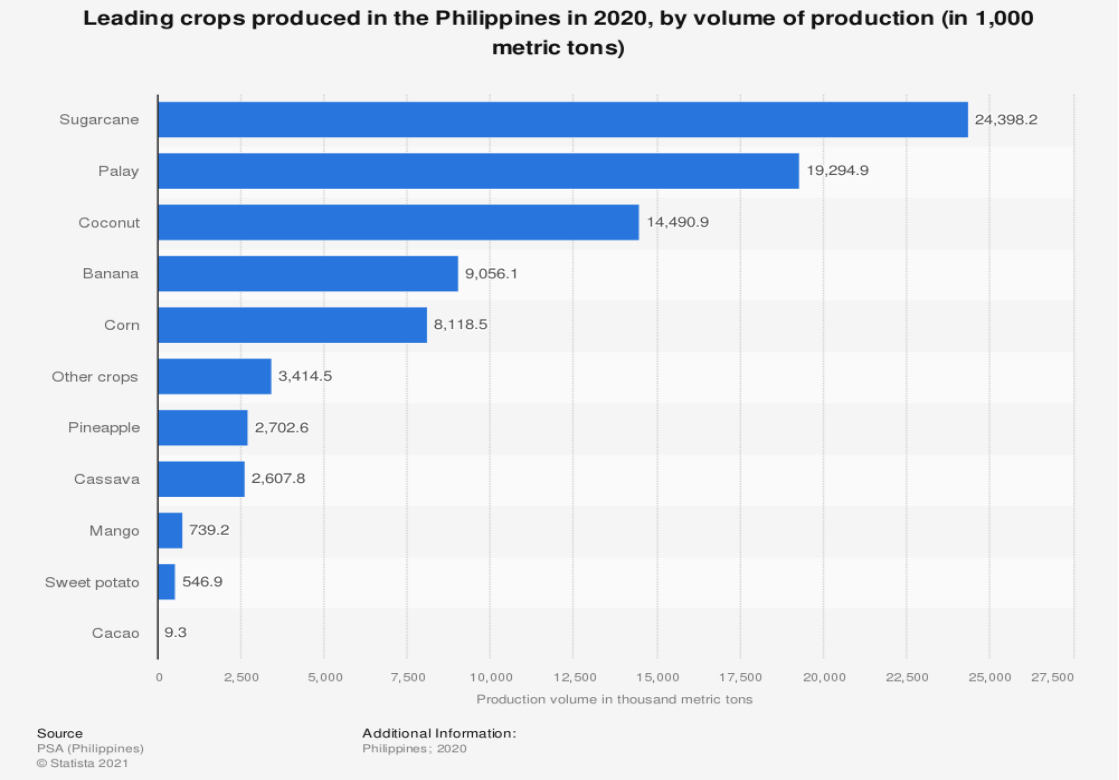

Figure 3: Leading crops produced in the Philippines in 2020, by volume of production (in 1,0000 metric tons), Philippine Statistics Authority. Retrieved from: Statista (2021)

The data shown above matches the recently released crop statistics of the PSA (2021). In the report, it showed that Western Visayas—the biggest percentage holder for crop production in 2020, was also the top region for distribution of sugarcane production. It produced 15.28 million metric tons or 62.6% of the total sugarcane production in the country. Northern Mindanao and Central Visayas followed with 13.1 and 9.7% shares, respectively. (Figure 4)

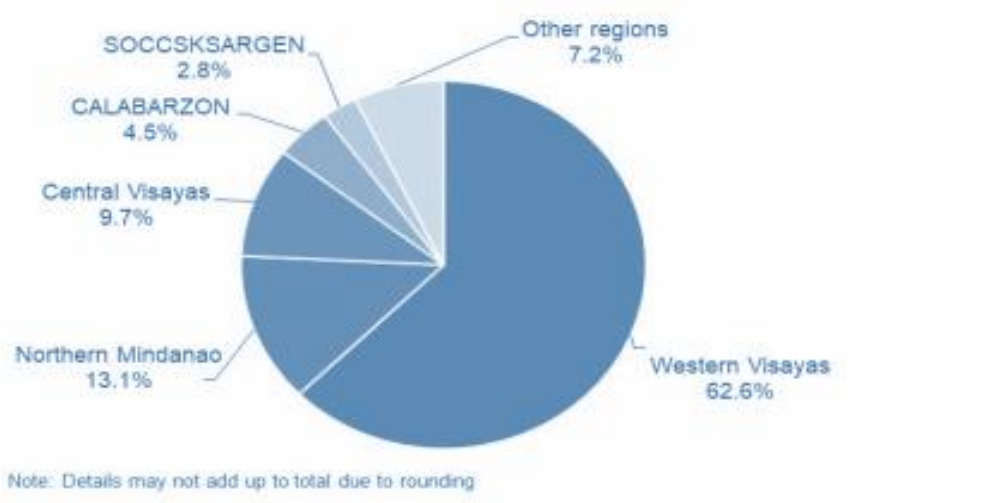

Figure 4: Distribution of production of sugarcane by region in 2020. Philippines Statistics Authority (2021, p. 18)

In summary, based on PSA's Crop Statistics of the Philippines report (2021), the following are the top-performing regions in terms of major crop production in 2020.

Major Crop	Top 3 Performing Region	Distribution of Production, as of 2020 (%)
Sugarcane	**1. Western Visayas**	**62.6%**
	2. Northern Mindanao	13.1%
	3. Central Visayas	9.7%
Palay	**1. Central Luzon**	**18.8%**
	2. Cagayan Valley	13.7%
	3. Western Visayas	11.9%
Coconut	**1. Davao Region**	**13.5%**

	2. Northern Mindanao	12.8%
	3. Zamboanga Peninsula	12%
Banana	**1. Davao Region**	**37%**
	2. Northern Mindanao	21.8%
	3. SOCCSKSARGEN	12.7%
Corn	**1. Cagayan Valley**	**22.9%**
	2. Northern Mindanao	16.5%
	3. Autonomous Region in Muslim Mindanao	14%
Pineapple	**1. Northern Mindanao**	**57%**
	2. SOCCSKSARGEN	30.2%
	3. N/A	
Mango	**1. Ilocos Region**	**24.1%**
	2.1. Central Visayas 2.2. Zamboanga Peninsula	10% 10%
	3. SOCCSKSARGEN	8.8%
Sweet Potato	**1. Eastern Visayas**	**18.5%**
	2. Bicol Region	16.7%
	3. Central Luzon	10.1%

Cacao	**1. Davao Region**	**77.7%**
	2. Central Luzon	3.3%
	3. Central Peninsula	3.5%

Table 1: Top-performing regions by crop production in 2020. Philippine Statistics Authority (2021)

The manufacturing industry

The F&VP sector is also associated with the food manufacturing industry. It is the largest subsector of the manufacturing industry in the Philippines comprising about 39% of total establishments in the manufacturing sector. It is classified under the 'low-technology' sub-sector because it is less-capital intensive, and more labor/resource-intensive compared to the other subsectors in the manufacturing industry. While it is a sub-sector that has less entry barriers, less skill requirements for workers, and generates huge employment opportunities, the food manufacturing sector faces strong competition from lower-cost products from other countries (Batungbacal, 2014).

Food manufacturing hires the most number of workers with 21% of total employment in the manufacturing industry. Under this sector, the subsector on manufacture of other food products has the highest employment followed by processing and preserving of fruits and vegetables (120,963 and 30,670 workers, respectively).

Despite this apparent dominance, however, the food manufacturing industry has not innovated or upgraded its capacity. In Aldaba's 2010 empirical analysis of the productivity of manufacturing sub-sectors, it was found that food manufacturing has negative total factor productivity (TFP) (Aldaba, 2010). A negative TFP indicates "very little capital accumulation or weak technological change as well as the absence of industrial upgrading" (Aldaba, 2014). This can be attributed to the fact that food manufacturing is deemed as a "light industry" - that is, it is an industry that requires less capital but more labor (Del Prado and Rosellon, 2017). Because of this, there is a low barrier for entry in the industry; anyone can enter it (Del Prado and Rosellon, 2017). However, the downside is that internal competition would be largely defined by cost advantages rather than product differentiation (Del Prado and Rosellon, 2017). In this case, the larger players are in the best position to capture this vantage point as they are the ones that have the machinery, equipment, and manpower to produce more outputs at cheaper costs. On the other hand, the smaller players, particularly the SMEs, are squeezed and consigned to capturing small markets.

The food processing sector is one of the beneficiaries of the Philippines' growing middle-class and young market base. Roughly 90% of the Philippine food and beverage processing industry's output is consumed domestically, with excellent growth prospects stemming from the country's resilient economy and strong consumer base. In addition, as quality and efficiency

continue to improve, the Philippines will be in a position to exploit export opportunities due to its strategic location and membership in various free trade agreements.

Large food processors are heavily reliant on direct importation for their raw agricultural materials. Meanwhile, small and medium-sized food processors purchase imported goods from local importers and distributors. Approximately 90% of the total produce of food processors is sold in the domestic market (Singian, 2019). The processed food products flow either to the retailers or the food service sector (e.g., fast-food chains) before ultimately proceeding to the end consumers.

The Philippine food processing sector must continually strive to be innovative in order to be relevant. Many food processing firms in the Philippines rarely have the competencies or the capital to innovate on their own. Investments in research and development, technology transfer and upgrading—the widely accepted measures of innovation, have been historically low for food manufacturing industries in the Philippines (Cororaton, 1999; Intal and See, 2008).

They need partners who could help them in capital and knowledge-intensive innovation collaborations and help them survive in this fast-changing environment. However, firms often find it difficult to establish strategic and efficient alliances that would support and foster productive technology transfer and knowledge-sharing.

Importance of SSC to Philippine Agribusiness Industry

Despite these developments, the agriculture industry in the country has yet to unpack a lot of potential. In an article published in Philippine Institute for Development Studies, Briones (2021) argued that one of the current challenges of Philippine agriculture is due to the slow growth in factors of production and in total factor productivity (TFP). TFP is regarded as one of the most significant elements for economic growth (Kim, J and Park, J, 2018), and its performance is the primary determinant of the sector's long-term growth (Briones 2017b). As a solution, it was recommended to promote research and development (R&D) in the Agri-business industry. Included is the reorientation and training programs of stakeholders to eventually adapt to better production systems and value-adding activities.

In the perspective of the F&VP sector, having the Sectoral Skills Council is a huge step up in delivering feasible and synchronized R&D activities. Given the scope and the diversity within the sector, it is necessary to have a collective group that would represent the Food and Processing Sectors. The SSC shall strengthen the communication of the sector which could be deemed helpful in producing effective and sustainable outputs for long term growth.

Methodology

This LMI study seeks to create a representation of the skills landscape for the Fruits and Vegetables Processing Sector of the Philippines. First-hand accounts from both employees and employers were gathered through surveys, and covered multiple key aspects of the job/skills qualification. Several FGDs were also done to supplement and contextualize the results of the surveys.

The study initially planned to survey 60 employers and 150 employees from 5 different Philippine regions. However, due to limitations and restrictions posed by the respondents' geographic, technological, and/or health and medical circumstances, only 90 employees were able to complete the survey within the period of collection. Meanwhile, the respondents from the employers surpassed the initial target with a total of 108 respondents.

Data collection consisted two phases. The first phase of this labor market intelligence (LMI) study was the pre-testing and validation of two sets of survey questionnaires meant for 1) employers and 2) employees of the F&VP sector. The second phase consisted of focus group discussions (FGDs) with representatives from the F&VP sector skills council members, government stakeholders, and educational institutions.

The process of data collection included a collaborative approach through the SSC members' assistance and involvement. The survey questions were also refined based on their comments and suggestions.

The FGDs were held simultaneously as survey data collection was ongoing. The results of the FGDs highlighted a clear understanding of all involved, and the need to address the facilitation of a governing body which will steer the sector's emerging and current skills requirements to the forefront, and to seek stakeholders and industry support and involvement.

Framework and Structure

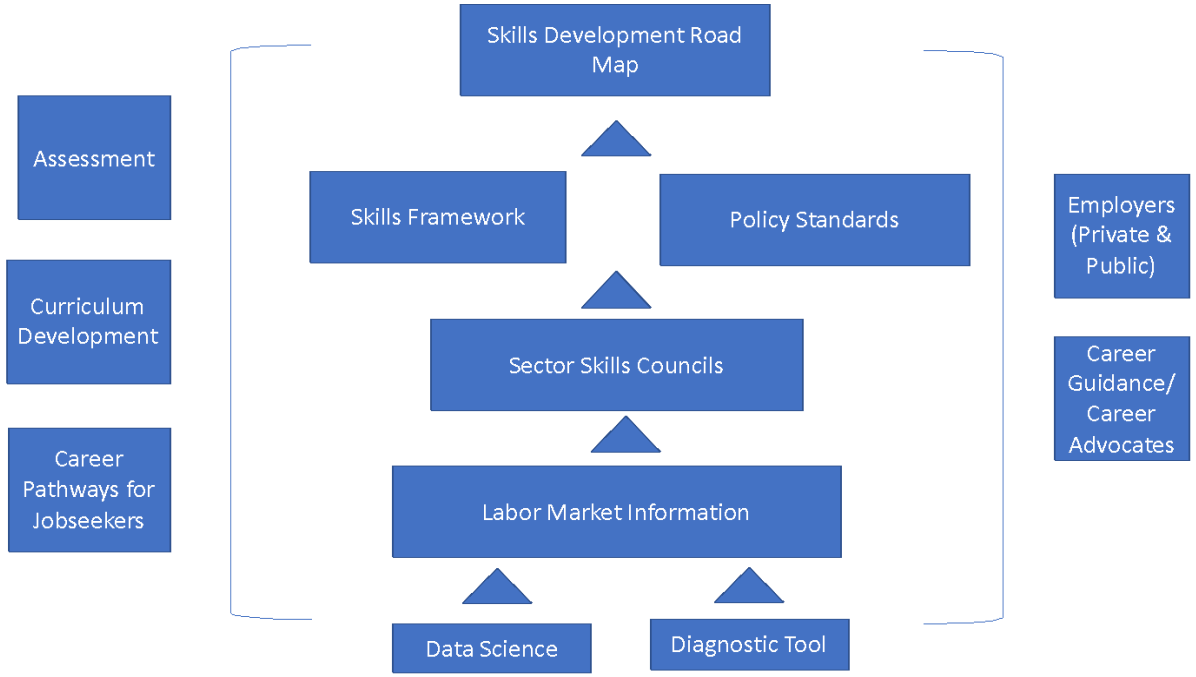

Figure 5: AFW Common LMI model

The AFW project implements a common LMI-SSC Model framework that aims to have a standard skills development road map for their respective sectors. This model recognizes that all stakeholders both in the public and private sectors need to work together in order to provide relevant data and information in order to further develop the sector.

Key areas of the LMI report

Employers and human resources

This LMI study concentrates on five areas to address the skills-jobs mismatch, namely: job description, employer branding, salary structure, employee life cycle, and consultancy agreement vs. employer-employee relationship. Employer and employee understanding and perception of the five areas may inform the SSC on the current gaps and directions of the industry.

The aim here is to understand how employers and job seekers see the jobs available, and if there is a need to address designing of jobs. On the other hand, employer branding is more important for job seekers. They consider the vision, mission, and values of a company and look at potential of new jobs in sustainability and green technology.

The LMI model also wants to understand the current salaries situation in the industry, and how it may affect the movement of the labor force. The salary expectations of jobseekers and employees might not be met by specific employers or employers might not hire based on those salary expectations.

Furthermore, the model studies the nature of the employment engagement, exploring the data of human resources in terms of placement, attrition, comparison of the percentage of full-time workers and outsourced staff, and presence of an effective performance management policy.

Finally, it also seeks to understand the human resources decisions in these companies as a response to the effects of COVID-19 to their operations. Another source of LMI information on the selected areas will be private career advocates like recruitment firms, career coaching, and related entities.

Schools, higher education institutions, training institutions

According to Ayuyao, et al. (2017), higher education institutions (HEIs) must be able to identify, monitor, implement and measure core processes revolving around and within their three-fold functions: instruction, research, and community extension.

As a part of this study, there is an evaluation of the education-related factors that affect the quality and skills of graduates, specifically curriculum and internship programs or apprenticeship programs, institutional linkages, and lastly training institutions outside of the traditional academe set-up.

Some factors were analyzed for F&VP related programs of specific HEIs include course orientation, its description, expected graduates' competencies, the availability of faculty and trainers, and as well as the availability of teaching materials and industry-related software. Meanwhile for internship programs or apprentice programs, there is a focus on the availability and effectiveness of practicum, number of practicum hours, and evaluation of OJT trainees.

Conversely, the community extension programs of HEIs are the core points of analysis for institutional linkages. There are questions concerning the availability of a career office that spearheads career fairs and career workshops, conducts tracer studies and industry-academe linkages, and looking at career data on the unemployment rate and months before being hired. The Commission on Higher Education has already required HEIs before to have an "LMI corner" that will be available for all students.

Over the years, there has been an increasing presence of training providers outside of formal education providers. For these types of training institutions, assessment can be done on graduates that are upskilling, employer required training, and as well as those who are changing careers.

This LMI study also examines the alignment of said programs to the current skills demands of the industry. It will also note the training available to those employed in the sector as well as the training current employees are seeking.

Summary and discussion of findings

Key Statistics: Employees

Respondent demographics

The survey was answered by 90 respondents from several regions of the Philippines. Figure 6 shows that most of the employees were from the Cordillera Administrative Region (Baguio), which comprised 32.2% of the total respondents. Zamboanga and Bicol Region each had 22.2% respondents, while 10% of the respondents were from the Central Luzon Region. The least number of respondents were from Central Visayas and Cagayan Region each at 2.2%.

On the other hand, Figure 7 shows that there were more female respondents (45 or 51.7%) than male respondents (38 or 43.7%). Although there were four participants who preferred not to disclose their sexual orientation.

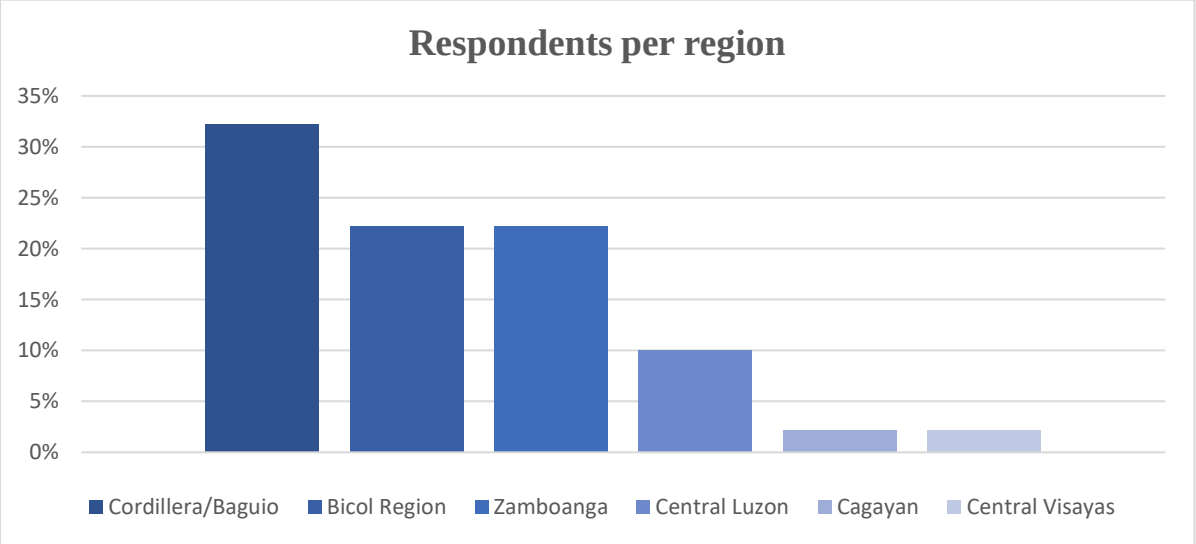

Figure 6: Respondents per region

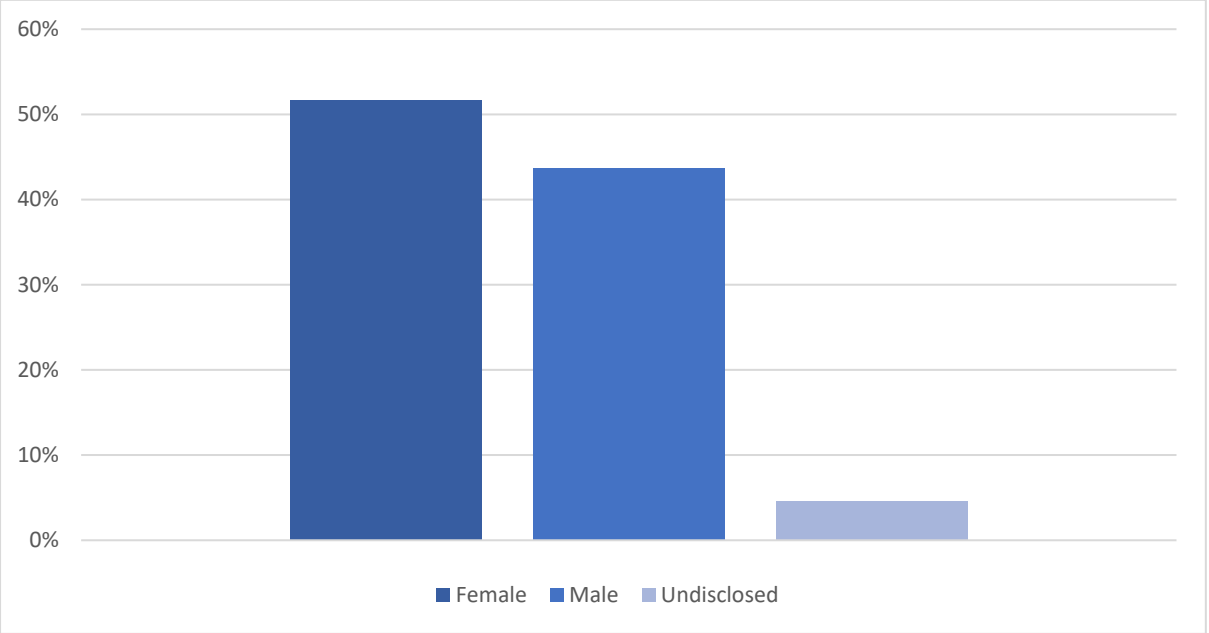

Figure 7: Respondents by sex

In terms of Educational Background, most of the respondents completed finished Basic Education. As shown on Figure 8, 35.6% are college graduates, while 23.3% completed high school and did not choose to pursue higher education. Meanwhile, 14.4% participated in either tertiary or technical-vocational programs, and 12.2% reported to be fresh graduates from senior high school. Meanwhile, 7.8% finished only 1st-2nd year high school and 5.6% are elementary graduates. One (1.1%) of the respondents has a post-baccalaureate degree. The survey also found that 73 of the 90 respondents are not currently attending school anymore.

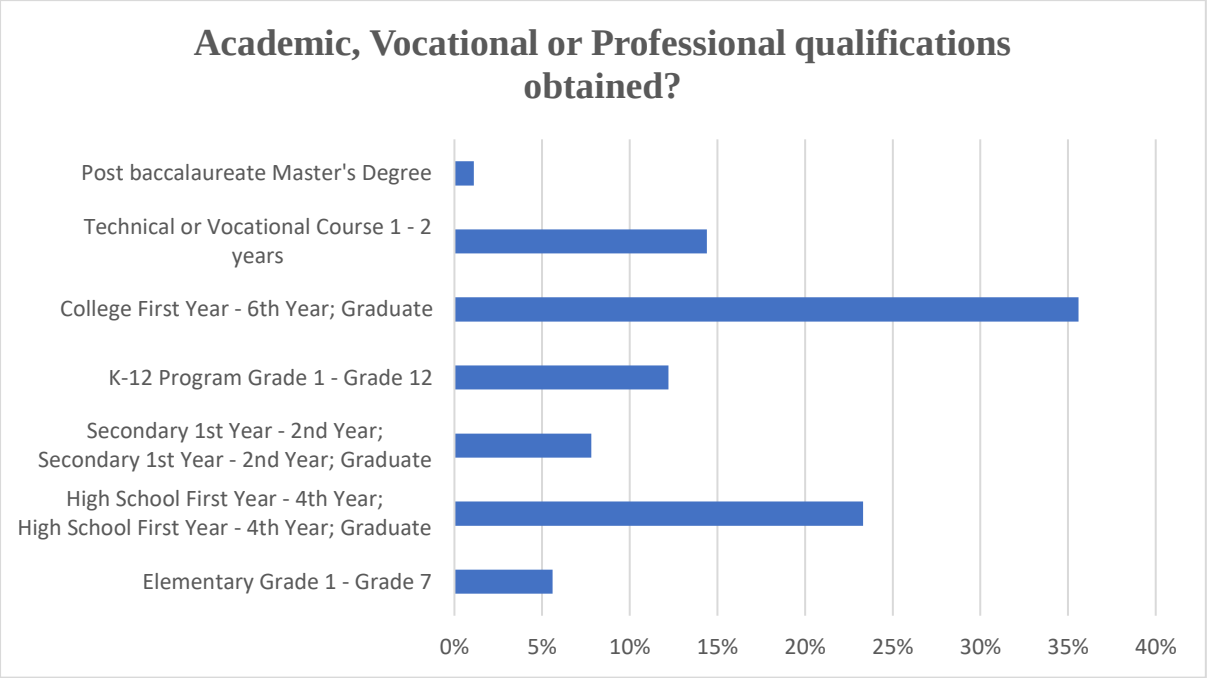

Figure 8: Respondents' highest educational attainment

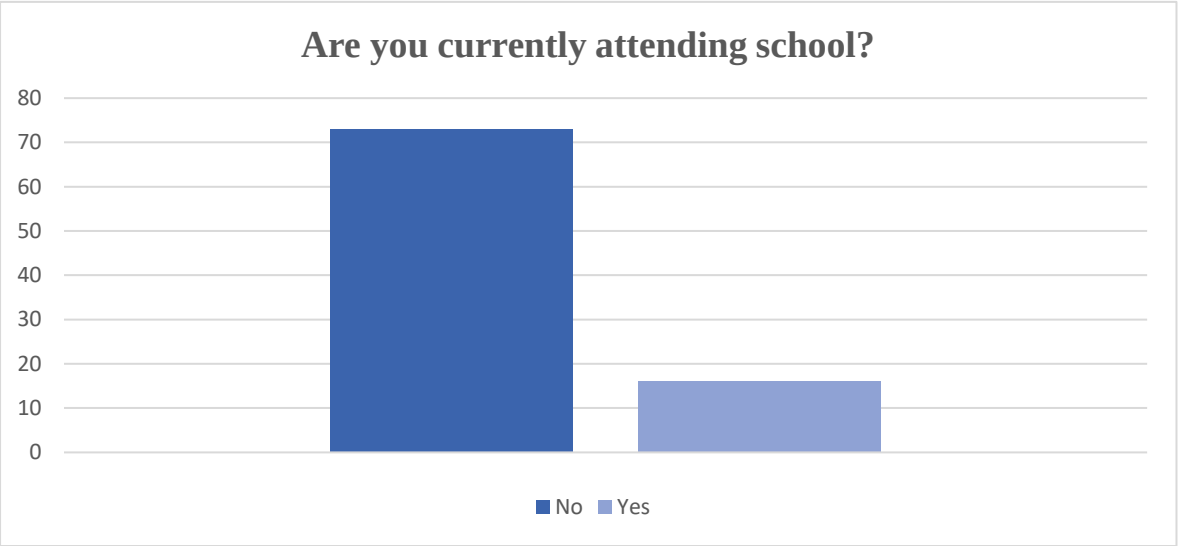

Figure 9: Respondents' status of schooling

Working conditions

Figure 10 summarizes the number of years respondents have been working for their current companies. Majority of the respondents have been working between one to five years, while only 3.4% have been working for 10 years or more.

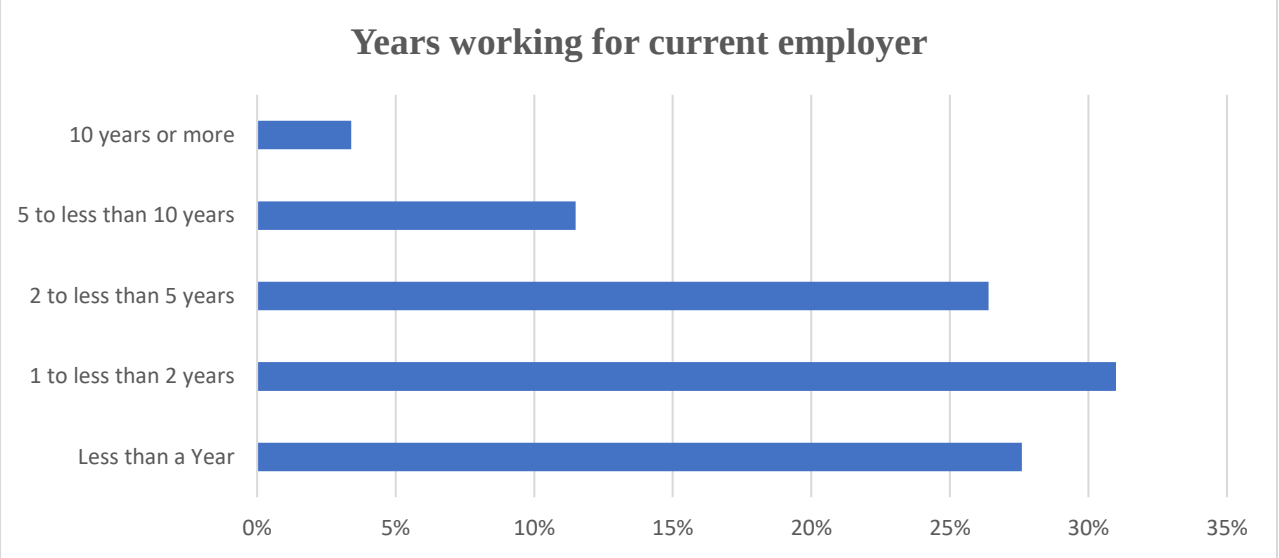

Figure 10: Years working for current employer

When it comes to the employee's current job status, majority (57 or 65.5%) of the respondents have permanent status or regular tenure, while 27 (31%) are still on short term, seasonal, or casual engagement. Three respondents report to have a more flexible engagement.

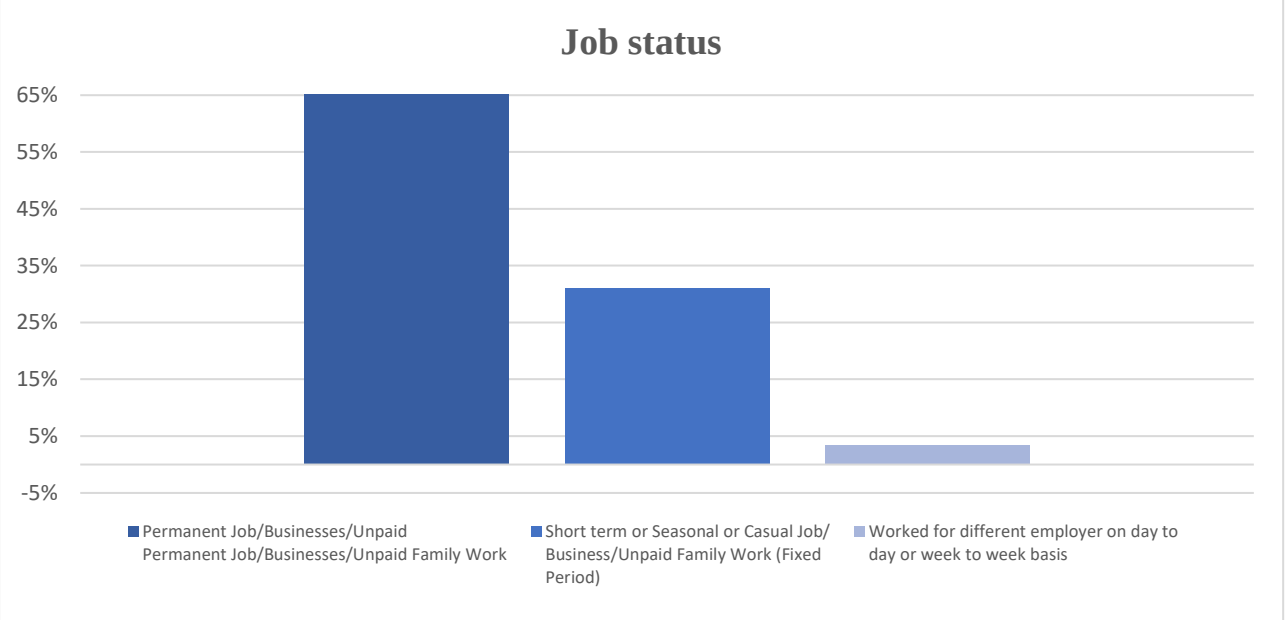

Figure 11: Job status

Skills and training

In terms of upskilling, the respondents reported that over the course of 12 months, 27.8% did not receive any form of skills training paid or organized by their employers, while 24.1% received training for at least less than a day. 20.3% attended 2 to less than 5 days of training, while 14.9% said they received 5 to more than 10 days of training.

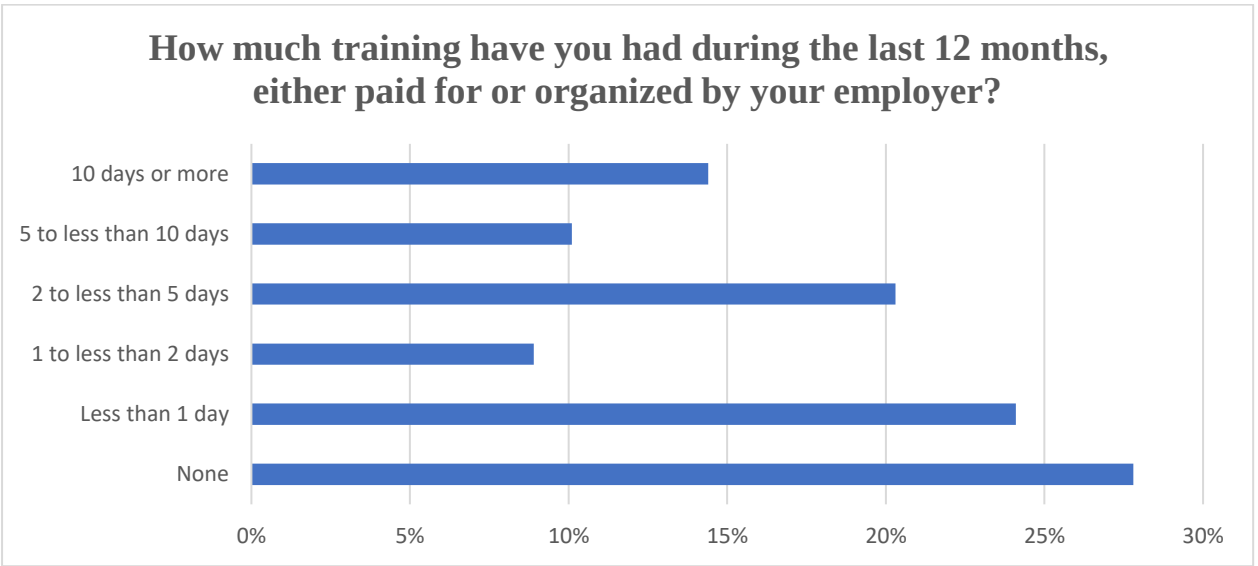

Figure 12: Duration of training received over the past 12 months

As shown on Figure 13, most of the respondents believed that their current skills match the requirements of their current occupation. However, the survey also found that they are eager to learn skills in relation to what they do. A summary of these skills, arranged according to the regions of the respondents is presented in Table 2. Some of the most common responses were technological skills, management skills, marketing, sales and basic accounting/bookkeeping, cooking, food processing, driving, and soft skills training.

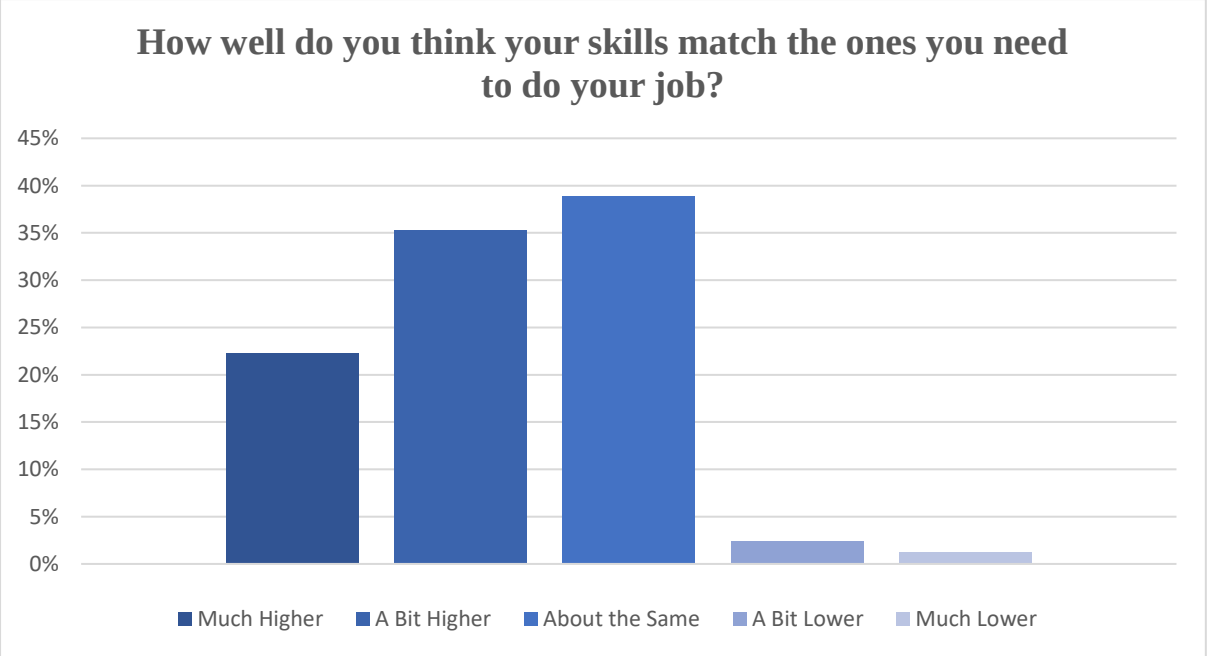

Figure 13: Job-skills match

Region:	Skills Identified:
Central Luzon	• Cooking • Soft Skills Training
MIMAROPA	• Technological Skills • Driving • Soft Skills Training • Management Skills
Zamboanga	• Cooking • Driving • Marketing • Technological Skills
Bicol Region	• Food Processing • Basic Accounting/ Bookkeeping • Marketing • Technological Skills

	• Soft Skills Training
CAR/Baguio	• Food Processing • Cooking • Driving • Technological Skills • Basic Accounting/Bookkeeping • Marketing • Management Skills
Cagayan	• Basic Accounting/ Bookkeeping • Marketing • Management Skills
Central Visayas	• Sales (Negotiation Skills)

Table 2: Additional skills employees want to acquire

The next figure shows the additional trainings the employees have taken in the past two years. 47.6% reported to have taken advantage of free training and resources from the internet. 44.4% attended training that were shouldered by their employers. Still, 41.3% paid for further skills enhancement training out of their own pocket.

Figure 14: Additional training/s taken over the past two years

As shown on Figure 15 a good number of respondents felt that their education is adequate in their job performance. Approximately. 27.4% believe that only some of their educational experience is being used on the job. Still, 10.7% answered that the adequacy was little, and 9.5% said that it has only a very little contribution.

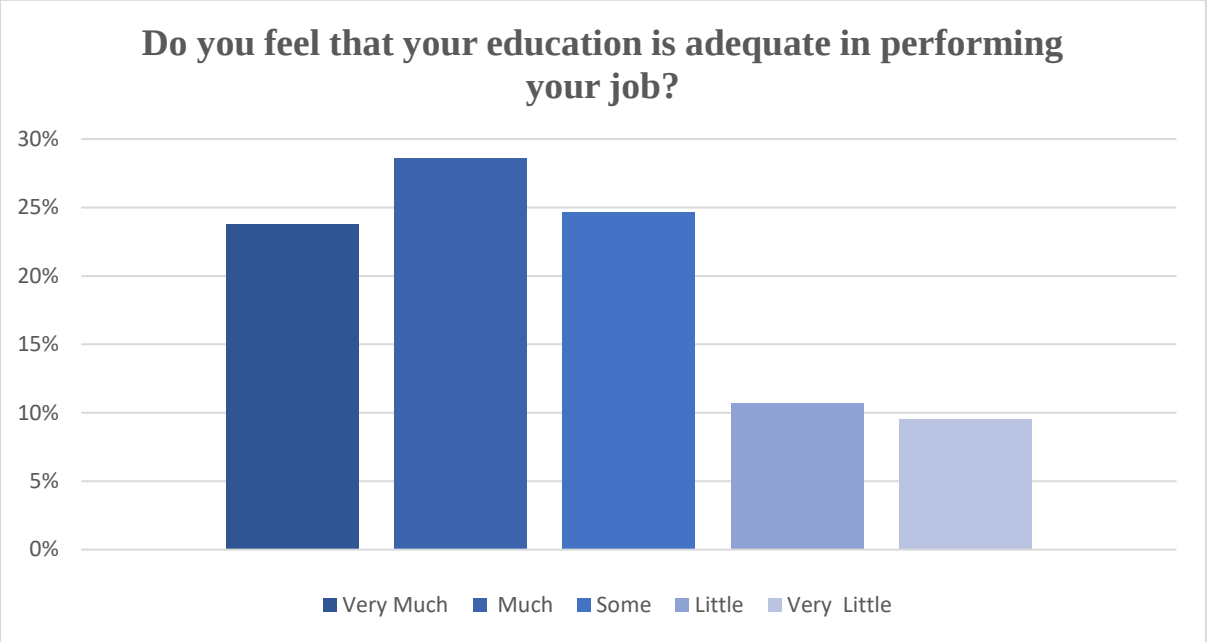

Figure 15: Education-job match

In terms of education and employment match, 40.2% of the respondents answered that the employability potential of their level of studies is just at the mid-level or "fair". Around 36.6% believe that theirs is good, and 13.4% answered very good. On the other hand, 9.8% rated poor to very poor.

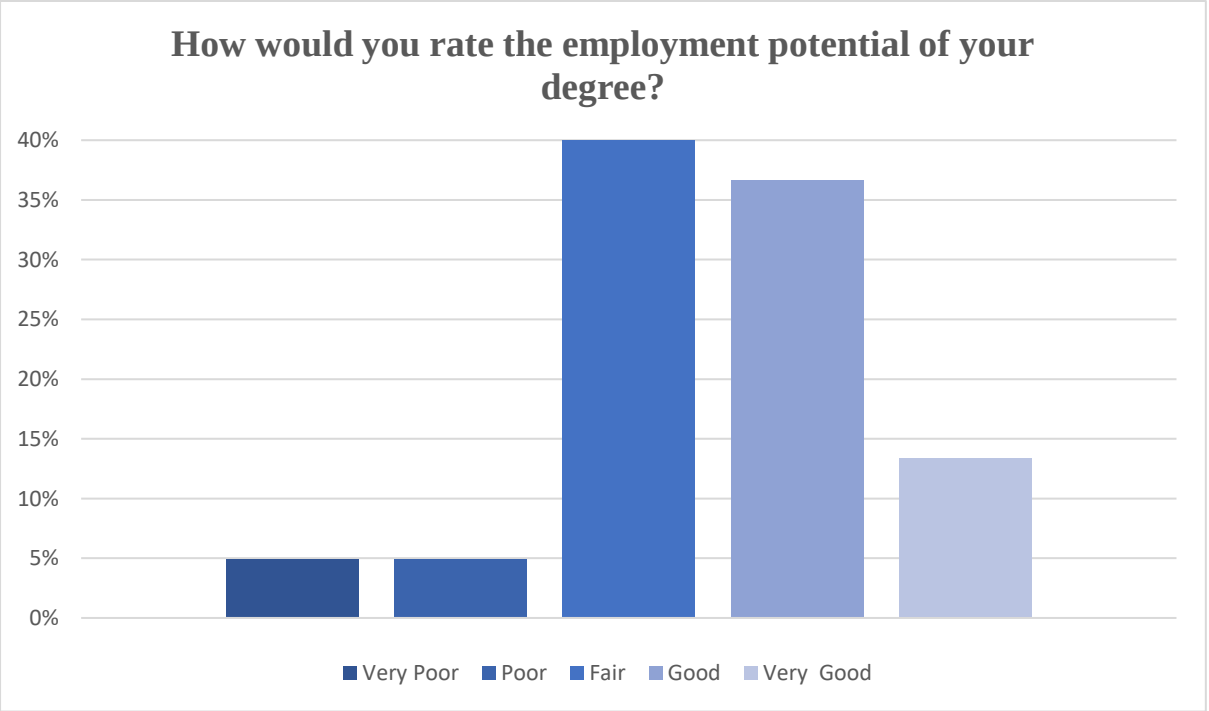

Figure 16: Employability potential of studies

As shown in Figure 17, a little over 40% of the respondents were actively looking for work over the past two years. In terms of platform, as summarized in Figure 18, local employment and school career services were most used by the participants. A number of respondents also answered that non-traditional platforms such as LinkedIn Premium or other premium subscriptions are either not available to them or they are not aware of its existence.

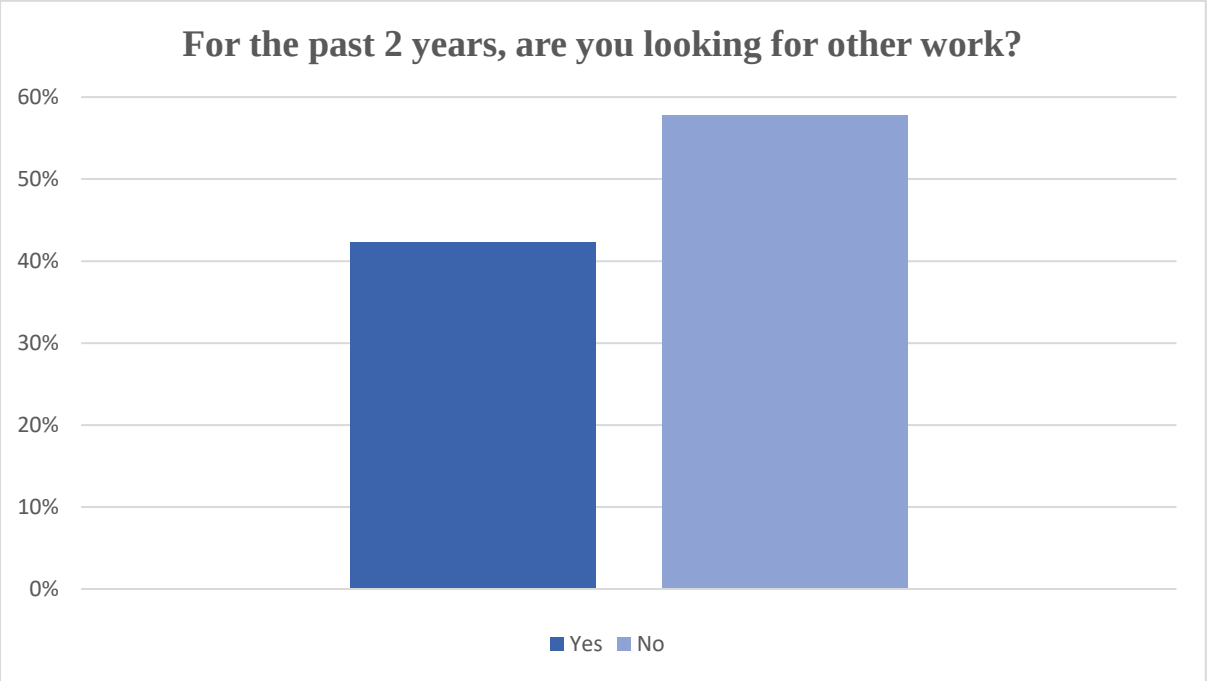

Figure 17: Job-seeking in the past two years

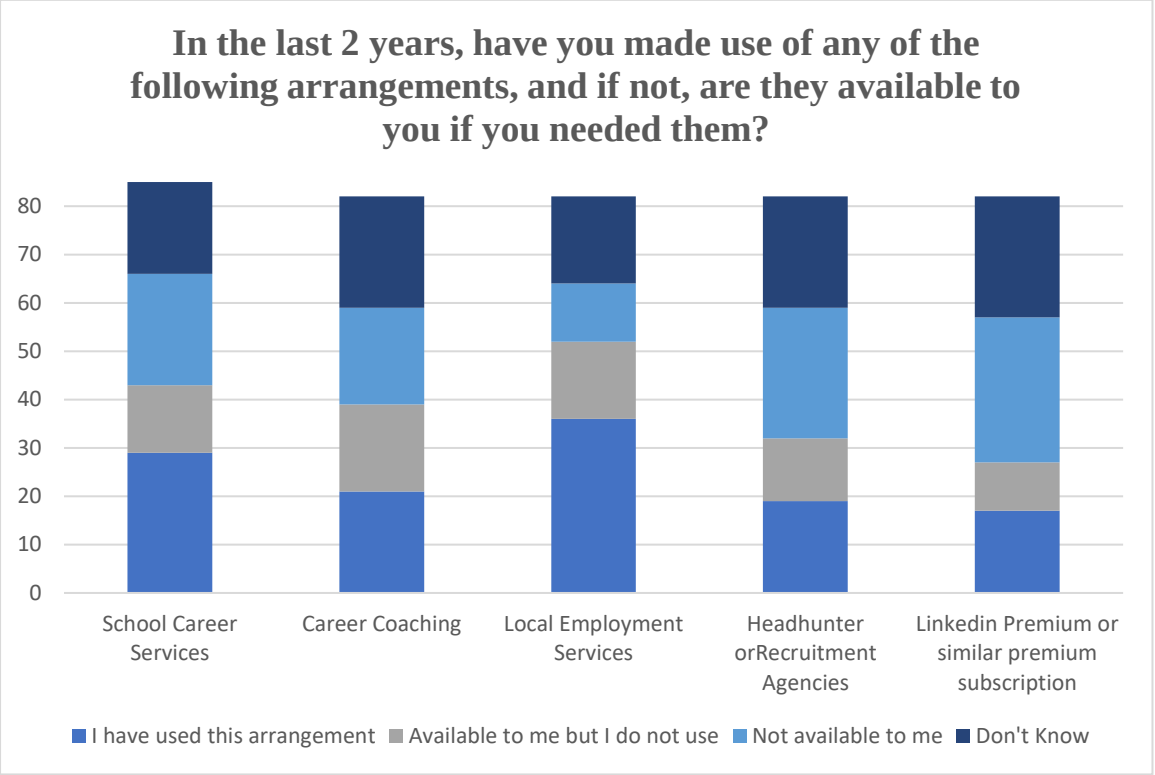

Figure 18: Job application platforms used

Key responses: Employers

Company profile

Employer respondents mostly came from small to medium-scale enterprises. Figure 19 shows that majority of them (75%) have a company size is 10 or less employees. Approximately 20.4% have 11-50 employees, while a minority have more than 50 employees.

In the following Figure 20, majority of the respondents (83.3%) shared that their estimated revenue for the year 2021 amounted to PHP 1 million or less.

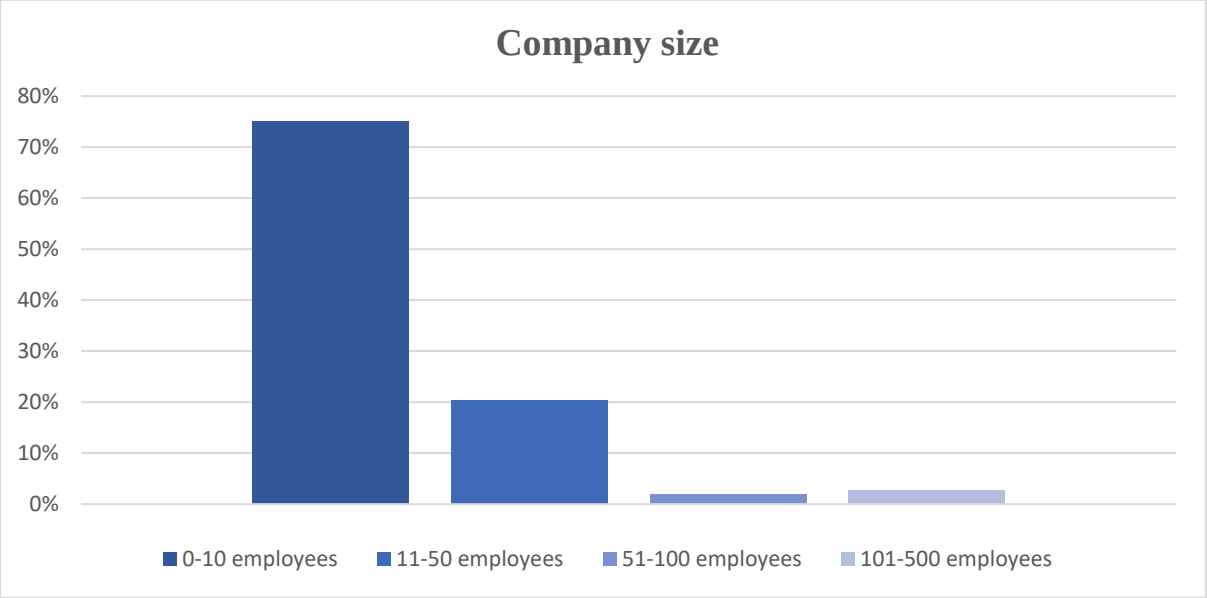

Figure 19: Company size

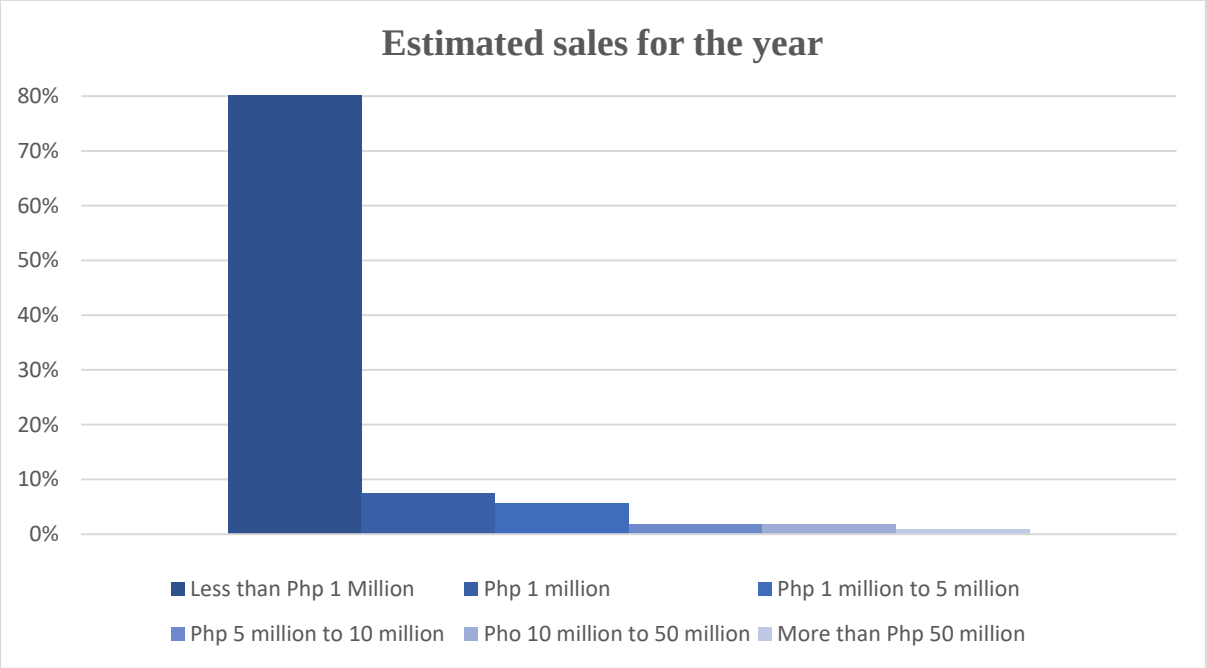

Figure 20: Estimated annual revenue for 2021

Skills and competencies of employees

Majority of the employers reported high satisfaction with their employee's current outputs. They also believe that their current manpower skill supply is already adequate to sustain the operations of their organization.

As shown on Figure 21, 36.1% of the employers think that the skills of their recruits are very much adequate for their company's needs. 34.3% respondents rated much adequate, and 27.8%

answered that only some are adequate. 1.9% of the total employer respondents said that the skills are a little inadequate for their needs.

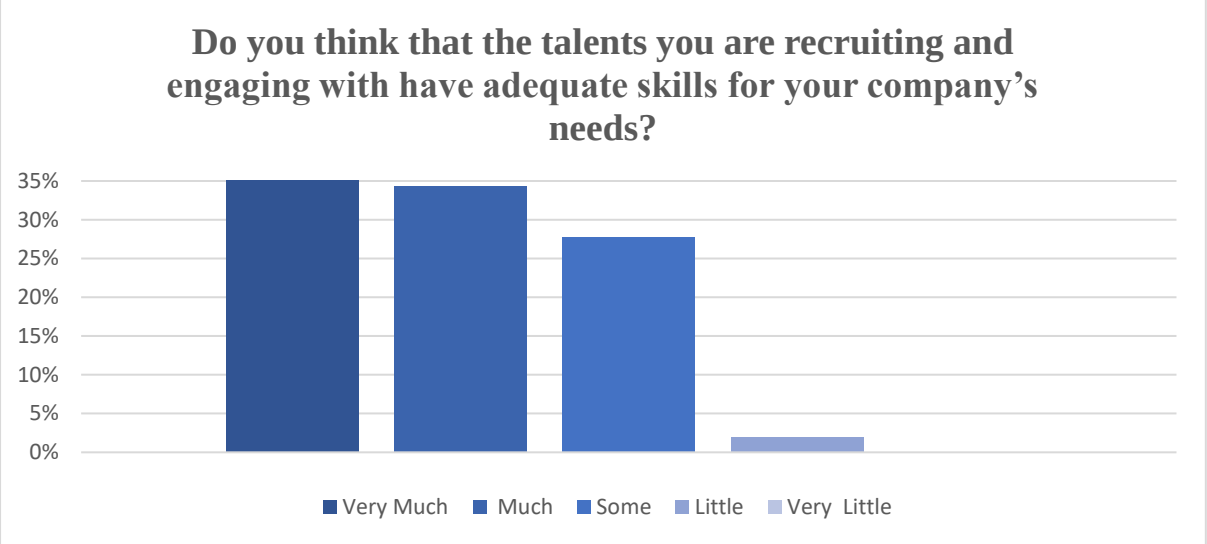

Figure 21: Match of employees' skills to company's needs

Meanwhile on Figure 22, 48.1% employers reported that the output of their employees is good. 23.1% gave a very good satisfaction rate, while 26.9% were fairly satisfied. On the other hand, only a small percentage (1.9%) were not satisfied with the output that their people are giving.

Figure 22: Employer's satisfaction to employees' output

Most of the respondents reported having existing development plans for the company, both in the short-term and long-term (Figure 23). Meanwhile, there is a divide regarding whether the employees' skills supply all the needs of the organization. 52.3% respondents believe that their employees were able to give all the skills needed, while 47.7% said "No" (Figure 24).

Among those who answered "No," 71.4% feel that there is a need to upgrade current skills through trainings. 27% believe that there programs that continuously upgrade skills must be integrated, and 1.6% said that hiring employees with matched skills should be planned ahead (Figure 25).

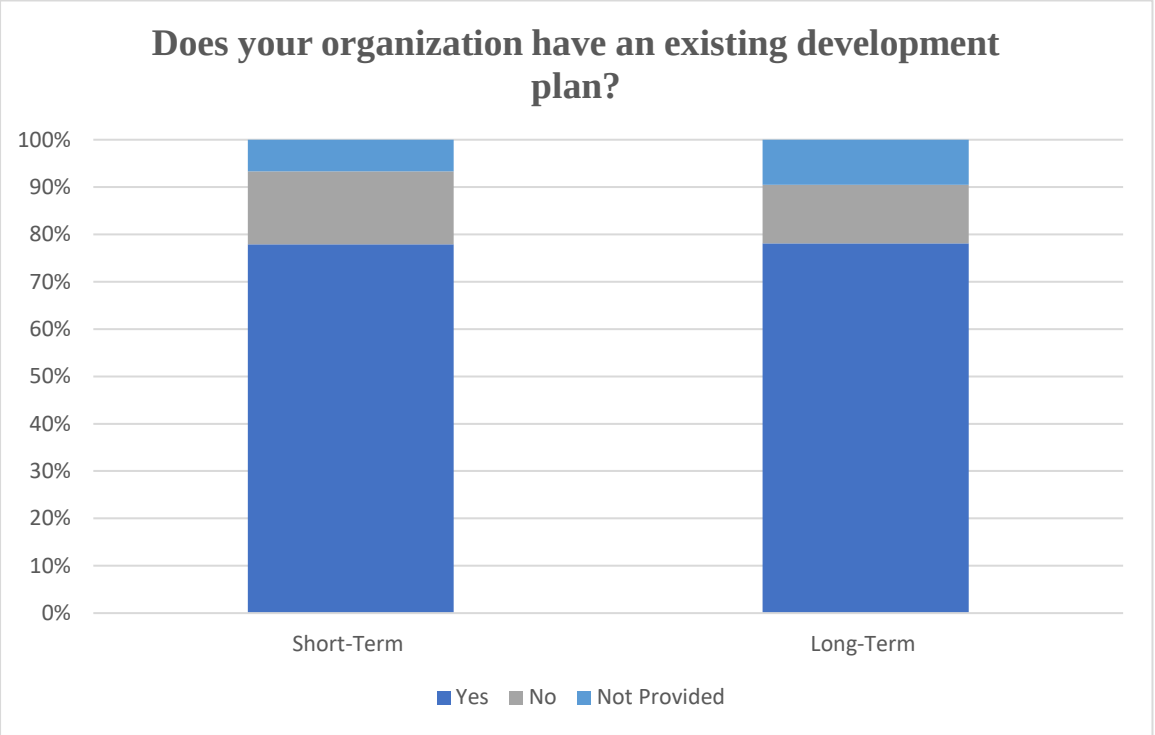

Figure 23: Existence of development plans

Figure 24: Employees' skills in relation to company's needs

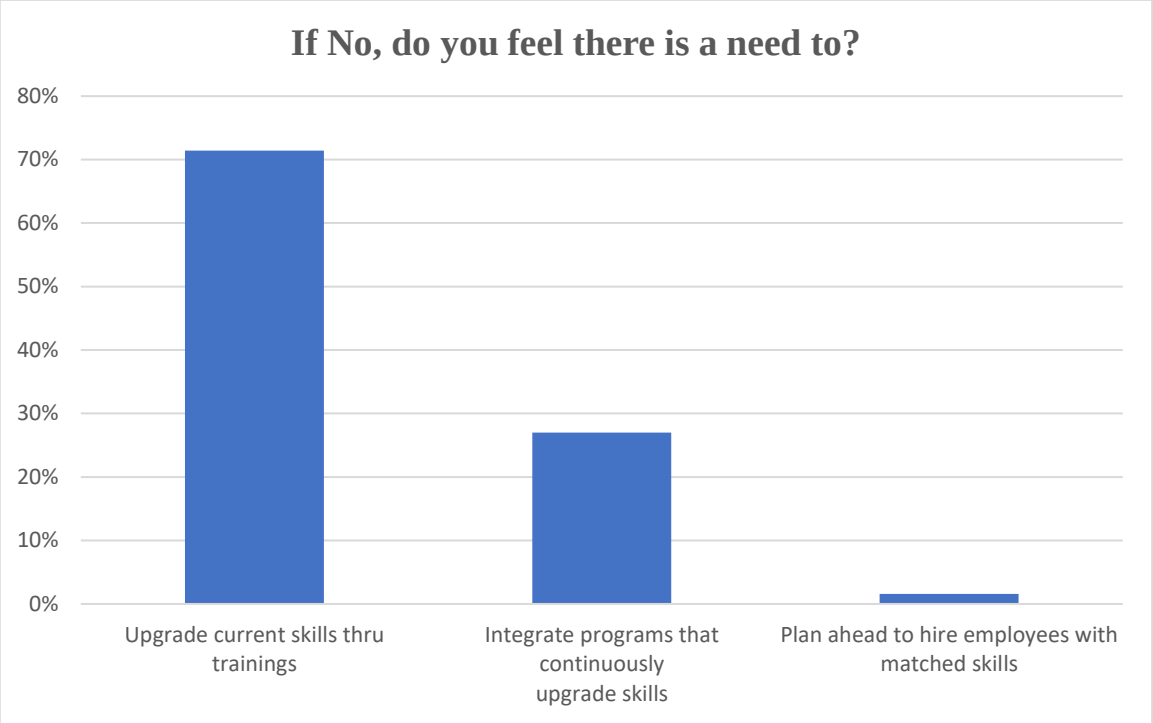

Figure 25: Interventions needed

Lastly, almost all of the employer respondents value the significance of matched skills in production output (Figure 26). 66.4% rated highly important, while 31.8% answered important on their ratings.

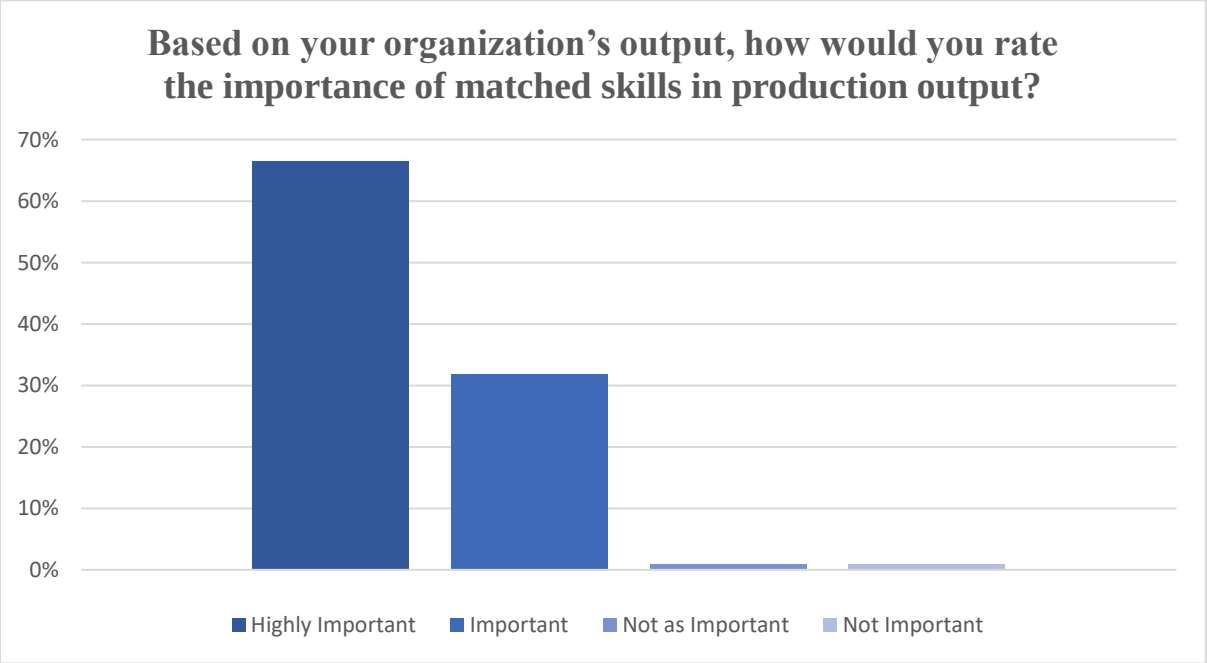

Figure 26: Rating on the importance of matched skills to production output

Training and development

A large majority (91.5%) of the employers reported that they provide training for newly onboarded employees before engaging them with actual work (Figure 27). The employees undergo an average of 1-2 weeks of training before being onboarded. They listed several training modalities including but not limited to the following:

- Seminars and workshops
- Shadowing, peer-to-peer
- Online training
- Classroom type

However, there is also a majority (54.3 %) of employers who reported to have minimal to no training budget for their employees.

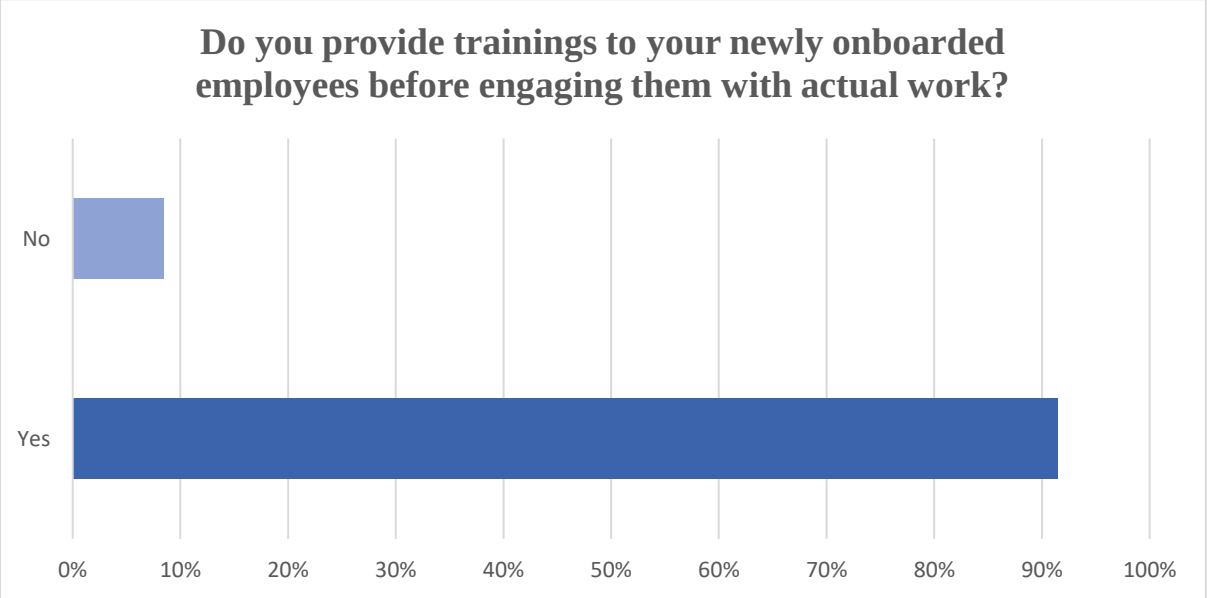

Figure 27: Training provided to new employees

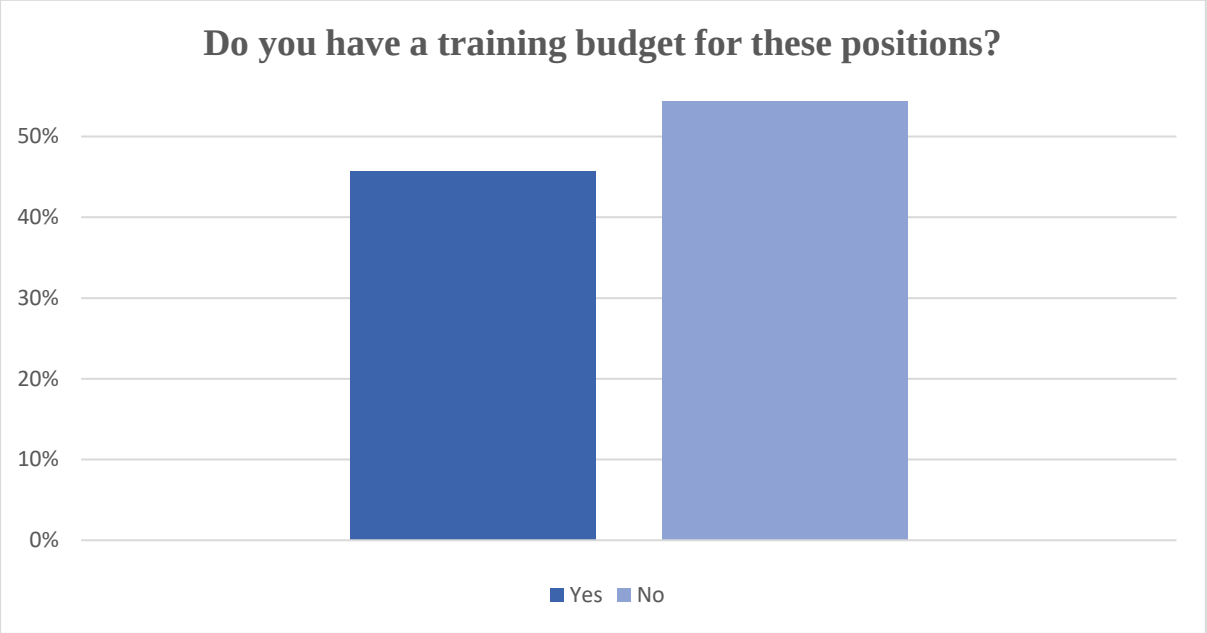

Figure 28: Employers' training budget for new employees

Employee performance

In measuring employee performance, the following materials are utilized by the respondents:

- Balance scorecard
- Ratings scale
- Evaluation form
- Assessment through actual performance
- Observation

As shown in Figure 28, most of the employers (87.9%) considered themselves to be providing competitive total rewards to their employees. This may have potentially affected employee satisfaction, as about 75% of the respondents also reported a low attrition rate, while 22.7% recorded a high attrition rate.

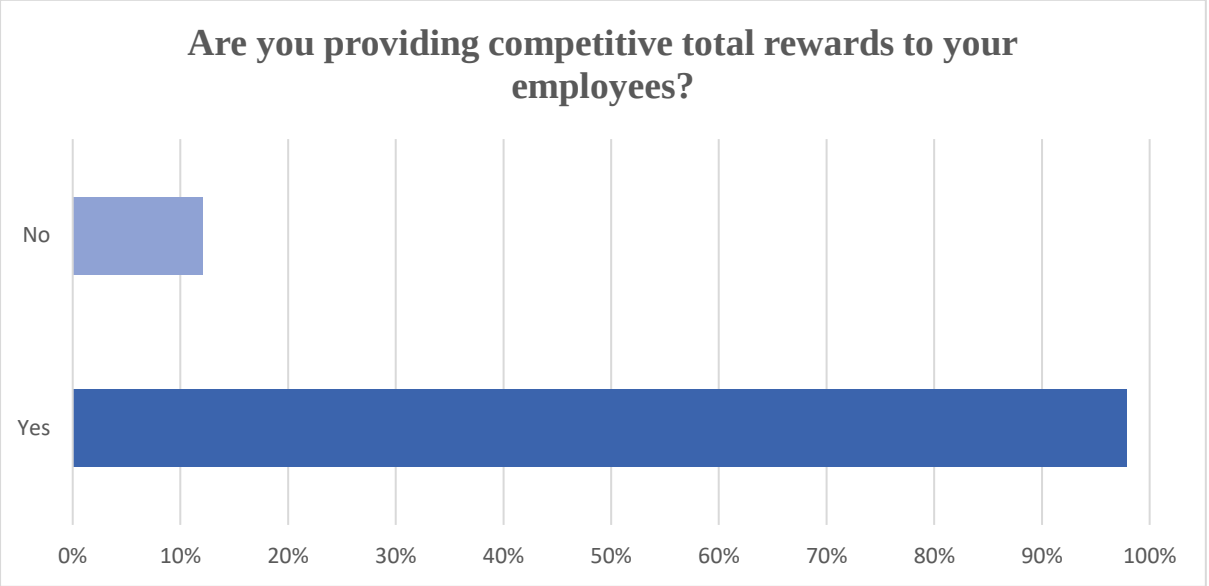

Figure 29: Competitive compensation and rewards for employees

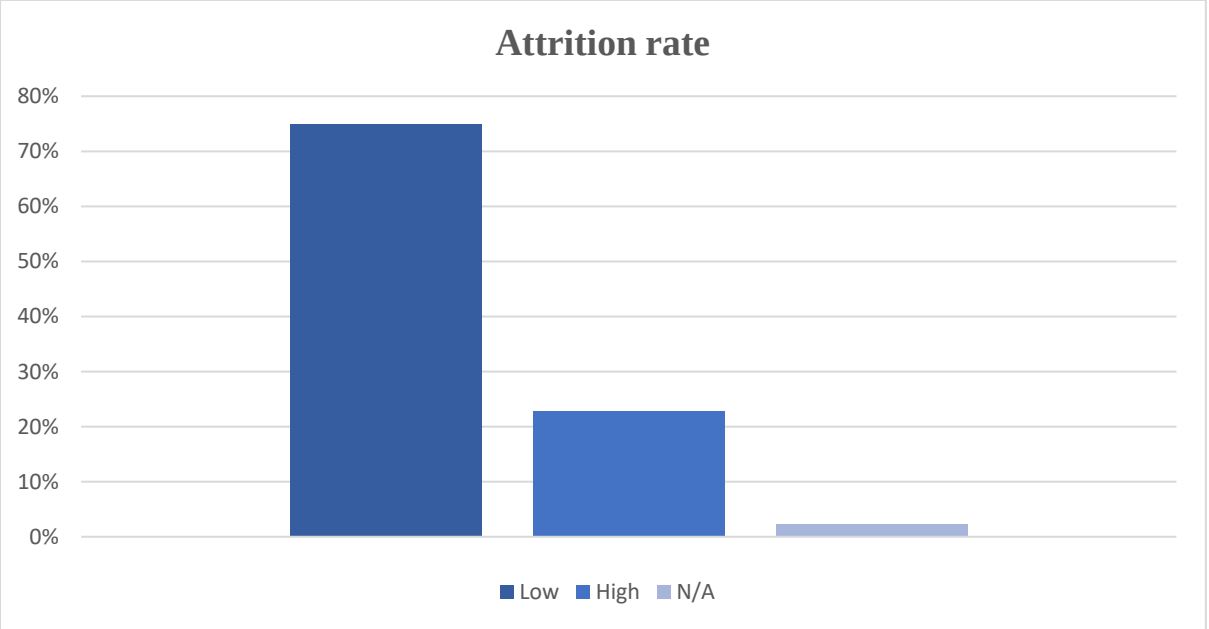

Figure 30: Employee attrition rate

The Employer – Employee relationship

The key statistics from the survey revealed several challenges between employees and employers of Fruits and Vegetables Processing MSMEs.

According to the employees, security of their jobs remains to be an issue that they would like their employers to address. As shown previously in Figure 10, , employee retention remains a challenge as 31% have been with their employer for less than 2 years to at least 1 year. Among

other reasons, the lack of training could be a cause of weak employee retention as suggested by the results of the survey.

While the employers reported that they were providing enough training for their employees, it is worthy to note that the employees reported that they paid for their own training to further enhance their skills. Additionally, while the employers reported to have provided training in varying modalities, employees have mostly upskilled through online platforms. Given this, improved employer support in terms of employee's upskilling should be initiated.

In terms of skills, both the employers and employees were of the same belief that the current manpower's skillset are enough to pursue the common objective of their companies. Employees reported that they believe their current skills match the requirements of their current position and role. However, they indicated interest in additional training for skills that are related to the business, but not specifically in fruit and vegetable processing production. They expressed interest in learning accounting, marketing, and driving skills among others. This may result from employees' assumption of multiple roles in the company especially in MSMEs. 75% of employers reported to have low attrition but 22.7% still report high turnover of employees over the last year.

In viewing the necessary skills that the employee respondents believe are needed to improve their job performance, apparent similarities were seen between regions. Improvement on both the practical and technical skills were essential to employees respondents.

In dissecting the following, "cooking" was apparent in the regions of Central Luzon, Zamboanga and CAR. "Soft skills training" was common between Central Luzon, MIMAROPA and Central Region. The need for "technological skills" and "driving" were both seen in MIMAROPA, Zamboanga, and CAR. "Negotiation skills" was uniquely raised by a respondent in Central Visayas; however the skills that fall under the scope of business management, which are "management, marketing and bookkeeping skills" were said to be needed in most of the regions that participated in this study.

Skills Gaps and Areas For Improvement In The Sector

In the various focus group discussions conducted by the PCCIHRDF, the industry players pointed out their staff's limited "technical know-how" on the mechanization of the food production process. A significant number also raised the lack of skills in online facilitation of order processing and packaging. There is also insufficient knowledge on maintaining sophisticated levels of sanitation and safety in the preparation of food. But above all, the most cited area for improvement among the industry players and trainers is the limited networking of the players. One participant specifically pointed this out by stating: "networking among growers, suppliers, manufacturers, distributors, and retailers." As a result, the food processing players cannot market their products effectively. At this point, it should be noted that the skills gaps they identified are very consistent with the ones specified in the initial economic scoping

performed by the researcher (see table below). The scoping pertains to the combination of desk research and focus group discussions attended by food processing participants held last 2021. The recommendations identified by the participants are presented below:

SKILLS GAPS IDENTIFIED BY THE RESEARCHER		SKILLS GAPS IDENTIFIED BY THE PARTICIPANTS
Skills Area	**Critical Gap**	
Processing Skills	1. Operative Skills (existing technology) 2. Operative Skills (new tech/process) 3. Production Supervisory Skills 4. Operative Skills (craft workers)	"Mechanization/automation of the food production process"
Sales and Marketing Skills	1. Marketing Skills 2. Language Skills 3. Negotiation Skills 4. Category Management Skills	"Networking" "Marketing"
Research and Development / New Product Development / Quality Control Skills	1. Skills needed to commercialize New Product Development 2. Product Research/New Product Development Skills	"Food sanitation and safety"
Support Skills	1. Training Skills 2. IT Skills (supply chain management and logistics) 3. Business Planning Skills	"Online facilitation of order processing and packaging"

Table 3: Comparison of the skills gap identified by the researcher and identified by the FGD participants

Skills gap based on industry-identified training needs

It was identified earlier in this study that food manufacturing, the manufacture of other food products, and preserving fruits and vegetables are among the industries with the highest production and staffing across the country. Breaking down the food processing industry further by location, it is crucial to identify the competency of workers available in that area based on the training or education they received. This section aims to identify the gaps of training based on applicable courses under the Technical Education and Skills Development Authority (TESDA) office for that particular region.

The following courses (Table 4) from TESDA were identified by the researcher as relevant to the food processing industry, and mapped out according to available records from TESDA. However, it is important to note that this is only a partial list. These courses are offered by private companies as well as some conducted directly by the agency. Table 5 presents the distribution of the courses identified.

TESDA course offerings
Agricultural Crops Production NCIII
Commercial Cooking NCIII
Cookery NCII
Customer Services NCII
Food Processing NCII
Organic Agriculture Production NCII
Bookkeeping NCIII
Commercial Cooking NCIV

Table 4: TESDA courses relevant to food processing, as identified by the researcher

Number of TESDA course offerings per province							
Abra	0	Capiz	1	Laguna	7	Pangasinan	10
Agusan del Norte	2	Catanduanes	0	Lanao del Norte	2	Quezon	19
Agusan del Sur	5	Cavite	5	Lanao del Sur	1	Quirino	4
Aklan	6	Cebu	2	Leyte	4	Rizal	8
Albay	1	Cotabato	7	Maguindanao	3	Romblon	1
Antique	1	Davao de Oro	0	Marinduque	4	Samar	8
Aurora	3	Davao del Norte	0	Masbate	1	Sarangani	2
Basilan	0	Davao del Sur	0	Misamis Occidental	1	Siquijor	0
Bataan	3	Davao Occidental	0	Misamis Oriental	2	Sorsogon	2
Batanes	0	Davao Oriental	7	Mountain Province	0	South Cotabato	4
Batangas	2	Dinagat Islands	0	NCR	0	Southern Leyte	1
Benguet	0	Eastern Samar	6	Negros Occidental	3	Sultan Kudarat	5
Biliran	2	Guimaras	0	Negros Oriental	6	Surigao del Norte	2
Bohol	7	Ifugao	0	Northern Samar	1	Surigao del Sur	2
Bukidnon	2	Ilocos Norte	4	Nueva Ecija	3	Tarlac	1
Bulacan	9	Ilocos Sur	1	Nueva Vizcaya	1	Tawi-Tawi	1
Cagayan	7	Iloilo	1	Occidental Mindoro	1	Zambales	2
Camarines Norte	2	Isabela	6	Oriental Mindoro	1	Zamboanga del Norte	1

Camarines Sur	0	Kalinga	0	Palawan	3	Zamboanga del Sur	4
Camiguin	0	La Union	4	Pampanga	3	Zamboanga Sibugay	3

Table 5: Number of TESDA course offerings by province, as compiled by the researcher

Courses offered in each province

Food Processing and Cookery

Food Processing and Cookery have the highest and second highest number of courses offered across the country. While there were 792 schools offering cookery, only 85 were listed under TESDA, and only 56 had complete addresses. As for food processing, there were 113 initially listed, but only 93 with identified locations.

Cookery NCII		**Food Processing NCII**			
Agusan del Sur	2	Agusan del Norte	2	Negros Occidental	2
Aklan	1	Aklan	1	Negros Oriental	2
Antique	1	Bataan	3	Northern Samar	1
Aurora	2	Biliran	1	Nueva Ecija	2
Batangas	1	Bohol	1	Occidental Mindoro	1
Bohol	5	Bukidnon	1	Oriental Mindoro	1
Bulacan	2	Bulacan	5	Palawan	1
Cagayan	2	Cagayan	3	Pangasinan	3
Cavite	1	Camarines Norte	1	Quezon	3
Cebu	2	Cotabato	5	Quirino	1
Cotabato	2	Davao Oriental	4	Rizal	2
Eastern Samar	2	Eastern Samar	3	Romblon	1
Ilocos Norte	1	Ilocos Norte	2	Samar	4
La Union	2	Iloilo	1	Sorsogon	1
Lanao del Norte	1	Isabela	3	South Cotabato	3
Leyte	1	La Union	2	Sultan Kudarat	5
Misamis Occidental	1	Laguna	1	Surigao del Norte	2
Nueva Ecija	1	Lanao del Norte	1	Tarlac	1
Pampanga	2	Leyte	1	Tawi-Tawi	1
Pangasinan	4	Maguindanao	2	Zambales	2
Quezon	9	Marinduque	3	Zamboanga del Sur	3
Quirino	3	Masbate	1	Zamboanga Sibugay	3
Rizal	2	Misamis Oriental	1		
Samar	3				

South Cotabato	1	Total for Cookery	56		
Zamboanga del Norte	1	Total for Food Processing	93		
Zamboanga del Sur	1				

Table 6: Provinces offering Cookery and Food Processing courses

Organic Agriculture Production and Commercial Cooking

Organic Agriculture Production had the third highest number of locations with 24 complete addresses. There are 784 locations listed, but details were incomplete. Commercial Cooking came in fourth at 20 identified locations, though 36 were listed.

Organic Agriculture Production NCII		**Commercial Cooking NCIII**	
Agusan del Sur	2	Aklan	1
Aklan	2	Batangas	1
Albay	1	Biliran	1
Bukidnon	1	Bohol	1
Cavite	2	Cagayan	1
Davao del Norte	1	Camarines Norte	1
Davao Oriental	1	Capiz	1
Isabela	1	Cavite	1
Laguna	2	Davao Oriental	1
Leyte	2	Ilocos Norte	1
Maguindanao	1	Isabela	2
Marinduque	1	Laguna	1
Negros Oriental	1	Misamis Oriental	1
Palawan	2	Negros Oriental	1
Pangasinan	1	Pangasinan	1
Sarangani	1	Quezon	2
Southern Leyte	1	Rizal	1
Surigao del Sur	1	Sorsogon	1
Total	**24**	**Total**	**20**

Table 7: Table 7: Provinces offering Organic Agriculture Production and Commercial Cooking courses

Other Courses

While specialized skills are clearly required for the food processing industry, they require several different roles to operate. *Bookkeeping* was identified as one of the important skills in the industry, however, only 15 locations with complete addresses were found to provide the course.

Customer Services has eight identified locations, it is offered in six provinces. The more advanced class of Commercial Cooking NC IV is only offered in six locations - four in Luzon and two in Mindanao.

As for *Agricultural Crops Production NCIII* it was only listed to have seven locations - one in Luzon, three in Visayas, and three in Mindanao.

Further coordination with TESDA and their regional offices would be able to provide a more accurate and up-to-date list of courses offered in the different provinces.

Commercial Cooking NC IV		**Agricultural Crops Production NC III**		**Customer Services NC II**		**Bookkeeping NC III**	
Davao Oriental	1	Agusan del Sur	1	Bulacan	2	Agusan del Sur	1
Negros Oriental	1	Aklan	1	Cavite	1	Cagayan	1
Pangasinan	1	Eastern Samar	1	Laguna	2	Laguna	1
Quezon	2	Ilocos Sur	1	Negros Occidental	1	Negros Oriental	1
Rizal	1	Lanao del Sur	1	Pampanga	1	Nueva Vizcaya	1
		Samar	1	Quezon	1	Quezon	1
		Surigao del Sur	1			Rizal	2
						Sarangani	1
						Surigao del Sur	1
						Ilocos Norte	1
						NCR	3
						Legaspi	1
Total	**6**	**Total**	**7**	**Total**	**8**	**Total**	**15**

Table 8: Other relevant course offerings

Business maturity

Of the 108 employers surveyed, 63 declared they were less than five years old. Employers expressed that it would be beneficial to them to develop skills in food processing, customer service and bookkeeping. For those who have been operating for more than five years, while in-house training and upskilling is preferred, offering progressive training courses to employees will develop individual skill as well as company product offerings. With the risk of employees leaving after considerable training, companies must develop their branding initiatives to entice employees to stay.

Years of Operation	**Number**
0-5 years	63
>5-10 years	2
>10-25 years	2
>25 years	5

Table 9: Number of employers by years of operation

Other participants did not give this detail. There were also other details such as type of industry or products that were not given by some of the employer respondents.

No further insights could be gathered from the employer and employee survey as respondents were from different industries or locations.

COVID-19 Impact on food supply chains and the food processing sector

Public health emergency measures disrupted both supply and demand sides of agri-food systems worldwide, and the food supply chain was not left untouched. Containment measures severely affected livelihoods due to loss of jobs, and the ability of households to purchase food. This kind of impact on the food system also had major effects on people's nutritional well-being.

Formal and informal retail outlets for food closed, and severely restricted the movement of citizens, with the production, processing, transportation, trade, and retail of food being profoundly affected. Most farmers and assemblers reported reduced sales and sales prices. In Metro Manila, the quarantine led to challenges in obtaining fresh produce with supermarkets and wet market stalls struggling to meet demand.

In other parts of the country, farmers faced challenges in selling their produce to manufacturers, traders and consumers. Filipino farmers were left with few people to sell their harvest to, leaving fresh produce going to waste. On the other hand, manufacturers / processors, and traders experienced difficulty with transport, production – operation due to skeletal workforce and travel restrictions.

Moving forward within the New Norm

The Department of Agriculture (DA) has taken full cognizance of the long-- term development constraints confronting the agri-food system and has adopted a *New Thinking for Agriculture* based on the themes *Ani* (Harvest) and *Kita* (Income). Adopting *Kita* in the New Thinking signaled that, aside from the usual preoccupation with production targets, the DA was placing farmers' welfare and livelihood front and center of the DA strategy.

The New Thinking is founded on eight paradigms:

1. Modernization
2. Industrialization
3. Export Promotion
4. Farm Consolidation
5. Roadmap Development
6. Infrastructure Development
7. Budget and Investments
8. Legislative Support

In late 2020, initiatives of advocacy groups, non-government organizations, and private sectors made the way to empower farmers by partnering with them to help reduce food waste and post-harvest loss – producers' and consumers', via online platforms, moving food from point to point, hub to hub within restricted pandemic measure. This is a process enabling the industry to better serve consumers in this changed trend. This allows hiring of movers, creating start-up businesses and the process of manufacturing picking up on old and new demands creating sustainability in the New Norm.

Future developments

MSMEs compose the majority of fruit and vegetable processing. Because of this, the industry comprises a wide selection of companies that are at the different level of their corporate cycle, distinct technologies, and varying resources. That being said, there are still common key determinants that will drive or shape the direction which the industry will move forward.

The drivers of the future Food Processing industry

Domestic Economy

The Covid-19 pandemic has reshaped the domestic economy specifically in the area of food processing, and its whole supply chain. The restrictions in the movements of goods, people and services changed production processes, altered people's choices and demands, and led to a lot of closure of suppliers to the bigger processors. It has also forced the stronger companies to further innovate or develop new product lines that are suitable to the "motorcycle delivery" mode that emerged from the pandemic. It is expected that the domestic economy for the food processing sector will cater to more products or services that can be "delivered door-to-door" from the seller to the buyer. While some elements of normalcy will still return, it is expected that the *al fresco* mode of dining will be preferred for the sector.

Consumer trends

More or less, the pandemic also raised the need for people to examine what they are eating ,and therefore have pushed for an even healthier option in terms of consumer demand. This trend is expected to really benefit the sector (more so the subsector of fruit and vegetable processing which have always been the healthy option) in the future. The pandemic served as a wake up call for people to follow a healthy diet to protect themselves and their immune system. Therefore demand for functional food which contain bioactive ingredients increased in the last two years, and will continue to increase in the foreseeable future.

*Agricultural and **t**rade **p**olicy*

The country's agriculture and trade policy will have a big impact on the types of food processing sector that will continue to flourish in the future. As the government tries to navigate its way through bigger trade agreements like the Regional Comprehensive Economic Partnership, it will have to maintain its offensive and defensive interests in these negotiations. Approaches to agriculture production, for example, have been influenced by the government's

economic interests, requirements from its donors, prescriptions from its lenders (ADB, World Bank, IMF, AIIB, etc).

*Food **r**egulation*

Food safety will be an even stronger requirement for businesses in the future. We have seen during the pandemic that food safety has gained more attention to prevent the transmission of coronavirus among producers, retailers, and consumers. While the government may not issue uniform business practices, it is expected that more regulations in terms of assuring that each business follows a procedure which effectively assess the business practices and lead the businesses to develop and implement specific strategies that will effectively reduce the risk of unsafe food.

Technology / Biotechnology

Biotechnology has proven to be a powerful and useful tool in the improvement of crops production, food quality and safety, while also preserving the environment. Sustainability principles will be more important to food consumers than ever before influencing how technology/biotechnology can be further used to produce "environmentally-sustainable" food. People will be more invested in food that was produced using less natural resources (water, land, transportation, etc).

Given the usual key drivers, it is important to note that the overall direction of change and success in the industry will be characterized by a number of factors: a greater degree of market liberalization, higher levels of food regulation, greater intensity of competition, more consolidation across all sectors, market-led rather than production drive, increased sophistication of both trade buyers and consumers, higher levels of technology and more demanding and greater fragmentation among consumers.

Opportunities in the sector

Training in the food sector is highly accessible as there are an estimated 110 training organizations involved in providing specific programs for the food sector, both public and private. These training programs are essentially concentrated around food hygiene, food safety, and hazard analysis and critical control areas which reflect the impact of legislation and regulation as a driver of training. However, given the accessibility of these training programs, there is still a relatively lower level of interest since many strategically important skill areas included only reflect the industry's short-term operational focus, even though these training programs are nationally accredited.

On the other hand, education in the food sector is highly prioritized because, to fulfill the competencies it demands, skills are not solely the factor. It also comes with knowledge and behaviors of the individual involved towards the role they will play in the operating process. Higher education in food science can play a role in moving the industry from its very basic to Industry 4.0 by focusing on workforce development for the new industrial era. This will require collaboration among food science and engineering departments supported by the food industry.

Companies can benefit from the computational power and domain capabilities of universities with access to state-of-the-art methods.

Given rapid digitization, mechanization, and the increased openness to new markets locally and internationally, the future looks optimistic for the sector. Listed below are the different areas where opportunities could come for companies.

- **New technology and digital solutions.** Majority of companies believe that human labor for the sector will not be obsolete. They believe that with the rise of new technologies and digital solutions, there is still a need for human intervention. This is why there is a mutual understanding to upskill the current workforce to prepare them for this transition. Additionally, the sector also understands that work could be done efficiently if appropriate technologies are used.
- **Increased consciousness on healthy choices.** The increasing awareness as well as growing market of people looking for sustainable, eco-friendly, and healthy products pushes the company to adjust and reassess or offer new products. The industry also believes that food safety compliance will get stricter especially during the global health crisis. To prepare for this, proper skills training should be in place.
- **Accessible training and good digital solutions.** In continuation with the industry's position to prepare for new technologies, the companies also believe that it is necessary to have accessible training, preferably can be done remotely, for their employees. There is an emphasis on accessibility because companies stress that employees cannot be gone too long as it may disrupt work arrangement. Additionally, companies would prefer budget friendly yet quality digital solutions that MSMEs can use.

Overview of the skills demand

As the Philippines continues with its efforts to develop competitive and innovative industries, both the government and the private sectors should continue to work hand-in-hand to push for the reskilling and the skills upgrading of the country's human capital and workforce. Such efforts present the country's dire need for industry development and transformation, and both the government and the private sectors acknowledge this pressing need, and are acting upon it by ways of partnerships across relevant agencies, sectors and governments.

June 2021 saw the formal launching and the signing of a Memorandum of Understanding between government agencies and the private sector for the first Philippine Skills Framework (PSF), which is a part of the country's inclusive innovation strategy with the main thrust of equipping the country's workforce with skills mastery and continued learning. The Philippine Trade Training Center-Global MSME Academy (PTTC-GMEA) of the Department of Trade and Industry (DTI), together with the Technical Education and Skills Development Authority (TESDA) and nine other government agencies forged partnership for the PSF. The PSF is a product of a partnership of both DTI and TESDA with Singapore's SkillsFuture in 2019. The PSF adopts the approach of Singapore by focusing on skills and the development of a skills

framework for specific industries. This is particularly in consonance with the Industry 4.0 Strategy.

IDTI Secretary Ramon Lopez said in a keynote speech that with skills development as the key pillar of the country's Inclusive Innovation Industrial Strategy, there will be implementations for the enhancements of the formal education curriculum, improvements in the technical and vocational education training and refinements in the higher education system.

The PSF will first be adopted and implemented by the Supply Chain and Logistics Sector, and will be implemented next by priority sectors such as the Construction, Information Technology-Business Process Management, Tourism, Health and Wellness, Food (agriculture and fisheries), Manufacturing and Creative Industries.

As the PSF was launching in June, the Philippine Chamber of Commerce and Industry Human Resource Development Foundation (HRDF) was in initial talks with DTI's PTTC in relation to getting information and support for the A Future that Works project, and admittedly, the timing could not have been better. PTTC Executive Director Nelly Nita Dillera showed her appreciation and support to the AFW project, which is presently steering the Fruit and Vegetable Processing Sector in the direction of the Fourth Industrial Revolution.

AFW's goal of bridging the skills gap is in sync with the Philippines' PSF, and in time to take opportunities being laid out by the government. While the PSF is targeting priority sectors mentioned, the AFW has three main sectors in mind: electronics, analytics and fruit and vegetable processing. To date, PCCIHRDF has already established a SSC for F&VP, volunteer members of which are mainly from MSMEs. From this point forward, further research is being made determining the key skills needed in this particular sector, to help and equip the newly created SSC in their mandate to stand council for the F&VP sector.

Meanwhile, in tackling the pillar of skills specifically needed in food manufacturing, there are two key factors as identified in the Singapore Skills Framework. One factor presents the Desired Attributes and the other the Skills in Demand.

In contrast to this, a separate study conducted by PCCI HRDF identified the different skills gap in the Philippine Food Processing. The study was based on the collective viewpoint of (1) Food and Vegetables Processing sector stakeholders and (2) Different Food Processors in the industry. The key findings and depth of the insights presented were also deeply rooted from the result of the FGDs conducted on the sectors mentioned.

The following sections will present the Demand of Skills as analyzed based on the Singapore Skills framework, the findings from study on the skills gap in the Philippine Food Processing, and the data gathered during the LMI study.

The factors are seen to work together to fulfill the needed overall desired requirements of a worker:

Desired Attributes

1. Hygiene Conscious
2. Analytical
3. Meticulous
4. Creative
5. Team Player

Skills in Demand

1. Food Science and Technology skills (Active and Smart Packaging, Food Product Improvement, New Product Introduction);
2. Automated Manufacturing skills (Advanced Processing Technology, Green Manufacturing Implementation, Data Synthesis);
3. International Business Development skills (E-Commerce Campaign Management, International Marketing Program Management, New Export Market Entry Strategy Formulation); and
4. Management skills (Innovation Management and Strategy Development).

In comparison with the Singapore Skills Framework and based on the data gathered during the LMI study, the Skills that showed up to be in demand among the MSME respondents in the field of the Fruit and Vegetable Processing are:

1. Technical skills
2. Attention to details
3. Coding
4. Team work
5. Critical thinking
6. Digital fluency
7. Ability to write and understand code
8. Industry specific credential/s
9. Time management
10. Programming
11. People skills

These skills when compared with Singapore's are a plethora of combined skills and attributes that should still be categorized into more specific skills within the framework of the processing of fruits and vegetables. These skills also point to the refinement of social and cognitive skills, which could be attributed to the training and educational institutions' programs initiatives.

In these suggested skills in demand, we see few specific skills which could lead to a lot of interpretation such as the lack of knowledge of what necessary skills are really needed within

the sector or a formal, national and standard reference for MSMEs to pattern with for a successful business. It is also noticeable how the mentioned skills are of mixed skills required of a manager or supervisor, and of a technical worker. This could also be translated that SMSEs could be needing employees of both characters, bearing qualities and skills of a supervisor who could also do technical and administrative skills. On the other hand, it also shares with Singapore's demand for analytical (critical) thinking, team player (team work) and digital fluency. According to the World Economic Forum in its Future of Jobs Report 2020, there is an increase in adoption and utilization of digital technologies which is expected to redefine tasks, jobs and skills as soon as 2025.

With digital skills showing up as one of the listed in-demand skills, we see how even (or more so) the SMSEs find digital technology to be relevant and essential in how they do business. Again, according to DTI, "the speed and breadth of the digitization and automation under the 4IR are rapidly creating demand for a range of new skill sets. These challenge companies to upgrade their workers' existing capabilities faster."

According to the 2021 McKinsey report, around 53% of companies consider reskilling their current workforce as the most useful action while 20% are looking to hire additional talent. 20% consider redeploying workers to new roles, and 6% will possibly opt for outsourcing. It also noted that about 43% of companies are saying that their companies are currently experiencing a skills gap now, while 44% expect the skills gap to occur in the next 2-5 years in their companies. Moreover, the business areas with the biggest skills gap are in data analytics, IT and web design, executive management, and HR and talent management.

Jobs marketplace in the Philippines

An initial scan of online jobs postings gives a look at the availability of jobs as well as how companies use the service. The following search terms have been used to come up with the following hits or results. Upon further digging, there are some postings that are either too broad (sales) that only fall into the search due to similar terms (software development) or are a highly specialized field (veterinary medicine). Search terms are based on HEI courses identified and roles as suggested by the SSCs. There was mention of digital marketing or online skills requirements, further research is needed to disaggregate the roles under food processing (business marketing vs production or processing). No mention of coding (#3) or programming (#10) as cited in the previous paragraph was apparent in the initial scan.

Search Terms on LinkedIn (___ job in the Philippines)	**Hits**	**Additional comments**
Food Technology	132	operations and gig economy
Food Processing	189	food processing - R&D, online platforms, QA

Food Quality Assurance	56	food quality jobs
Agricultural Technology	8	farm management
Agriculture	190	includes sales, tech development and veterinarian jobs

While the algorithm may change for commercial accounts, the job locations are mostly within Luzon/ Manila, with most (8/10) postings. Visayas and Mindanao posting are much less at one of 10 postings.

It could be that most companies in the food processing industry defer to alternative modes of hiring, either hyper-local traditional communications (newspapers, bulletin boards, word-of-mouth) or through manpower agencies and services. This could be developed further as an extension of the study. Further study in this regard is needed.

DOST project and innovation support

As pointed out previously, individual firms have little to no ability to innovate on their own. As such, DOST has provided support for various industries with grants and subsidies since 2010. On their Project DARIUS website, they list 9,906 projects in varying levels of execution. Of these, 169 are related to the food processing industry - and 28 were started in 2020, during the pandemic. The total disbursement of DOST for food processing has reached Php 140,505,053.

Constraints of the survey respondents

Survey respondents

The survey data was re-encoded by the researchers into a Google Form from submitted responses by contacted partners. Some of the responses are missing entries or contain errors that could not be corrected by the time of this revision. Employer and employee respondents were from different locations and industries and could not provide a concrete picture of the industry or their region. Their responses however were used to qualify the availability of government support in their area.

As for the terminology used in the survey, more than half of the responses appeared to not align with the intended question or are left blank. Terms like branding strategy may not be as colloquial as policy, and may have unduly affected the results.

Of the employees who responded to the survey, it must be noted that 26 completed the non-K-12 curriculum. Whether or not they completed their education in the same region as their current work was not part of the questions. From this sample, we can see that more of those respondents (32) from K-12 actually moved on to complete college. However looking at those

who finished college, their salary does not appear much higher than those who did not complete college education.

K-12 Program Grade 1 – Grade 12	11	Elementary Grade 1 – Grade 7	5	Technical or Vocational Course 1 – 2 years	13
Secondary 1st Year – 2nd Year; Graduate	7	High School First Year –4th Year; Graduate	21	Post baccalaureate Master's Degree/Doctoral Degree	1
College First Year – 6th Year; Graduate	32				

Alternative methods for collecting survey responses should be developed as some entries were deemed invalid or the respondent did not understand the context of the survey (eg. job: comedian). Engaging the sector skills council for the collection of data will only emphasize the importance and seriousness of the survey.

Educational attainment per region

As for the distribution of the respondents based on their educational attainment, the distribution is summarized below.

	CAR	Central Luzon R3	MIMAROPA R4B	R5 Bicol Region	Central Visayas R7	R9 Zamboanga
Recent Curriculum						
K-12 Program Grade 1 – Grade 12	1	0	0	4	0	6
Secondary 1st Year – 2nd Year; Graduate	2	2	1	0	0	3
College First Year – 6th Year; Graduate	13	2	3	9	0	5
<2015 Curriculum						
Elementary Grade 1 – Grade 7	0	1	1	1	0	2

High School First Year – 4th Year; Graduate	7	2	4	4	1	3
Other Education						
Technical or Vocational Course 1 – 2 years	7	2	1	1	0	1
Post baccalaureate Master's Degree/Doctoral Degree	0	0	0	1	0	0

Table 10: Distribution by region of respondents' educational attainment

On pay scale versus educational attainment

A pay scale range with Php 10,000 increments was used to categorize income. Based on their declared educational attainment, most of the respondents (57) were receiving less than Php 10,000. Almost a third (25) was receiving Php 10,000 to Php 19,999. It is noteworthy that there are more (13 vs. 8) who graduated from K-12 earning in the mid-range than those who went through the previous curriculum.

	K-12 Program Grade 1 – Grade 12	Secondary 1st Year – 2nd Year; Graduate	College First Year – 6th Year; Graduate	Elementary Grade 1 – Grade 7	High School First Year – 4th Year; Graduate	Technical or Vocational Course 1 – 2 years	Post baccalaureate Master's Degree/Doctoral Degree	Distribution
P0-9,999	9	4	18	4	14	8	0	68.67%
P10,000-P19,999	1	2	10	1	7	3	1	30.12%
P50,000-P59,999	0	0	1	0	0	0	0	1.20%

Improvements to the survey should make use of a different stratified pay scale, considering the difference between rural and urban wage rates and the prevailing minimum wage. Wages also need to be defined as either fixed salary or variable, with the number of working days per month.

Furthermore, formal employment must be distinguished from task/job-specific (*pakyaw*), part-time or informal work. The outlier receiving the highest pay grade is from a family-owned business.

Courses and trainings

Based on the gathered data, there is a lack of the following course offerings, and the researchers could not find any available courses through an online search. Advanced skills training for the food and vegetable processing industry is not available or are only offered for a select few in the industry. There is no apparent need for artificial intelligence training in the survey sample.

Courses currently unavailable	
Food Processing NCI	Process Inspection NCII
Food Processing NCIII	Process Inspection NCIII
Warehousing Services NCII	Warehousing Services NCIII
Food Processing NCIV	Warehousing Services NCIV
Food Production NCIII	In-Company Trainer TM1
Food Production NCIV	Research and Development

Take Your Career Further Section

Given the results from the quantitative and qualitative analysis, and all the literature available, Take Your Career Further section would like to offer the readers—specifically the students, employers and employees —a glimpse of the possible avenues, options and opportunities in the Fruits and Vegetables Processing sector.

Each section utilized all the resources gathered from the FGDs with the government, employers, educational institutions.

Take Your Career Further: Students

This section shall serve as a guide to students who are interested in F&VP and assist them to jump start their educational path. Students who want to pursue a career in Fruit and Vegetable Processing industry have different choices on where and what could they could study.

The following options below are linked to the available courses and trainings offered by the government, as seen on the previous sections. Many of these can be accessed free (e.g. tuition, vouchers with TESDA). On the offerings of education institutions, it is also worth noting that majority of the courses, degrees, or/and programs that are offered are located outside Metro Manila.

Educational Institutions

1. TESDA Courses

Technical Education and Skills Development Authority (TESDA) offers the most offerings when it comes to skills relevant to the Fruit and Vegetable Processing. There are 16 TESDA courses available based on scoping activity conducted by the researcher. These are as follows:

Agricultural Crops NCIII,
Organic Agriculture NCII,
Commercial Cooking NCII, NCIII, and NCIV
Cookery NCII
Food Processing NCI, NCII, NCIII and NCIV,
Food Production NCIII and NCIV,
Warehousing Services NCII, NCIII, and NCIV
In-Company Trainer TMI

The TESDA offerings mentioned above are generally available in TESDA centers and TESDA-accredited institutions nationwide. Although, it should also be noted that there are limited TESDA institutions offering courses on Food Production, Process Inspection, Warehousing Services, and In-Company Trainer. For students interested to enroll in the TESDA courses, they can apply for TESDA vouchers through their local or regional TESDA office or directly to the institution they want to enroll in.

As identified in the crop statistics presented in this research, there is a need to redistribute the course offerings to reach the rest of the industry. While much of the current offerings are located in large municipalities, there is an apparent lack of resources in the Visayas and Mindanao regions - with more than 50% national production of sugarcane, pineapple and cacao.

However, based on the scan, there were basic training courses that were found lacking or not available. Further coordination with TESDA on this could provide helpful information. The available courses were mapped out in the following table.

2. Higher Education Institution Degree Programs

HEI degree programs that are related to the Fruit and Vegetable Processing are majority offered outside Metro Manila. Unlike TESDA courses that teach students specific skills, degree programs in the college level can lead students to different career paths. The scoping of the researcher found 6 of degrees that could lead students to a direct career in Fruit and Vegetable Processing industry, which are as follows:

BS in Agricultural Technology
BS in Agribusiness
BS in Agribusiness Management
BS in Agriculture
BS in Agricultural Entrepreneurship
BS in Food Technology

Majority of the programs above are offered by Local University and Colleges (LUCs) and State University and Colleges (SUCs) which offer free tuition for students.

It must be noted that there are specific skills needed outside the scope of F&VP production and manufacturing. Given this, the study listed degree programs that are aligned to other disciplines, but could be valuable in pursuing a career in the of the fruits and vegetables processing sector. Based on the skills map developed *(see appendix A)* and the survey conducted by the researchers for the employees, the following programs presented is a partial overview of what are mostly needed in the operations and business development of the F&VP supply chain.

BS in Business Administration
BS in Marketing Management
BS in Business Management
BS in Culinary Arts
BS in Operations Management

3. Basic Education Training

There are limited skills training offering for the Fruit and Vegetable Processing in the basic education. In a consultation meeting, the Department of Education (DepEd) notes that the Food Processing training, which follows the TESDA curriculum, is more

specialized on Fish Processing. Despite that, DepEd is very much open on offering more specialized F&VP courses based on the demand of the students and of the schools.

Government Support

1. Commission on Higher Education (CHED)

CHED recommended to HEIs, especially to those with degree program in the sciences, to have their laboratories pandemic-ready. CHED also supported other SUC and LUCs in improving their post-harvest technology for students.

2. TESDA Voucher Scholarship

TESDA offers voucher scholarship to eligible trainees. In order to qualify, trainees must be 15 years old or above, finished 10 years of basic education or finished Alternative Learning System (ALS). The voucher covers free training, student and book allowance. Interested trainees could go to their local TESDA centers to inquire or go to the TESDA website and apply online (https://www.tesda.gov.ph/Barangay/).

Take your Career Further: Employers

Employers in the F&VP who want to develop further heir means of doing business and employees have different choices or government support which they can access. These findings could help interested businesses explore theses available resources, technology and support to aid in their development..

The following options listed below are findings from the technical working groups discussions with the government. These options are available through different government agencies listed below. This address the training and development needs of the employers as identified in the findings of the survey and FGDs. With the help of the government, many skills demand that cannot be trained by the businesses themselves, could be bridged by the government support. Likewise, this could go the same with technological and industry specific needs.

Government Support

1. Philippine Skills Framework

The PSF is the most tangible and latest there is to show for the support of the government and the private sectors to upskill or reskill the country's workforce. According to Senator Joel Villanueva, former Chair of the Committee on Higher Education and Technical & Vocational Education, by guiding the Filipino, especially the youth, to the country's priority sectors and in-demand occupation and skills, they can take action to make their career choices work for them. He also acknowledged that "the future of work is already here", even before the pandemic.

The Department Secretary of DTI Mr. Ramon Lopez emphasized the need to reskill Philippines' human capital and that it remains a significant part of the plan to produce a future-ready workforce and move the country closer to becoming an industrialized nation. Meanwhile, TESDA Director General Isidro Lapena mentioned that the MOU on the PSF signifies commitment to coordinate and collaborate towards the development of sectors, guiding and enhancing skills for a particular job role.

The commitment of Singapore to helping with the implementation of the PSF is also seen to entice Singapore-based businesses to invest in the country with its future-ready workforce. This is in relation to how the Philippines will work with Singapore, referencing its Skills Framework to implement the PSF.

For guidance, a skills framework as used in this context, is a common reference or language that employers and workers share to ensure the match between jobs and skills.

For employers, the PSF will help them in identifying the skills and competencies of potential employees. For companies, the framework can assist and guide in designing and developing their human resource.

According to DTI, the skills framework, particularly the PSF, will provide the following:

- Relevant sectoral information, including its employment landscape;
- The various occupations/job roles, which describe the skills requirement, work context, and expected profile of the worker performing the occupation/job role;
- The skills description that defines the performance expectations from each skill;
- The career pathways, or how these occupations/job roles in the sector are structured progressively; and,
- Possible training programs, which link the skills identified under particular occupations/job roles to programs available.

2. Department of Agriculture (DA)

The DA offers various training that employers could take advantage of to improve their companies.

- Philippine Center for Postharvest Development and Mechanization offers training on postharvest technology. Although, the majority of their training focused on high value crops such as rice and corn.
- The Agriculture Training Institute is the training of DA handling all capacity development programs. The office conducts regular food safety training for food safety officers and other relevant occupations.
- The DA is also in partnership with the World Bank to support Farmers and Cooperative Associations that will go directly into post-harvest processing.
- Producers and processors are given space in the DA Kadiwa program to sell their products.
- The DA continues to build processing facilities nationwide which contains

equipment for processing and packaging. The latest one in construction is the Baguio Agri-Pinoy Trading Center in Benguet.

- It is important to distinguish assistance given to company-led agricultural initiatives and small-scale farming and food processing, wherein the most of the assistance must be given to smaller scale producers and processors.

3. Philippine Trade Training Center (PTTC)

The PTTC is the training arm of the Department of Trade and Industry (DTI). The office's mandate is to help develop the MSMEs. The training provided varies from finance, human resources development, marketing, and operations. Specifically related to the Fruit and Vegetable Processing, the office offers training on Certificate of Good Manufacturing Practices.

The PTTC also offers the Food Connect initiative which is an incubator accelerator program in partnership with the Food and Drug Administration (FDA). This initiative helps MSMEs to be compliant on international labeling requirements, for documentary requirements of the FDA, and mentoring sessions for innovation and other processing technologies.

4. Department of Science and Technology

DOST offers technical services as well as technology transfers to assist companies in their commercialization and in research and development. The DOST also offers livelihood technology training for processing products such as calamansi, ginger, banana, and other products. The department also helps by giving quality assurance and quality checking training.

The DOST also uploads E-Learning technology videos on YouTube (DOST-ITDI) which can assist trainees and interested people to learn more on various processing techniques among others. This was not part of the survey and any evaluation of this mode of instruction is outside the scope of this research. Engagement in the field must be followed-through by on-site training caravans to provide access to these technological resources.

Various food innovation centers are located in all regions and these centers are tied with local academy partners. This initiative helps create a link to schools, government, and eventually to businesses.

5. Department of Labor and Employment

While DOLE does not have a program directly tied to Fruit and Vegetable Processing, the department offers Occupational Safety and Health (OSH) training which is an essential training for all industries. The basic OSH training is an 8-hour orientation and additional 2-hour training of trainers. Additional OSH training is offered for other occupations.

Take your Career Further: Employees

This section would like to offer current employees under the F&VP sector the possible options for their career development. This aims to help them improve their current skills while being employed in an F&VP or related business.

With the premium of getting the appropriate skills and qualifications, it is important for employees to have necessary evidence to improve their capability in the sector. Thus, this section highlights two possible options where employees can get themselves certified.

As reflected on the identified skills gaps by the researcher and survey participants, we can note that many of the skills are on the technical side (e.g. production skills, operation skills). Additionally, the following options could help address the skills gap on the sector.

Government Support

1. Philippine Skills Framework (PSF)

   As stated above, employees could expect training assistance once the PSF will be fully implemented. Once fully implemented, employees could be given a picture on the career pathways in their chosen industry.

2. TESDA Certification

   The TESDA National Certificate stands as one of the recognized proof of qualifications that local and some international companies recognize. Employees are encouraged to get certified to show proof of their skills. For employees that handle trainees, it is recommended to get the In-Company Trainer TMI which covers skills on conducting training, performing job analysis, and performing assessment.

Preparing for Future Skills: Conclusion and Recommendations

Given the data from the surveys and interviews that were conducted, the Fruit and Vegetable Processing sector is faced with numerous challenges that need to be addressed. Solving these challenges lays out a possible roadmap for the industry which will be crucial for two reasons: first, is to improve and continue the sector's competitiveness; and second, is to rebound from the effects of the COVID19 pandemic.

Human Resource Training Plan

This section contains suggestions on the training needed based on the arising needs and possible gaps from the study.

For Students:

- Improve training and integration of soft skills in the curriculum to address the skills gap conveyed by employers and employees.
- Update training for students to incorporate new technology used by the industry. This should also include training on digital solutions which is essential if students want to proceed in self-employment;
- Trainings on warehousing and logistics must be incorporated in the curriculum of higher education; and
- Improve student industry immersion as a means of closing the skills gap and creating a better partnership between the schools and the private sectors.

For Employers:

- Digital training must be offered to companies especially to MSMEs that are not familiar or need training with new forms of technologies. Trainings should include topics on, but limited to, digital marketing, digital advertising, and e-commerce platforms;
- Government should offer more innovation webinars and training to help companies revisit and reassess their company needs in consideration to the evolving market;
- Companies should invest in having a dedicated in-company trainer to ensure that different training needs are met accordingly.
- Government should expand its technology transfer training provided by DOST and access to market training provided by the DTI.

For Employees:

- Employees need regular training and retraining on food safety standards for compliance with the government and the industry;
- There is a demand for more training and upskilling from the employees as reflected by the survey, hence the research would encourage the companies to increase their training and upskilling programs to keep up with this demand;

- Employees are urged to take certification for their skills as part of improving employee credentials. As reflected in the findings, the most accessible type of certification for the workforce is currently offered by TESDA.

Recommendations

The researcher of this study recommends the following steps as possible improvement on the supply of skills, policy approaches, and other possible intervention to improve the Fruit and Vegetable Processing sector.

Education and Skills Development

- The government should increase schools offering National Certificate on Warehousing. This comes after reviewing the TESDA website where there are limited technical vocational institutions offering the said program. Increasing the number of schools could also help local businesses fill up various positions in their respective warehouses.
- Repeated and timely updating of training resources, and list of courses offered and training schedules will greatly improve the effectiveness of these programs. Course offerings must be tailored to the area or region for implementation, particular to the types of crops or produce available. This is important in moving away from an urban-centric approach where skills training in the provinces are steps to get gainful employment in the metropolis.
- An assessment of currently offered training programs for the food processing industry should guide the plans for creating more programs that are tailored to the needs of each region. The current map of having generic, low-level courses limits the access to skills development. Geographical limitations further hamper access and neglect specific skills for that region.
- F&VP stakeholders must be guided of the specific skills and training needed through a guided skills map. This study suggests a sample mapping of the skills needed based on the job opportunities reflected on of the data gathering *[See Appendices A and B]*. The goal of this is to show the necessary skills, job opportunities, and courses and trainings available in the different stages of the F&VP value chain.

Technology and F&VP Advancement

- The government should increase funding for technology transfer to MSMEs in order for them to be able to compete in a highly automated and digitized market.
- Technological development and support from DOST should focus on preservation, cold storage and warehousing facilities closer to the area of production. This would allow for longer shelf life and mitigation against climate-related effects or instances.
- Artificial intelligence (AI) was not sufficiently defined within the survey and not applicable to most of the respondents (e.g. banana vendors). Any discussion on technology must begin with a baseline assessment of current technologies available and predominantly used. Any advanced technologies will raise the barriers to entry and severely limit small businesses and will open these industries to large companies

monopolizing them.

- Basic and intermediate skills training is one of the more urgent concern, thus there is little need for AI. Applications for artificial intelligence and machine learning were not identified in this study. Despite that, the government should prepare training programs on how stakeholders in F&VP can take advantage of AI technologies.

Economic

- The government should strengthen and capitalize further local Public Employment Service Office in order to get a quick glimpse of available jobs in specific industries. This helps not just the Fruit and Vegetable Processing industry but also other industries in the area to help fill job positions.
- The parallel program of creating jobs and strengthening industries in rural settings will aid decongesting cities as well as building local economies

Future Studies

- A better skills roadmap for the Fruit and Vegetable Processing Sector should be crafted in order to create targets which the sector could achieve by a target date. This could be crafted with the support of a Sector Skills Council representing the industry and in partnership with the government and other relevant stakeholders.
- Continued development of PBEd and the Sector Skills Council of the methodology, minimum data standards and overall policy for evaluation is important. Standardizing the survey content and methodology will prove crucial in establishing a concrete picture of these sectors. Having a minimum list of details (demographics, pay, education) will provide better benchmarks across sectors referenced against the same Philippine education system.
- The F&VP sector is a niche sector that has not yet been fully explored, thus in many studies it fails to be separated on the macro agriculture industry. Future researchers can explore alternative survey methods for data gathering and examine other international secondary resources to further provide a more extensive analysis on the Fruits and Vegetables Processing Sector.

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Appendices

A. Skills Map

The skills and the job occupations indicated in this study are based on the respondents of the Labor Market survey conducted by the PCCIHRDF. It is important to note that since the majority of the respondents of this study come from the Micro, Small, and Medium Enterprises (MSMEs) there are overlaps in their overall function within the company, hence these are placed in categories where they have a bigger role to perform.

I. PRODUCTION/ MANUFACTURING

1. **Production Staff / Processor / Production Assistant**

Job Description:
Production Staff / Production Assistant / Processor contributes to the initial production process by preparing, preparing the equipment, and finally packaging of the products. They are also expected to observe company standards in production and hygiene.

Key Tasks:
- Prepare raw materials and ingredients
- Observe and follow company processes and standards
- Maintain proper hygiene and sanitation

Minimum Educational Attainment: Basic Education

2. **Factory Worker / All-around Staff / Warehouse Staff**

Job Description:
Factory Worker / All-around Staff / Warehouse Staff contributes to the completion of production processes and other relevant company tasks. They are also expected to observe and comply with company standards in production, hygiene, and sanitation.

Key Tasks:
- Provide assistance in overall production processes or as needed
- Observe and follow company processes and standards
- Maintain proper hygiene and sanitation

Minimum Educational Attainment: Basic Education

3. **Production Manager**

Job Description
The Production Manager manages the overall production in a company by ensuring that processes are followed, standards are followed and observed, and necessary administrative matters are met.

Key Tasks:

- Observe and comply with company workflow
- Implement and adhere to regulations and standards of the company (including OSH).
- Maintain proper hygiene and sanitation

4. Warehouse Associate

Job Description:
The Warehouse Associate coordinates with the Production department and the Logistics department to store and receive raw materials and processed products. Additionally, the Warehouse Associate works with the Logistics Department in the release and delivery of products.

Key Tasks:

- Receive Raw Materials / Ingredients
- Facilitate processed products for delivery

Minimum Educational Attainment: Basic Education

5. Cook

Job Description
The Cook is responsible for delivering food to be processed in production. The cook is also responsible for making sure that necessary food safety and sanitation standards are being observed.

Key Tasks:

- Follow company recipe
- Ensure clean handling of food on every stage of food preparation
- Maintain proper hygiene and sanitation

Minimum Educational Attainment: Basic Education

6. Operations Manager

Job Description
The Operations Manager takes the overall responsibility on making sure that the machines and work processes are observed and working accordingly. The Operations Manager is also responsible in coming up, and subsequently ensuring compliance, with organizational strategies for the production and the company to work effectively.

Key Tasks:

- Observe and comply with company workflow
- Setup, maintain, and operate production equipment
- Implement and adhere to regulations and standards of the company (including OSH).
- Maintain proper hygiene and sanitation

Minimum Educational Attainment: Basic Education

II. F&VP OPERATIONS DEVELOPMENT

- *QUALITY ASSURANCE AND QUALITY CHECKING*

1. Head Chef

Job Description
The Head Chef in the food processing sector oversee the overall production at the same time compliance with hygiene and sanitation. The Head Chef also manages other staff that are processing.

Key Tasks
- Maintain proper hygiene and sanitation
- Manage other staff involved in the food processing

Minimum Educational Attainment: Technical Vocational Completer or College Degree

- *RESEARCH AND DEVELOPMENT*

1. Food Technologist

Job Description
The Food Technologist performs tests, produce product prototype with the goal of improving the company products. The Food Technologist is also responsible in making sure that product prototypes are in compliance with company standards.

Key Tasks
- *Conduct food tests*
- *Come up with new products*
- *Contribute to the marketing of the products*
- *Innovate products*

Minimum Educational Attainment: College Degree

2. Research and Development Officer

Job Description
The Research and Development Officer leads the research and innovation for the company. The position requires technical knowledge on food production, food safety, and advance techniques in food development. The Research and Development Officer is also responsible for making suggestions and decisions to adapt new technologies for production.

*Key Task*s:
- Come up with new products
- Conduct research and innovation
- Innovate products

Minimum Educational Attainment: College Degree

- *LOGISTICS*

1. **Logistics Officer**

Job Description
The Logistics Officer is responsible for the smooth operation of the supply chain including procurement, purchasing, and delivery of goods.

Key Tasks:
- Monitor and track logistics operations.
- Prepare necessary reports

Minimum Educational Attainment: College Degree

2. **Delivery Driver / Rider**

Job Description
The Delivery Driver / Rider is responsible for the delivery of products to stores or to different locations. Depending on the type of product, Drivers / Riders should have the proper knowledge on handling the products to their delivery destinations.

Key Tasks:
- Delivery products in a timely manner.

Minimum Educational Attainment: College Degree

III. BUSINESS DEVELOPMENT

1. **Marketing Manager / Marketing-in-Charge**

Job Description
The Marketing Manager / Marketing-in-Charge is the lead person to develop marketing strategies and other marketing programs. The position requires communication skills to properly promote the products to new and existing clients.

Key Tasks:
- Brand management
- Facilitate Business-to Business Marketing and Business-to-Customer marketing
- Develop marketing strategies

Minimum Educational Attainment: College Degree

2. **Sales Manager**

Job Description
The Sales Manager is in charge of overall sales generation of the company. The position requires management of individual sales representatives. The position also requires knowledge of the product to assist in client inquiries.

Key Tasks

The Sales Manager is in charge of overall sales generation of the company. The position requires management of individual sales representatives. The position also requires knowledge of the product to assist in client inquiries.

Minimum Educational Attainment: College Degree

3. **Cooperative Manager**

Job Description
Cooperative Managers leads the overall management of a cooperative. This position usually exists in Cooperative organizations and other NGOs.

Key Tasks
- Maintain overall orderliness of the company or department.
- Supervise employees, provide coaching assistance if necessary

Minimum Educational Attainment: College Degree

4. **Treasurer**

Job Description
The Treasurer oversees the overall financial affairs of the company. The Treasurer is also responsible for financial decisions including investments and loans.

Key Tasks
- Oversee financial transactions
- Manage cash overall cash flow
- Prepare reports for the company and the board of incorporators.

Minimum Educational Attainment: College Degree

5. **Secretary**

Job Description
The Secretary provides administrative support and other clerical duties.

Key Tasks
- File and manage paperworks
- Provide administrative support

Minimum Educational Attainment: College Degree

6. **Bookkeeper**

Job Description
Bookkeepers are responsible for the daily accounting of the organization.

Key Tasks:
- Maintain Cash Flow
- Handle Ledgers

- Manage invoices
- Keep daily transactions

Minimum Educational Attainment: Technical Vocational Completer

7. Sales Staff / Sales Personnel / Sales Assistant / Saleslady / Salesman

Job Description
Sales Staff / Sales Personnel / Sales Assistant is in charge of selling the company products. The position reports to the Sales Manager or a position equivalent to that effect.

Key Tasks
- Sell products
- Prepare sales report

Minimum Educational Attainment: K-12 Completer

8. Promodiser

Job Description
The Promodiser promotes the product to customers which might lead to brand and product recognition and eventual sales. The position requires knowledge about the product in order to communicate it properly.

Key Tasks
- Promote the product to customers
- Prepare necessary reports

Minimum Educational Attainment: K-12 Completer

9. Storekeeper

Job Description
The Storekeeper oversees the physical store of the company. The position requires knowledge of the product as well as basic skills in inventory management and sales.

Key Tasks:
- Manage physical shop of the company
- Ensure proper management and inventory of products
- Answer questions about the product if necessary

Minimum Educational Attainment: K-12 Completer

10. Vendor

Job Description
The Vendor manages the door-to-door sales of company products. The position requires basic knowledge of the product and skills in sales.

Key Tasks:

- Sell products

Minimum Educational Attainment: K-12 Completer

11. Cashier

Job Description
The Cashier manages the physical store's cash flow. The position requires basic knowledge in accounting and form management.

Key Tasks:

- Maintain regular cash flows

Minimum Educational Attainment: K-12 Completer

B. Skills Requirements Across Different Stages of the Fruits and Vegetables Processing

	Production/ Manufacturing	F&VP Operations Development	Business Development
Required Skills	**Processing Skills**	• **Research and Development / New Product Development / Quality Control Skills** • **2. Support Skills**	**Sales, Marketing and Business Management Skills**
Job Opportunities	1. Production Staff / Processor / Production Assistant 2. Factory Worker / All-around Staff / Warehouse Staff 3. Production Manager 4. Warehouse Associate 5. Cook 6. Operations Manager	1. Head Chef - Culinary 2. Food Technologist 3. Research and Development Officer 4. Logistics Officer 5. *Delivery Driver / Rider	1. Marketing Manager / Marketing-in-Charge 2. Sales Manager, 3. Cooperative Manager 4. Treasurer, 5. Secretary 6. Bookkeeper 7. Promodiser 8. Sales Staff / Sales Personnel / Sales Assistant / Saleslady / Salesman 9. Storekeeper 10. Vendor 11. Cashier
Educational Attainment based on Jobs	Basic Education, K-12 or Technical Vocational Completer	Technical Vocational Completer, College Graduate **[5] This skill do not require specific educational attainment, but are required in F&VP Operations*	K-12 or Technical Vocational Completer, College Graduate
Courses and Trainings Available	TESDA: • Organic Agriculture NCII, • Warehousing Services NCII, NCIII, and NCIV • Agricultural Crops NCIII, • Commercial Cooking NCII, NCIII, and NCIV • Cookery NCII • Food Processing NCI, NCII, NCIII and NCIV, • Food Production NCIII and NCIV	TESDA: • Commercial Cooking NCII, NCIII, and NCIV • Cookery NCII HEIs: Bachelors of Science Degree in: • Culinary Arts • Food Technology • Agricultural Technology • Agribusiness • Agribusiness Management	TESDA: • Customer Services NCII • Bookkeeping NCII HEIs: Bachelors of Science Degree in: • Agribusiness • Agribusiness • Management • Agricultural Entrepreneurship • Business Management • Business Administration

	• In-Company Trainer TMI	• Agriculture • Agricultural Entrepreneurship • Operations Management	• Marketing Management

C. Survey Questionnaire - Employees

Questionnaire for Employees	
.Demographics	1. Name 2. Sex 3. Age 4. Region/Province/City 5. Which of the following describes your current civil status? 6. Which, if any, of the following academic, vocational or professional qualifications have you obtained? 7. Are you a breadwinner?
II. About your Job	1. What is the full title of your main job? 2. Describe what you do in your main job. Please describe as fully as possible. 3. What was your previous occupation? 4. How much do you get paid for your job here, before tax and other deductions are taken out? 5. What is the total hours worked for main job per month? 6. Which of the following do you receive in your job here? 7. How many years in total have you been working with your current employer? 8. Which of the phrases below best describes your job here? 9. Class of Worker for current job 10. Did you have other jobs or businesses aside from your main job? 11. Is it related to the same industry? 12. Do you supervise any other employees? 13. Do you agree or disagree with the following statements about your job? . My job requires that I work very hard a. I never seem to have enough time to get my work done b. I feel my job is secure in this workplace c. I feel I always have to catch up completing my work d. I always finish ahead with my work e. I feel I contribute a lot to total output f. I feel I do not contribute enough g. I feel my skills and talent are not matched with the demands of my work h. Given the chance, I would like to seek other jobs related to my education/training
III. Promotion	1. In general, how much influence do you have over the following? . The tasks you do in your job a. The pace at which you work b. How you do your work

	c. The order in which you carry out tasks d. The time you start or finish your working day 1. How satisfied are you with the following aspects of your job? . The sense of achievement you get from your work . The scope for using your own initiative a. The amount of influence you have over your job b. The training you receive c. The opportunity to develop your skills in your job d. The amount of pay you receive e. Your job security f. The work itself
IV: Workplace	1. In the last 2 years, have you made use of any of the following arrangements, and if not, are they available to you if you needed them? . Flexi-Time a. Job Sharing b. Work from Home in Normal Working Hours c. Work in a different or safer location/site d. Reduce Working Hours e. Working the same number of hours per week across f. Fewer days g. Paid leave or unpaid leave to care for myself and dependents in an emergency (Both covid & noncovid) h. Equipment & Office infrastructure (laptop, Microsoft, Gsuite, etc) i. Wifi Access (Subsidized) 1. Now thinking about both your commitments, do you agree or disagree with the following? • I often find it difficult to fulfill my commitments outside of work because of the amount of time I spend on my job • I often find it difficult to do my job properly because of my commitments outside of work
V. Skills and Training	1. Apart from health and safety training, how much training have you had during the last 12 months, either paid for or organized by your employer? 2. How well do you think your skills match the ones you need to do your job? 3. Do you think there are other skills, aside from what you have now, that you need to have to perform better? 4. If there are skills other than what you have now that you want to acquire what are these? 5. Are there times you feel you lack the skill or knowledge for a certain job or assignment? 6. Do you think training is a waste of time?

	7. Overall, how satisfied are you with the amount of involvement you have in decision-making at this workplace? 8. f your skills are not compatible with your current work, what additional training have you taken for the past 2 years?
VI. Educational Background	1. Do you feel that your education from university/college is adequate in performing your job? 2. Do you feel that your education from university/college equipped you in developing technical skills to perform your job? 3. How would you rate the employment potential of your degree? 4. For the past 2 years, are you looking for other work? 5. In the last 2 years, have you made use of any of the following arrangements, and if not, are they available to you if you needed them? . School Career Services a. Career Coaching b. Local Employment Services c. Headhunter or Recruitment Agencies d. Linkedin Premium or similar premium subscription 1. Do you have any final comments you would like to make about your workplace, or about this questionnaire?

D. FGD Questionnaire - Employers

Questionnaire for Employers	
I. Demographics	1. Type Name of Company 2. Years of operations of the company 3. Category according to your BIR 2303 4. Office locations: (please list all locations) 5. Industry 6. Services/Products 7. Company Size 8. Estimated Revenues or Sales for the Year
II. Skills & Competencies	1. Do you think that the talents you are recruiting and engaging with have adequate skills for your company's needs? 2. How satisfied are you with your people's output in the organization? 3. Does your organization have an existing short-term development plan? 4. Does your organization have an existing long-term development plan? 5. Do you think that your employees' skills supply all that your organization needs? . If No, do you feel there is a need to? 1. Do you think your organization have a need for skills matching at this point or in the future? Why or why not? 2. Based on your organization's output, how would you rate the importance of matched skills in production output? 3. What are the skills in demand in your organization? Please list all:
III. Training & Development	1. Do you provide training to your newly on boarded employees before engaging them with actual work? 2. What are the available trainings or programs? (ex. Classroom type, OJT, Online learning, etc) Please list all. 3. For the past 2 years how many were trainees in the firm? 4. For what specific positions? 5. Do you have a training budget for these positions? 6. What is the average length of training? 7. Do you have an internship or practicum program for the specific positions mentioned? 8. For the past 2 years how many were OJTs in the firm? 9. Are your OJTs students of agriculture, food technology, business administration/management courses, others, or vocational courses? Please specify all that applies. 10. How do you evaluate the internship or practicum program?

IV. Recruitment	1. Do you ask questions for filtering candidates during your recruitment process? Please check if all are available: 2. How would you rate your talent fulfillment rate? 3. What recruitment channel has been effective for recruiting?
V. Employee Performance	1. How do you measure employee performance? (ex. Balance Scorecard, Ratings Scale, etc.) 2. Would you say you are providing competitive total rewards to your employees? 3. What does your attrition rate look like? (High or low)
VI. Employer Branding	1. Is your firm doing deliberate employer branding strategies? 2. How do you rate your employer branding initiatives? 3. How does the firm give importance to the following employer branding initiatives? 4. In the last 2 years, has your organization provided the following arrangements? 5. Do you think these branding strategies attract competitive and/or appropriately skilled employees? Why or why not? 6. Do you think that these strategies are even important in securing competitive or appropriately skilled employees? Why or why not?
VII. Employee Demographics:	1. Gender 2. Status 3. What age group does the majority belong to? Enter the exact figure or estimated percentage. 4. How many have declared PWD or special needs are working for your firm?
VIII. Future Outlook	1. Based on the production output of your organization (skill and talent-based), would you rather retain employees or would you consider Artificial Intelligence (AI)? Ex. Face to face selling vs automated online selling; Cashier vs electronic order; personnel packer vs machine packaging 2. Are actions for implementation related to AI included in your organization's future plans? 3. Do you think that bridging the skills gap will prevent AI use? How and why? 4. Do you think that AI will replace the need for employees? How and why?