

**LABOR MARKET STUDY FOR
SKILLS FOR EMPLOYMENT INVESTMENT PROJECT (SEIP):
AGRO FOOD PROCESSING SECTOR**

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Executive Summary

The agro-processing industry is an important part in the manufacturing sector of Bangladesh. It works as a bridge between agriculture and the industrial process leading to the development of the country. While in terms of contribution to GDP, Bangladesh may no longer be called as an agrarian country, yet agriculture is the major provider of livelihood to around half of the population. Creating value addition to the agricultural products through agro-processing industries, may therefore be a key strategy for stimulating the development process and can play an important role in export diversification plan in future. Agro- processing industry is already identified in having a significant global impact on economic development and poverty reduction, in both urban and rural communities (da Silva et al., 2009). In the present study we have, however, only focused on agro processing industries that is under the manufacturing sector and thus enterprises that are related to food products and beverages are only included in the calculations.

The low level of skills and productivity of the Bangladeshi labor is endemic, as indicated by labor force survey data that more than 60% of the labor force has either no education (40%) or only up to primary level (23%). To improve this situation, Government adopted the National Education Policy (NEP) into 2010 followed by the National Skill Development Policy (NSDP) in 2011, to facilitate major education and training reforms. In 2014 the government of Bangladesh initiated the Skills for Employment Investment Program (SEIP), a multi-tranche financing facility supported by the Asian Development Bank (ADB) and Swiss Agency for Development and Cooperation (SDC), anchored in the National Skills Development Policy (NSDP), 2011. Under first and second Tranches, about 2, 23,000 people have been trained and certified, with a job placement rate of nearly 70 percent. The combined training target under the first two Tranches is set to 5,02,000. Female participation among trainees is more than 30 percent. In this backdrop, BIDS has conducted a study on the labor market in the Agro Food Processing sector for Skill for Employment Investment Project (SEIP) with the following objectives.

The main objective of assignment is to analyze labor supply and demand over the next 10-year period (2020-2030) in order to assist the government and the private industry to better plan the capacity and quality of skills training systems according to the evolving skills/trade/market demands from rapidly growing industry sectors.

The second objective of the assignment is to determine sector priorities, assess skills gap by sector,

analyze sector-wise occupational composition of employment (including gender composition of employment), assess occupation-wise training requirement by sector and trade.

To fulfill the objectives of the study, both quantitative and qualitative primary data have been collected. It employed a variety of methodologies such as document review, questionnaire survey using structured questionnaire with concerned enterprises and employees and Key Informant Interview (KIIs) with government officials/leaders/representatives of associations and Focus Group Discussion (FGDS) have been conducted. For the questionnaire survey, a pre-tested (on December 2020) structured questionnaire has been used. Guideline/Checklist are developed for KIIs to obtain information like skill gap/shortage, Covid-19 impacts for the sector, skill needs and labor demands, future projections for demand of labor, important suggestions for the development of the sector etc.

In this survey a Total of 117 agro food enterprises data are collected and also the data of 547 employees working in those enterprises are also collected to measure the skill-gap of this sector from both the demand and supply side perspective. In addition to this ten KIIs with association leaders/industrialists/authorities, one Focus Group Discussion (FGD) with BAPA and one FGD with BSFIC have been completed.

This study includes 117 agro processing enterprises which employ 41,546 employees in total. Survey result shows that overall output per enterprise in 2019 is 2348.47 million Taka and the export per enterprise is 59.86 million Taka. Hence, export to output ratio per enterprise is around 3%. It means that only 3 percent of the total output of the 117 agro processing enterprises are exported. The enterprises agreed that the current employees have skill gap. Moreover, it seems that higher skill gap exists for higher paid jobs like Managers and Professionals. The perception of enterprises about skill gap decreases for lower paid jobs like Elementary Occupations. Similarly, Service and sales workers, Craft and related trades workers and Plant and machine operators, and assemblers have an average of 6 percent responses saying yes to the current skill gap. The KIIs, FGDs and consultation of agro-food processing also corroborates with the survey results that there are a number of skill gaps in workers in different occupations in this sector. This sector has high potential for growth but this will require that the identified skill gaps and shortages are adequately addressed. Basically, agricultural production, packaging, storage and transportations require some basic skills. Even few more skills are needed in future to address the automation of industries those have been identified by the leaders of three associations in this sector.

It seems SEIP trainings have gained popularity among the enterprises as the trainings are provided by BAPA and the leading Agro-food Industries like PRAN, IFAD, MEGHNA, WELL FOOD etc. provide trainings in this sector. Hence, 80.7 % (92) enterprises expressed that they are willing to send their workers in future to undertake trainings under SEIP Training Curriculum. On the other hand, although 90.52 % of the enterprises expressed that they would prefer to hire people having TVET training in their companies, however, only 19.66 % have hired apprentices trained from TVET in their factories.

Recommendations

- 1) Since, the enterprises emphasized that increasing training activities is the number one solution that they think can minimize the skill gap we asked them what types of trainings they need for the current occupations. Based on the responses we listed top 18 trainings that the agro processing enterprises think that their employees currently need. Among those trainings on Quality Assurance, Quality Control, GMP, GHP, HACCP are on the priority list of enterprises. In addition to this we inquired four leading agro-food enterprises about their current training programmes, they are : i) ISO 9001 Certificate and British Standard Certificate, ii) British Retail Consortium (BRC) Certificate, iii) American National Slandered Institute Certificate (ANSI), iv) Food Safety and Preventive Control Alliances (FSPCA) Certificate, v) Occupational Health and Safety Assessment (OHSAS) 18001Certificate, vi) Food and Drug Administration (FDA) Certificate, vii) Hazard Analysis Critical Control Point (HACCP) Certificate, viii) Good Hygiene Practices (GHP), ix) Food Safety Management system (FSMS) and x) HALAL Certification. These trainings were provided by both local institutions like Bangladesh Standards & Testing Institution (BSTI), Directorate of Ministry of Industry Productivity cell and Islamic Foundation Bangladesh. Also, trainers from UK, USA and Malaysia were hired for providing trainings on ensuring quality and international standard of the agro-food products.
- 2) Training and awareness of food preservation, specially maintaining the temperature need to be spread from the farmers, to suppliers (freezing van) to consumers.
- 3) For quality maintenance of the final product cold chain maintenance need to be ensured from growing till the products are supplied to consumers. However, the employees found that even the educated people they hire don't have sufficient knowledge of temperature control and preserving the output.

- 4) Even the farmers need to be trained up properly for maintaining and preserving the quality of the agricultural raw materials.
- 5) After analyzing seven types of enterprises based on the product line we have identified that the occupation categories that need specified and specialized trainings compared to other employees in improving the output of the agro-food enterprises are: senior quality control officer, workers to control industrial product and quality management ,workers to control industrial product and quality management, officers to maintain SOP (standard operating procedures), Skilled Operator (Oven), Soft drink specialist, Packing workers and cold chain management officer.

Chapter 1: Introduction

1.1 Background

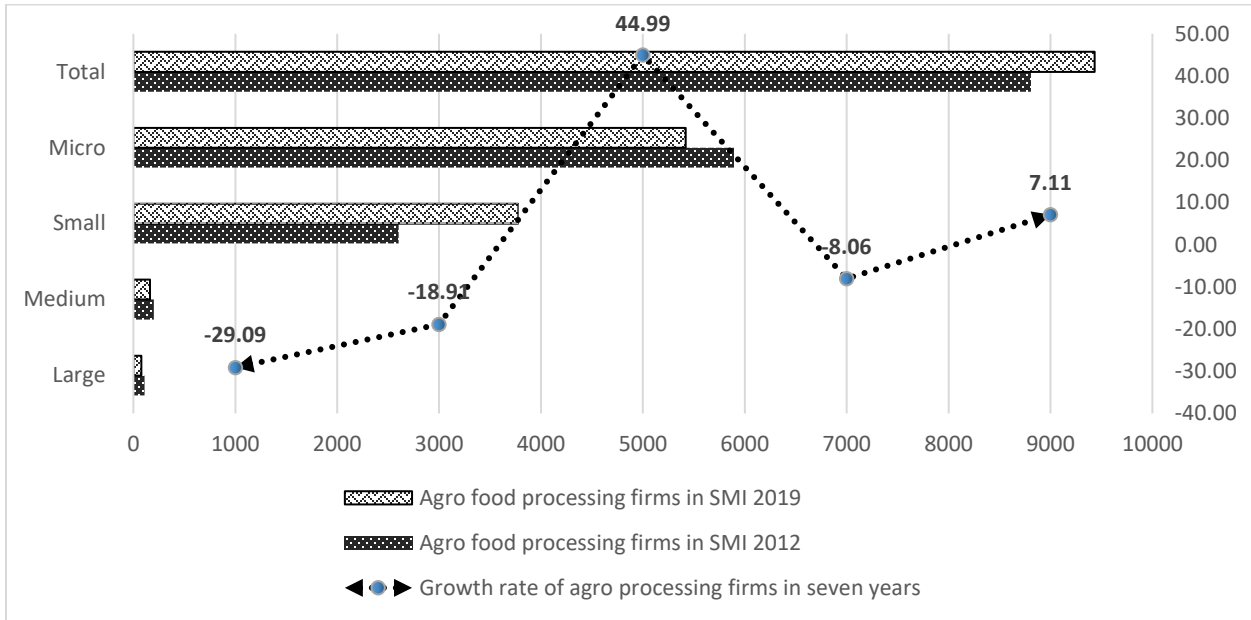
The agro-processing industry (API) is an important part of the manufacturing sector in Bangladesh. It works as a bridge between agriculture and the development process in Bangladesh in which the manufacturing sector is expected to play a large role. While in terms of GDP, Bangladesh may no longer be called an agrarian country, agriculture still is the major provider of livelihood to around half of the population. Creating value addition to the agricultural products through agro-processing industries may, therefore, be a key strategy for stimulating the development process in general and of agriculture, in particular, now and in future. The agro-processing industry is already identified in having a significant global impact on economic development and poverty reduction, in both urban and rural communities (da Silva et al., 2009).

Agro-food industries produced Taka 1,387 billion as gross output, which is 12.26 % of the total gross output of manufacturing industries in 2019 [SMI, 2019]. It's currently at the second position in terms of contributing to the manufacturing sector only after the Readymade garments (43.13%) [SMI, 2019]. Hence, the gross value addition of the agro-food sector is 5,93,174 million or 59,317.4 crore BDT, which is 13.08 % of the total value addition of the manufacturing sector in 2019 [SMI, 2019].

About 3.12 lakhs of persons are currently engaged in this sector which is 5.7 percent of total industrial employment (SMI 2019, p.71). As there is certain grey area in definition of agro-processing as to exactly where it is part of farming and where it is part of manufacturing also creates some difficulty in understanding fully the role and contribution of agro-processing.¹ In the present study we have, however, only focused on agro processing industries that is under the manufacturing sector and thus enterprises that are related to food products and beverages are included in the calculations.

¹ For example, dehusking paddy into rice had historically been part of farm family's home-based activity which has been in decline for quite some time and husking mills and automated rice processing mills which obviously are part of manufacturing, have replaced them.

Figure 1.1: Growth of Agro food Processing Industries



Source: SMI 2012, page 17; SMI 2019 page 71

Figure 1.1 above shows that from SMI 2012 to SMI 2019 the total number of agro food processing enterprises increased from 8, 808 to 9, 434 with a growth rate of 7.11 percent. However, the number of large, medium and micro enterprises decreased in number while the number of small enterprises increased from 2,603 to 3,774 at almost 45 % rate of growth.

Over the last two SMI survey years, the number of total employments increased from 2,91, 334 to 3,11,918 (Fig. 1.2). The growth rate of employment in male employees was 7.40 % which is higher than the growth rate of the female employees of 5.91 %. Also, compared to males, the number of females employed in this sector is quite low about 22 % of the total employment.

Figure 1.2: Employment growth in Agro food processing Industry

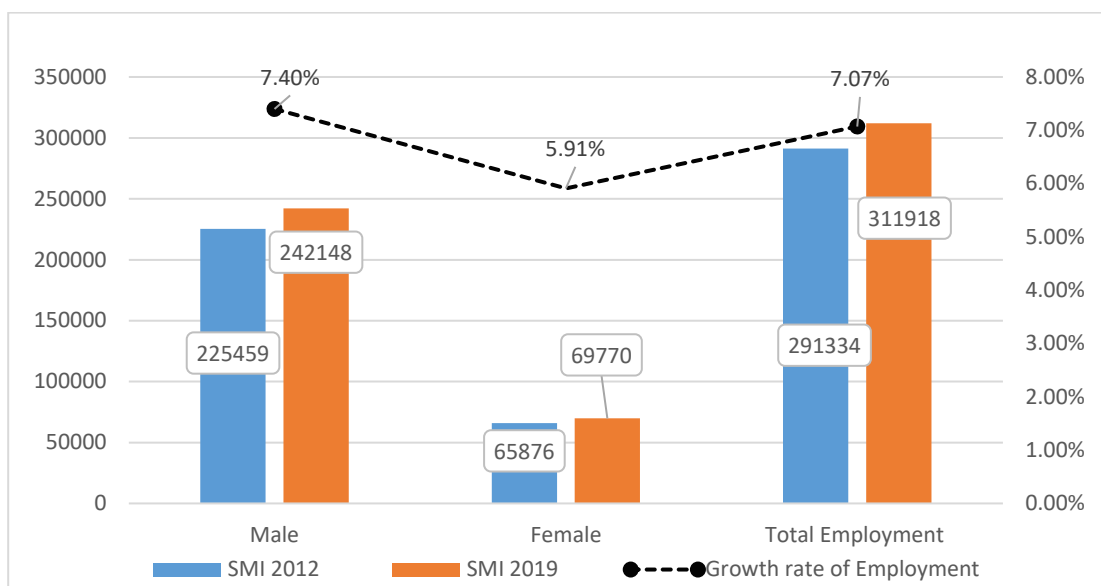


Table 1.1 depicts the growth of the agro processing sector for the last three fiscal years and its rate. According to Quantum Index of Major Industries in FY 2018-19, that of agro-processing sector is 417.7, with a projected growth rate of 15.1 percent in FY 2019-20 ranking as the 9th top ranking industries among the 22 manufacturing industries in Bangladesh (National Accounts Statistics 2020, p.7).

Table 1.1: Quantum Index of API (Large and Medium Scale Industries)

(Base: 2005-06)

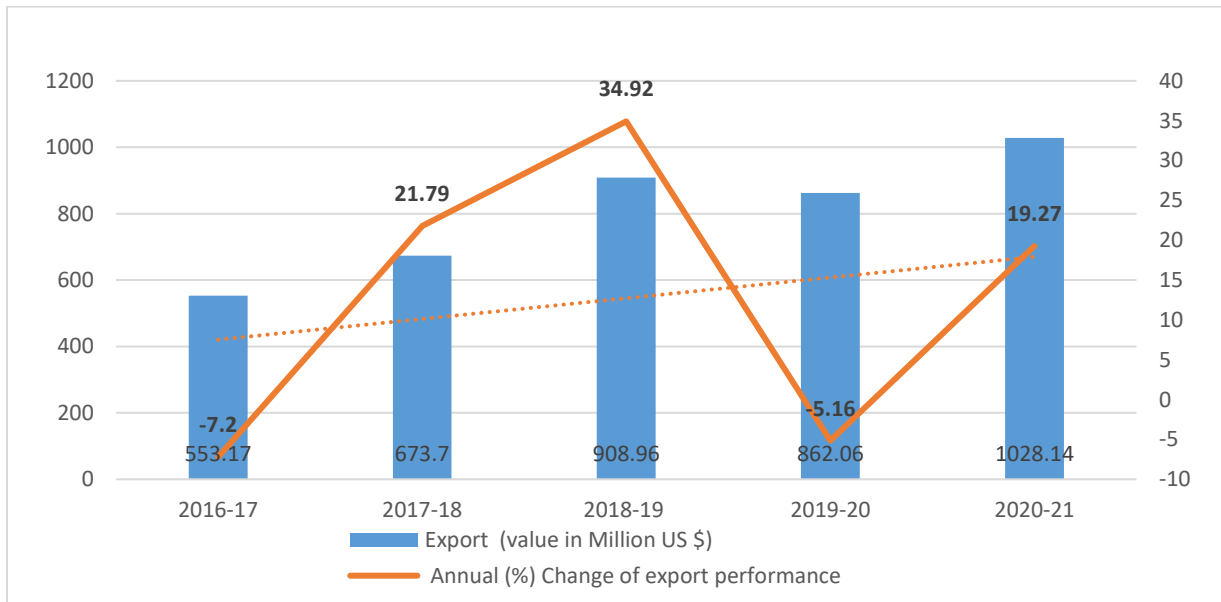
Industry	2016-17	2017-18	2018-19	Growth rate (%) (Projected for FY 2019-20)
Food Products	410.42	501.16	562.63	11.0
Beverages	257.61	240.41	272.74	19.1
Average for Agro-food industry	334.01	370.79	417.68	15.1

Source: National Accounts Statistics 2020, BBS, page 7

API's share of total exports in FY 2019-20 stood at around 2.75 per cent². According to some research the country has much higher potential of exports from this industry as reflected in its estimated revealed comparative advantage (RCA) after Textiles and Clothing in 2015³ (World Integrated Traded Solution, 2021). Bangladesh now exports about US \$ 1028.14 million processed agro-food products (in 2020-21) (Export Promotion Bureau, 2021) and has the potential to rise further in the near future given the RCA (Hossain et al., 2021).

The industry has been increasingly focusing on export markets. Figure 1.3 shows the export performance of Agricultural Products and Agro Processed Food for the last five years and its annual growth rate. Bangladesh exported US\$ 553.17 million in 2016-17 which increased by 35% percent in 2018-19. In 2020-21 it hit US\$1.0 billion in spite of the ongoing pandemic situation which adversely affected RMG, the major export earning sector. Although government provides both tax holidays and cash incentives for exporting processed food, still granting of such incentives for export promotion remains very problematic from the economic efficiency point of view (Mahmood, 2019).

Figure 1.3: Export Performance of Agricultural Products and Agro Processed Food



Source: Export Promotion Bureau, Bangladesh, https://epb.gov.bd/site/view/epb_export_data/-

² Author's calculation from Total Export value in Million US (\$) in 2019-20 in 31,316 million US \$, Bangladesh Bank 2021 and Export (value in Million US \$) for Agro-food products 862.06 million US \$, in 2019-20 from Export Promotion Bureau 2021.

³<https://wits.worldbank.org/CountryProfile/en/Country/BGD/StartYear/1988/EndYear/LTST/TradeFlow/Export/Indicator/RCA/Partner/JOR/Product/all-groups>

The major export items of API are composed of frozen fish, shrimp and other frozen food products, tea, spices, some dairy products, fruits including dry fruits and some other processed agricultural products. The United Kingdom, the middle East, Singapore, India, Australia and the Gulf are the major export destinations (TRADE MAP, 2021). The target consumers in those countries are migrants from Bangladesh and other South Asian countries who reside there.

The Government of Bangladesh is taking initiative to make the agro-processing industry one of the leading industries in Bangladesh that could help the country's export basket more diversified. Hence, the ongoing Agro-food Processing Industry Promotion Policy 2020 is being prepared for the period of 2020 to 2025 with the goal to make the food processing industry expand and diversify towards making Bangladesh a regional food production hub of halal brand and emphasizing total factor productivity (TFP) growth (5th Draft, 2021, p.3). In order to achieve this goal, improving human resource and technology, enhancing R&D, enhancing the production capacity and producing high value-added and niche products all these are important steps that also need the support of wise and visionary entrepreneurs (5th Draft, 2021) However, the first step is to properly identify and define "the Agro-food Processing Industry of Bangladesh", as its definition is still unclear. According to FAO (2009); "The agro-industrial sector is the subset of the manufacturing sector that processes raw materials and intermediate products derived from agriculture, fisheries and forestry and distributes food and non-food outputs from agro-industry" (da Silva et al., 2009, p.11).

According to the new Agro-food Processing Industry Promotion Policy 2020 Draft (p. 5) the Agro food industries are defined as factories and enterprises that are engaged in:

- i. Fruit and vegetable processing including grading / packing
- ii. Food grain milling / processing, using modern technology and equipment
- iii. Dairy products including milk, processing and milk-based products.
- iv. Processing of poultry, eggs, meat and meat products.
- v. Fish processing.
- vi. Bread, oilseed meals (edible), breakfast foods, biscuits, snacks, confectionery including cocoa processing and chocolate oil expellers and refining, malt extract, protein isolates, high protein foods, weaning foods, extruded / other ready to eat food products and all other processed foods (excluding non-packed food items served in Hotels and Restaurants of all categories).
- vii. Fruits based ready to serve beverages.

- viii. Tissue culture laboratories, green houses, green house nurseries and seed production units, based on modern scientific methods to meet industry standards.
- ix. Floriculture.
- x. Cold Storage Units/ Cold Chain.
- xi. Refrigerated transport vehicles / containers (including second hand refurbished Vehicles / containers).
- xii. Units for Manufacturing Food-Grade Packaging, Scamming and Bottling of Processed Foods.

Clearly, this definition reflects the vast diversity and differentiated products of this industry which includes the core activities as well as supporting ones and are thus difficult to be compared with any other manufacturing industries. Hence, identifying a proper strategy for this sector is also a challenging task. In 2019 Bangladesh Agro Processors association (BAPA), the leading association for this sector, conducted a study known as Project 073/2019 to identify the major barriers to the development of this sector. The study findings concluded that the major challenges to this are:

- i. ***Lack of skilled manpower (shortage of technical expertise):*** workers have little no knowledge of modern production, processing and packaging; there is a shortage of skilled technical personnel and appropriate mechanism; lack of HACCP, ISO (9001) & Halal certificate and lack of efficient marketing systems and personnel to man them.
- ii. ***Lacking quality assurance system:*** Sanitary and phytosanitary systems are poor at the stage of agricultural crop production. On the other hand, due to lack of a proper post-harvest handling system results in a huge number of crops especially the perishable crops being lost every year. In case of fruits and vegetables, such post-harvest loss amount to 20-40% during their handling and transportation.
- iii. ***Lack of testing facilities for quality control:*** Lack of cold chain and preserving facilities & proper management of wastes cannot maintain the compliance standard of the consumers abroad about the quality of agro-processing food.
- iv. ***Lack of appropriate training facilities:*** There exist a gap specially in medium and small agro-food processing enterprises to enable proper training opportunities including business advisory services , access to information and marketing, innovative technology that would facilitate export promotion and expanding the market to different countries.

Although the study sample was only 50 compared to the total number of factories (5894 factories according to SMI 2012), this study reveals that without proper strategic approach and establishing distinctive competitive strengths, Bangladeshi agro-food processing industries would face difficulties to compete in the global market. In this study we intend to analyze some of the problems related to supply and utilization of skilled labour in API in Bangladesh and provide specific recommendations for improving the situation.

1.2 Objective of the Study

The main objective of assignment is to analyze labor supply and demand over the next 10-year period (2020-2030) in order to assist the government and the private industry to better plan the capacity and quality of skill training systems according to the evolving skill/trade/market demands from rapidly growing industry sectors.

Towards attaining the first objective, the second objective of the assignment is to determine sector priorities, assess skill gap by sector, analyze sector-wise occupational composition of employment (including gender composition of employment), and assess occupation-wise training requirement by sector and trade.

1.2.1 Specific Objectives

Against above backdrop of objectives, the specific objectives of this study are:

- i. To take a stock of the overall demand and supply of skill in Agro Food Processing sector and how these demand and supply will change in the next 10 years.
- ii. To measure various types of skill mismatch including skill gap, skill shortage, over-education and under-education, horizontal mismatch and other indicators of mismatch of the API sectors.
- iii. To take stock of the government policy and interventions to produce and upgrade the skill for the Agro Food Processing sector.
- iv. To assess the type of training programs required to meet the skill demands in the API sector.

1.3 Literature Review on Skill of Labour

A brief literature review is provided below. This review helps to sharpen our understanding of various issues, forms and measurement of skill mismatch. These conceptual issues guide us to determine more clearly the scope of our study and also to design the questionnaire so that we can elicit the right information from the surveys that were conducted for the study.

A. Market failure: Transferable vs. non-transferable skill

Employers have little incentives to invest in skill development of the employees if skill is transferable in nature across firms or industries. Becker (1962) argued that firms will not pay for the training for general skill where return to firm be lower than the returns to employees. In this case, market fails and government should intervene. This provides a guideline for identifying the areas the government should consider to impart training on.

If the skill is very firm-specific, or transferable across only across a small number of firms, wages may not rise as much as the productivity of the trained worker, and hence the firm can appropriate some of the returns to these skills. In such cases, the firm has a greater incentive to invest in an employee acquiring the skill.

B. Soft vs. Hard Skill

Soft skill includes non-cognitive abilities or personality traits such as teamwork, communication, work ethic, time management, work under pressure, etc. While there is an increasing evidence on the high return of soft skill, we do not consider capturing soft skill in this study. Our study focuses on hard skill only which includes specific skill to perform a specific job.

C. Skill Mismatch

Skill mismatch refers to various types of imbalances between skills offered and skills needed in the labor market. The broad concept of skill mismatch can assume different forms, such as vertical mismatch (over-education and under-education), horizontal mismatch (field of study/training vs field of work), skill gaps, skill shortages and skill obsolescence. Skill mismatch, in all of its forms, is a major source of labor underutilization. For example, if workers in a firm are overeducated than is actually required for the particular job they are working in, this means that the firm is wasting a part of labor productivity which, if skill had matched perfectly, could have been used to generate a higher level of output. Similarly, under-education means that the firm is not operating at its full potential,

losing a part of output which could have been gained in the absence of the mismatch. All labor market actors, e.g. the government, corporations and workers need to ensure that the appropriate skill gets employed at the appropriate job in order to shape labor market outcomes which leads to higher growth, productivity and competitiveness (ILO, 2014). In developing countries, the first order problem is skill shortage and skill gap – there are not enough skilled workers available and if available they do not possess the required level of skill. In the following sections we will briefly discuss various forms of skill mismatch and how to measure them.

D. Forms of Skill Mismatch

Skill Gap

Skill Gap is a firm-level measure of skill mismatch based on employer's perception about the ability of employees. It measures the degree to which workers lack adequate competencies to successfully perform their current duties at job. This type of skill mismatch may cause lower output per worker, increase labor cost, incur additional costs on recruitment and training and adversely affect firm-level profitability.

Skill Shortage

Skill Shortage refers to a situation where employers cannot find suitable candidates with certain skills to fill job vacancies. Situations like this are characterized by market conditions where the demand for skills by employers cannot be met by the available supply at the equilibrium wage rates. An important feature of this firm-level measure is that it is directly linked with skill gap; whenever firms find it hard to fill vacancies due to lack of a particular skill-group, they are forced to recruit inadequately skilled workers into those positions

Over-education and Under-education

Measured at the level of individual's circumstances, over-education and under-education refer to the degree to which workers' education levels are above, below or poorly matched to those required for their current jobs. In case of job vacancies, the measure relates to the degree to which applicants' education level meet the hiring requirements. This is also known as vertical mismatch.

Horizontal Mismatch

Horizontal Mismatch refers to situations where workers get employed in jobs that are neither related to their education, nor to their skills and knowledge. The measure identifies any mismatch between the workers' primary field of study or training and the skill actually required for their current jobs.

E. Measurement Issues of Skill Mismatch

Skill Gap

Skill Gaps are typically measured from information perceived by the employer on skill insufficiencies among the workers in a firm. However, similar perception-based information are also collected from the employees themselves on their skills and expertise. For example, we can ask for responses in a scale from 1 (not at all) to 5 (to a very high extent) to the question: "To what extent does this work require more knowledge and skills than you can actually offer" with 4 and 5 denoting skill gap. It is found in the literature that employees tend to over-report skill gap compared to employers, maybe because, while responding to questions on skill gap, the former are more likely to consider future career requirements, rather than immediate job requirements (McGuinness and Ortiz, 2016).

Skill Shortage

Surveys aiming to measure skill shortage generally involve asking two separate sets of question to employers, with one trying to establish the existence of unfilled or hard-to-fill vacancies and the other trying to gather information on the reasons underlying any recruitment difficulties. There are, however, some sources of bias in the estimate coming out of employers' responses. Employers tend to inflate the true magnitude of recruitment difficulties by adding to it their inability to offer necessary salary, working conditions to attract workers with relevant skills (Cedefop, 2015).

Over-education and Under-education

There are three approaches in literature to measure over-education and under-education, namely subjective method, realized matches method and job evaluation method. The first two are the most commonly used methods in the literature. Each method has its own advantages and disadvantages and estimates from the three approaches might differ and produce conflicting results.

The subjective method collects a worker's self-assessed responses to questions "what are the level of qualifications required 'to get' or 'to do' your current job" and "what is the highest level of qualification you have". These responses are then compared to determine if the worker is

overeducated (level of education higher than that is required), undereducated (level of education lower than that is required) or matched (level of education equal to the requirement). Variables denoting over-education and under-education might take both the forms of binary dummy and the years of over-education and under-education. The subjective method is relatively easier to apply in survey data. However, this method cannot be retrospectively applied to existing data and the method is prone to subjective bias.

The realized matching method or the empirical method estimates the mean or modal value of educational requirement for a particular job and compares it with each worker's education level. The greatest advantage of this method is that it is applicable to existing micro datasets, such as national labor force survey, containing information on educational qualifications and occupation, hence facilitates cross-country comparisons. One of the disadvantages of the realized method is that instead of actual skill requirements, it takes an average measure of qualifications of all workers. Therefore, the method less closely captures the required education level "to do a job" compared to that of "to get a job". Another drawback of the method is that due to limited sample size, it can only capture skill mismatch for broad occupational groups (e.g. health professionals), not at a disaggregated level for individual job title (e.g. nurse).

The job evaluation method uses the field expertise of professional job analysts to measure the educational requirements for different occupations. This approach is less prone to subjective bias as it uses specialized knowledge on the particular field and hence more accurate compared to the other methods.

Horizontal Mismatch

Measuring horizontal mismatch involves asking workers to assess the relevance of their current job with their field of study and expertise. Some studies measured the mismatch independently by comparing a field of study variable with occupation codes (Robst, 2007 and 2008 and Allen and de Weert, 2007).

Chapter 2: Data and Methodology

2.1 Sample Size Determination

To ensure the coverage of important industries under the agro-food processing sector, the sampling relies, for lack of more recent data, on the information of the ‘Survey of Manufacturing Industries 2012’⁴. Further, the sample has been stratified following the definition of size in National Industry Policy 2010 based on the persons employed. Accordingly, we classify firms into large, medium and small categories. The total number of establishments by different size is given in the table below:

Table 2.1: Number of agro-processing establishments by size and industry (BSIC 2 digits)

BSIC-2digits	Small	Medium	Large	Total
10 Manufacture of food products	2416	187	105	2708
11 Manufacture of beverages	187	14	5	206
Total firms	2603	201	110	2914

Source: Survey of Manufacturing Industries 2012, page 17

Therefore, the population size for this sector is 2914 and WBES formula yields sample size of 116. However, as the agro-food industry is highly heterogeneous, we oversample the enterprises to capture the nature of skill mismatch for a wide range of industries. The literature review and personal experience suggest the following distribution of products described in Table 2.2 in our sample. Initially, we intended to survey all sugar producing factories. However, because of Covid-19 pandemic and unfortunate closure of a number of government owned sugar-making enterprises, in consultation with BAPA and Government owned Bangladesh Sugar and Food Industries Corporation (BSFIC) we lowered the number of sugars producing factories and limit the survey to a total 117 enterprises of all kinds. The types of enterprises surveyed are shown in Tale

2.2 Data Collection Tools

To fulfill the objectives of the study, both quantitative and qualitative data have been collected. It employed a variety of methodologies such as document review, questionnaire survey using structured questionnaire with concerned enterprises and employees and Key Informant Interview (KIIs) with government officials/leaders/representatives of associations. For the questionnaire survey, a pre-tested structured questionnaire has been used. Guideline/Checklist were developed for KIIs to obtain

⁴ The Survey of Manufacturing Industries (SMI) 2019 was not published during the time of the survey, hence the study relied on SMI 2012 for our sample selection.

information like skill gap/shortage, Covid-19 impacts for the sector, skills needs and labor demands, future projections for demand of labor, important suggestions for the development of the sector etc. A total of 117 enterprises survey and 547 employees survey from different categories and skills have been conducted (Table 2.2). In addition, ten KIIs of association leaders/industrialists/authorities, one Focus Group Discussion (FGD) with BAPA, one FGD with BSFIC have been completed (Annex-1). According to Terms of Reference (ToR) for SEIP, the research team of Agro-food processing was to arrange one consultation meeting with sector experts and associations at BIDS premise before the process of preparing questionnaire. Due to the pandemic situation, the sector consultation could not be held in BIDS premise. The consultation was done using online platform at the time of pandemic and also by doing face to face interviews or KIIS with experts before the public holidays due to Covid-19.

Table 2.2: List of Surveyed Enterprises and Employees

Types of Enterprises	Number of Surveyed Enterprises	Percentage	Number of Surveyed Employees	Percentage
Sugar Processing	11	9.4	75	13.71
Edible Oil	14	11.97	55	10.05
Starch	4	3.42	13	2.38
Spices	10	8.55	39	7.13
Dairy Products	16	13.68	85	15.54
Automated bakery items	34	29.06	165	30.16
Meat (Processed)	7	5.98	29	5.3
Fruit Processing	18	15.38	73	13.35
Industries Supporting Agro-Food Sector	3	2.56	13	2.38
Total	117	100	547	100

Source: BIDS-Skill Survey 2020-2021

We picked two employees from each occupation/task with the consultation of the manager in such a way that one is a skilled one and the other is unskilled in the manager's view since the manager/employer knows best about the level of skill of his or her workers.

As stated earlier, this study covers 117 factories. From these, a total of 547 employees are surveyed in different occupational categories (Table 2.3). The number of employees surveyed in each occupation category at 3-digit level of BSCO occupation code is described in this table.

Table 2.3: List of Surveyed Employees at 3-digit level of Occupation

Occupation Category	Number	Percentage
Manager		
Business services and administration managers	16	2.93
Sales, marketing and development managers	70	12.8
Production managers in agriculture, forestry and fisheries	15	2.74
Manufacturing, mining, construction, and distribution managers	6	1.1
Retail and Wholesale Trade Manager	6	1.1
Professional		
Physical and earth science professionals	11	2.01
Life science professionals	10	1.83
Engineering professionals (excluding electro technology)	24	4.39
Electro technology engineers	2	0.37
Finance professionals	1	0.18
Administration professionals	17	3.11
Sales, marketing and public relations professionals	2	0.37
Technician and associate professional		
Physical and engineering science technicians	20	3.66
Mining, manufacturing and construction supervisors	1	0.18
Process Control Technicians	1	0.18
Life science technicians and related associate professionals	19	3.47
Sales and purchasing agents and brokers	1	0.18
Administrative and specialized secretaries	17	3.11
Service and sales workers		
Street and Market Salespersons	1	0.18
Protective Services Workers	1	0.18
Skilled agricultural forestry and fishery workers		
Market Gardeners and Crop Growers	81	14.81
Subsistence Crop Farmers	1	0.18
Craft and related trades workers		
Painters, building structure cleaners and related trades workers	19	3.47
Electrical Equipment Installers and Repairers	8	1.46
Food processing and related trades workers	34	6.22
Other craft and related workers	23	4.2
Plant and machine operators, and assemblers		
Food and related products machine operators	120	21.94
Agricultural, forestry and fishery labourers		
Locomotive engine drivers and related workers	1	0.18
Agricultural, forestry and fishery labourers	16	2.93
Domestic, Hotel and Office Cleaners	1	0.18
Other Elementary Workers	2	0.37
Total	547	100

Source: BIDS-Skill Survey 2020-2021

2.3 Limitations

At the beginning of the survey conducted for this study a list of industries was collected from BAPA, and then 150 industries were randomly selected from those lists. Because of the Covid-19 situation, it took time to start the survey and had to make a few changes (around 10%) for operationalizing the survey at the field level, and finally 117 industries were surveyed. Most of the time industry owners hesitated to permit entrance of the enumerators to their industries due to Covi-19. Finally, the request from SEIP authority, BAPA and Industry Ministry helped a lot to receive access to those enterprises. With this permission, we had to take extra health related measures for the enumerators according to the guideline of WHO (World Health Organization) and Ministry of Health, Bangladesh. All these measures finally delayed the survey process and incurred extra cost and time to conduct questionnaire survey and to gather qualitative primary information.

Chapter 3: Understanding the Skill Gap in Agro Food Processing Industries

3.1 Nature of the Surveyed Agro Processing Enterprises

The 117 factories under the present study cover those from five divisions: Dhaka, Chittagong, Rajshahi, Khulna and Mymensingh and 21 districts under them. About 40.7 percent factories are located in Dhaka division districts (see Annex Table 1). About 52 factories are located in rural areas, 27 in the urban areas and the other 24 factories are in peri-urban areas. Around 90.6 % (N=96) factories reported that they have head offices located elsewhere (dethatched from the factory compound). The largest category of ownership of the enterprises belong to local private businessmen (about 74.4 %) (Table 3.1) The percentage of surveyed enterprises which are a part of an agglomerate is 62 percent (N=61). Seven enterprises reported to have multiple factories. Among these factories under these enterprises 13 factories produce similar/same type of products and other 13 produced different types of agro-processing products.

Table 3.1: Ownership of the Enterprises

Ownership of the enterprise	Freq. (%)
Government ownership	13 (11.1%)
Local (Bangladeshi) private ownership	87 (74.4%)
Joint ownership (Local/Foreign)	17(14.5%)
Total	117 (100%)

Source: BIDS-Skill Survey 2020-2021

The agro-processing sector is diverse in nature with multiple types of products. This survey was designed to capture its diversity by including different types of product for data collection and analysis. However, due to the pandemic situation and other constraints we ended up surveying nine types of agro-processing industries (Table 3.2), of which the last category is industries producing intermediate products for use by other enterprises to produce final products. In this category we surveyed three enterprises that produce mango pulp, mango pulp and tomato paste and flavor, color, seasoning and remix that are used by other agro processing industries to produce their final products.

Table 3.2: The Nature of Enterprises

Serial Number	Codes of Product Line	Number of Enterprises	Percent of Enterprises
1	Automated bakery items	34	29.06
2	Fruit Processing	18	15.38
3	Dairy Products	16	13.68
4	Edible Oil	14	11.97
5	Sugar Processing	11	9.4
6	Spices	10	8.55
7	Meat (Processed)	7	5.98
8	Starch	4	3.42
9	Industries Supporting agro-food enterprises	3	2.56
	Total	117	100

Source: BIDS-Skill Survey 2020-2021

This study includes 117 agro processing enterprises which employ 41,546 employees in total. Table 3.3 depicts a snapshot of the enterprise survey of this study. It shows that overall output per enterprise in 2019 is 2348.47 million takas and the export per enterprise is 59.86 million Taka. Hence, export to output ratio per enterprise is around 3%. It means that only a very small proportion on average of the total output of the 117 agro processing enterprises is exported. Also, the capital-labor ratio per enterprise per employee stands at 6,283 Taka as the capital stock per enterprise is in total 261.05 million takas. Finally, the output per worker stands at 56,526 Taka.⁵ It should be noted that these are all average values and thus there are variations around them.

3.1.1 State of export in the surveyed enterprises

Among the 117 enterprises 56 enterprises reported to export their agro-food products and among the products different types of edible oil (like rice bran oil, mustard oil, sunflower oil, fortified D soya bean oil), spices (like biriyani mix, turmeric powder, coriander powder, red chili powder, mixed spices, chicken masala,curry powder chotpoti, firni and halim mix were mentioned), milk and milk products(like fresh milk, banana milk, chocolate milk, pure ghee, condensed milk, whole milk, flavored milk) , among bakery products (wafer, custard cake, vegetable noodles, cookies, white

⁵ In Neoclassical Growth Model, if
 N_t = size of the labor force in year t
 K_t = capital stock in year t
 Y_t = output produced in year t
 $y_t = Y_t/N_t$ = **output per worker**
 $k_t = K_t/N_t$ = **capital stock per worker = capital-labor ratio**

bread, fruity mix, Choco fudge) and fruit processing products (Tropicana, carrot preservation, mango pulp, tomato paste) and molasses were mentioned. In the later phone interviews, the enterprises mentioned lack of proper agricultural raw material supply, lack of storage facility, local certification and authority to approve of international certification for finished agro-processing goods, inadequate seasonal transport availability as major challenges for export. Hence, establishing a proper cold storage system linked with food supply chain management and establishing local labs and certifications up to the WTO (World Trade Organization) standard, and providing seasonal transport system to acquire fresh fruits and vegetable from field to the factories and ensuring proper pricing of raw materials by establishing a price control board, are some of the proposals mentioned by officials in the leading agro-processing enterprises.

Table 3.3: Brief Description of the surveyed agro-processing enterprises

Indicators	Full sample
Employment (total number of employees)	41,546
Total Number of agro-processing enterprises	117
Output per enterprise (2019) (in million taka)	2348.47
Export per enterprise (in million taka)	59.86
Capital stock per enterprise (in million taka)	261.05
Capital labor ratio per enterprise (in taka)	6,283
Export/Output ratio	0.03
Output per worker (in taka)	56,526

Source: BIDS-Skill Survey 2020-2021

Furthermore, in Table 3.4 when we divide the surveyed enterprises into large, medium, small and micro enterprises according to the definitions in National Industrial Policy 2016, about 45 enterprises in this survey were large, 28 were medium enterprises, 27 small enterprises and 17 were micro enterprises. Also, about 33,854 or largest number of employees were employed in the large enterprises.

Table 3.4: Size of the Enterprises

Categories	Employment	Number of Enterprises
Large (More than 250 workers)	33854	45
Medium (100 to 250 workers)	5673	28
Small (25 to 99 workers)	1697	27
Micro (10 to 24 workers or less)	322	17
Full sample	41546	117

Source: BIDS-Skill Survey 2020-2021

3.2 Wage and Employment Scenario in the Surveyed Enterprises

Table 3.5 describes the wage and employment situation of the sample enterprises. In total, we got 209 Job Titles (see Annex 1) from the survey that were first converted to 4-digit code from BSCO 2019 and then to 1-digit code of BSCO 2019 codes for simplifying the analysis. Hence, we ended up with six occupational categories at 1-digit level that are related to production in the agro processing sectors. In Table 3.5 the occupation or rather Job Titles are given in BSCO 3-digit code, under 1-digit code for in depth analysis. For example: There are seven managerial Job Titles under the occupation category ‘Manager’, nine professional Job Titles under the occupation category ‘Professionals’ and so on.

Table 3.5: Wage and Employment situation of the agro processing enterprises

SL	Occupation (in BSCO 3 digit)	Employment in Surveyed Enterprises	Percentage of female workers	Average monthly salary, wage and honorarium (taka)		Percentage of permanent workers	Percentage of fulltime workers
				Male	Female		
	Managers (in 1 digit)	2210	2.72	87,064	34,876	95.99	93.25
1	Managing directors and chief executives	45	0.46	127186	538	96.30	96.30
2	Business services and administration managers	699	4.70	74214	6069	97.49	93.61
3	Sales, marketing and development managers	684	11.40	39325	5261	96.15	94.13
4	Production managers in agriculture, forestry and fisheries	683	4.35	96654	3758	95.53	90.30
5	Manufacturing, mining, construction, and distribution managers	65	1.24	39361	4167	94.12	88.24
6	Retail and Wholesale Trade Manager	17	47.06	10000	8333	100.00	100.00
7	Other services managers	17	0.00	14200	0	87.50	87.50
	Professionals (in 1 digit)	1426	3.65	44,525	29,806	95.71	91.33
8	Physical and earth science professionals	13	0.00	33792	0	100.00	100.00
9	Life science professionals	332	12.72	22867	7325	95.56	91.11
10	Engineering professionals (excluding electro technology)	517	7.87	48896	6543	94.55	88.23
11	Electro technology engineers	52	0.00	35357	0	100.00	92.86

SL	Occupation (in BSCO 3 digit)	Employment in Surveyed Enterprises	Percentage of female workers	Average monthly salary, wage and honorarium (taka)		Percentage of permanent workers	Percentage of fulltime workers
				Male	Female		
12	Finance professionals	32	5.56	35433	3308	97.22	97.22
13	Administration professionals	463	2.55	44798	3098	94.52	91.56
14	Sales, marketing and public relations professionals	4	0.00	71250	25000	100.00	75.00
15	Database and network professionals	7	0.00	13083	0	0.00	0.00
16	Social and Religious Professionals	3	0.00	21667	6667	66.67	66.67
	Technicians and associate professionals (in 1 digit)	2209	1.97	21,822	18,589	92.13	90.42
17	Physical and engineering science technicians	155	2.98	23707	1931	85.78	78.31
18	Mining, manufacturing and construction supervisors	847	5.71	14972	1409	86.07	86.07
19	Life science technicians and related associate professionals	412	5.38	17543	1787	92.78	90.68
20	Sales and purchasing agents and brokers	4	0.00	30000	0	100.00	100.00
21	Administrative and specialized secretaries	749	5.18	22586	6363	92.31	95.38
22	Artistic, Cultural and Culinary Associate Professionals	25	5.00	25444	6944	100.00	100.00
23	Information and communications technology operations and user support technicians	20	4.17	20264	2604	100.00	100.00
	Craft and related trades workers (in 1 digit)	4323	4.85	20,396	10,086	96.56	92.86
24	Painters, building structure cleaners and related trades workers	113	22.66	12478	3478	94.78	90.82
25	Electrical Equipment Installers and Repairers	18	15.38	17500	7500	100.00	100.00
26	Food processing and related trades workers	4135	7.86	13636	1364	95.00	95.00
27	Other craft and related workers	57	2.69	30064	1308	93.33	86.67
	Plant and machine operators, and assemblers (in 1 digit)	3773	2.91	18,199	14,923	94.43	93.49
28	Food and related products machine operators	3424	9.09	16692	5230	93.82	92.25
29	Assemblers	18	0.00	36750	0	81.25	81.25
30	Locomotive engine drivers and related workers	331	0.00	10556	0	75.00	75.00
	Elementary occupations (in 1 digit)	27605	0.94	10,873	9,084	71.42	82.69

SL	Occupation (in BSCO 3 digit)	Employment in Surveyed Enterprises	Percentage of female workers	Average monthly salary, wage and honorarium (taka)		Percentage of permanent workers	Percentage of fulltime workers
				Male	Female		
31	Agricultural, forestry and fishery labourers	27007	40.82	9090	6242	72.90	85.64
32	Manufacturing labourers	103	16.67	8000	0	66.67	66.67
33	Food preparation assistants	144	5.05	16792	2500	66.67	66.67
34	Refuse workers	351	30.00	13000	2333	50.00	50.00
	Total	41546	9.43	48360	4500	91.96	90.09

Source: BIDS-Skill Survey 2020-2021 [At 3 Digit Level of Occupation Code of BSCO 2019]

Table 3.5 reports the description of the total number of employments under each occupation category in the surveyed enterprises, percentage of female workers, average salaries of the male and female employees, percentage of permanent workers and percentage of fulltime workers across the occupation categories. ‘Elementary Occupations’ have the highest number of people 27,605 employed, which is almost 66.45 % of the total occupation category (example: Floor man, cleaner, sweepers, Factory workers, Line-in-charge, Loader/Garbage and recycling collectors, Makers, food preparers, Assistant pastry man, Packaging workers etc. at 4-digit level) [details in Annex 1]. Also, among this category of occupation ‘Agricultural, forestry and fishery labourers’ are the highest in number. The next is ‘Craft and related trades workers’ where 4,323 number of people or 10 percent of the total employment among the surveyed enterprises are employed⁶.

Also, female engagement is highest among this occupation category (4.85%), earning an average salary of 10,086 Bper month, although the male employees in this occupation category earn twice as much as them mostly because they have more knowledge and skill in terms of food processing and related trade knowledge. Finally, around nine percent or a total of 3,773 workers’ are employed under the ‘Plant and machine operators, and assemblers’ category among which ‘Food processing and related trades workers’ have highest number of employment in this category (3,424), ‘Assemblers’ with the lowest number of employed people (18) and highest amount of pay of 36,750 BDT monthly

⁶ Quality control specialist, supervisor, Assistant maintenance manager, Mixer specialist, Product analyst, Senior fitters etc. belong to this category at 4-digit level of occupation) [details in Appendix 1].

salary, ‘Locomotive engine drivers and related workers’ earn the lowest average salary of 10,556 BDT per month in this category⁷‘

The three broad occupation categories (Craft and related trades workers, Plant and machine operators, and assemblers & Elementary occupations) altogether consist of the 85.93 % of the total employment in the agro processing industry. Further, the female engagement in the agro food processing industry is quite low, as only 2.85 percent of the total employees are female. Female employees are mostly engaged as ‘Professionals and Craft and related trades workers’ (4.85 %), followed by Professionals (3.65 %) and then Plant and machine operators, and assemblers (2.91%). These figures indicate that females are only engaged in certain processes and less than 5 % of the employees are female in the surveyed enterprises. To address this issue in details four telephone interviews were carried out with four leading enterprises. Their responses are listed in the table below:

Table 3.6: Reasons and Suggestions to address the lower female participation in the agro-processing sector

<i>Reasons for lower female participation in the Agro-food processing sector</i>	<i>Suggestions by leading enterprises that could assist in hiring more female employee in this sector</i>
1. LACK OF SOCIAL SECURITY	<ul style="list-style-type: none"> • To create awareness among local government and political leaders to create safe environment for female workers for travelling • Transportation facilities for females from office to home • Self-security and IT training for female employees to assess police and other support when facing dangerous situations.
2. LACK OF INSTITUTIONAL SKILL DEVELOPMENT	Vocational Training
3. TECHNICAL SKILL GAP	Agro food processing training for skill development, like basic food preparation training in bakery products, homemade products, cereal, snacks etc. , packaging methods, storage of raw products, food safety and hygiene practice training

⁷ Plant and machine operators, and assemblers engaged in Job titles as senior operator, junior operator, junior production officer, assembler, machine operator and bakery specialist etc. [details in Appendix 1].

	food handlings, food packaging training, product storage (Like: ISO , HACCP, FSMS, HGP)
4. LOW SALARY	Increasing the productivity and soft skills and technical skills of the females

During the phone interviews, key informant interviewees stated that they are willing to hire female employees but due to lack of social security of females to go to work from their areas and lack of availability of transport facilities are the main reasons for lower female participation rate. Also they urged that females interested to work in this sector to acquire trainings in basic food preparation like preparing bakery products, homemade products, cereal, snacks etc.: also certified technical skills in ISO, HACCP, FSMS, HGP from reputed institutes in packaging methods, storage of raw products, food safety and hygiene practice training food handlings, food packaging training, product storage etc. Learning proper skills in handling and packaging food products, understanding the quality maintenance and hygiene practices are the only way for women to increase their productivity in this sector and earning better salaries.

As expected, the average monthly salary is the highest for the Managers category employees (Table 3.5) which is 87,064 BDT, whereas the next highest i.e., that earned on average by professionals (like Quality Control Mangers, Engineers, Chemist, Hazard Analyst & Financial analyst etc.) is roughly one-half of that for manger categories at 44,525 BDT. Technicians and associate professionals get roughly half on average of that of professionals at 21,822 BDT. Craft and related trades workers, Plant and machine operators, and assemblers get somewhat similar pays. That shows that those who practically run the real cogs and wheels really do not get much remuneration compared to those who direct them from above. This also shows that the remuneration ratios based on average salaries between top paid and lowest paid among technical people may be about 4:1. People engaged in elementary occupations earn the lowest with a monthly salary of 10,873 BDT. Interestingly, the gap between wages of the three categories ‘Technicians and associate professionals, Craft and related trades workers, Plant and machine operators, and assemblers’; are not much wider, since jobs under these categories require knowledge and skills related to food production and managing machines efficiently, thus enterprises are paying salary based on the practical skills of the employees. Hence, training employees under these categories would bring higher return in salaries from the employee’s point of interest.

Female wages are comparatively low especially in higher ranking jobs as the gap between male and female employees are higher where a female manager earns only 34,876 BDT per month, less than one-half of their male counterparts. Similar picture is found in case of Professionals and Craft and related trades workers where majority of the women are employed, female average salary is close to half of the male employees.

Table 3.5 also shows the composition of permanent and full employees in the agro-processing industry. Almost 92 percent employees are permanent and 90 percent are full time working in the surveyed agro-processing industry. However, this may not be the case for the whole agro –processing sector, as in this survey 45 enterprises (38%) are large industries and only 17 (15%) are micro enterprises (Table 3.4). On the other hand, from the Survey of Manufacturing Industries 2019 (p.71) 5419 or 57.4 percent of the agro-processing enterprises are micro in nature. It is likely, therefore, that while in medium to large agro-processing enterprises the formal type of employment is dominant with permanent and full-time jobs, it may not be the same for small and micro enterprises which dominate this sector. Also, for elementary or low skilled occupations the percentage of permanent workers drops drastically to 71.42 percent and the full employment to 82.7 percent indicating that in case of low skilled workers the situation of informal type employment may be more of a norm.

3.3 Actual and Desired Qualification of the Employees across Occupation Categories

In this section we will look into the actual educational qualification of the already employed persons and also the desired level of qualification that the employers want. In table 3.6 the current education level of the employees in years and their average experience in years are listed along with their subject preference in the secondary and higher secondary exams. Science graduates in both S.S.C and H.S.C level and more so in case of latter as they dominate the agro processing workforce. HSC science graduates dominate in all categories of occupation and interestingly most so in case of elementary occupations probably indicating that they expect to move higher up the ladder as they gain experience. The percentage of Arts graduates working in this sector is comparatively low except for the mid-level occupation categories where after completing S.S.C, vocational training or specialized skills training can help them get a job in this sector.

Table 3.7: Actual Level of Qualification by occupation categories in Agro Processing Sector

Occupation (At 1-Digit Level)	Average qualification level currently held by workforce (Science) (Percentage)		Average qualification level currently held by workforce (Arts) (Percentage)		Average qualification level currently held by workforce (Commerce) (Percentage)		Actual year of qualification (avg. class studied)	Average experience at the entry level (in years)
	S.S.C	H.S.C	S.S.C	H.S.C	S.S.C	H.S.C		
Managers	53.62	72.14	6.83	8.64	13.87	19.22	14.84	6.57
Professionals	68.81	79.35	7.95	11.23	7.03	9.42	13.77	4.47
Technicians and associate professionals	63.83	76.52	17.02	22.61	1.42	0.87	12.49	3.9
Craft and related trades workers	48.89	74.07	11.11	22.22	2.22	3.7	10.05	2.73
Plant and machine operators, and assemblers	58.14	69.89	24.03	25.81	0.78	4.3	11.65	3.47
Elementary occupations	25.88	82.61	5.88	13.04	4.71	4.35	7.75	1.23
Full Sample	57.27	75.03	10.25	13.55	8.1	11.42	13.31	4.84

Source: BIDS-Skill Survey 2020-2021⁸

Table 3.7 points out high paying jobs like managers and professionals required to have S.S.C and H.S.C in preferably with science background and obviously diploma, bachelor's or some sort of long-term vocational trainings in terms of their academic development. That's why both these categories have 14.84 to 13.77 average years of schooling. Also, to be working in this level 6.57 or 4.47 years of experience was needed indicating that one needs to work at least 5 to 7 years after getting the degrees to get promotion at this level For Technicians and associate professionals post senior

⁸ The actual year of qualification column represents the average number of years spent on schooling for each occupation category. If a person spends around 10 years in study he/she is equivalent to S.S.C level of qualification, spending 11 years means he/she is equivalent to H.S.C level of education, spending 12 years means he has attained diploma courses additional to passing H.S.C, spending 13 years means he/she has received vocational training, 14 years means he received some sort of skills trainings along with H.S.C and 15 years means the employee has completed a Bachelor's Degree, 16 means he/she has completed Master's Degree and completing 17 years of education means the person has obtained a PhD degree

managers of quality control, production or department head may have attained bachelor's degree but for most of the cases after the higher secondary certificate they have done some vocational or skills training or directly went for diploma courses after their S.S.C exams to get the Jobs. Elementary occupations have the lowest average education level (7.75 years) and experience (1.23 years) to work in their current Job positions.

Table 3.8: Desired Level of Qualification by Occupation Categories in Agro Processing Sector

Occupation (At 1-Digit Level)	Average qualification level desired from workforce (Science) (Percentage)		Average qualification level desired from workforce (Arts) (Percentage)		Average qualification level desired from workforce (Commerce) (Percentage)		Desired years of qualification (avg. class studied)	Desired Average experience at the entry level
	S.S.C	H.S.C	S.S.C	H.S.C	S.S.C	H.S.C		
Managers	73.24	70.14	9.3	11.83	17.46	18.03	15.54	8.09
Professionals	84.7	82.92	8.54	9.25	6.76	7.83	14.46	5.74
Technicians and associate professionals	80.34	81.03	19.66	17.24	0	1.72	13.39	4.31
Craft and related trades workers	88.24	84.85	8.82	12.12	2.94	3.03	12.04	4.85
Plant and machine operators, and assemblers	76.85	72.64	22.22	25.47	0.93	1.89	11.90	3.60
Elementary occupations	81.4	79.41	16.28	14.71	2.33	5.88	9.44	3.46
Full Sample	78.89	76.54	12.15	13.41	8.96	10.05	14.05	6.15

Source: BIDS-Skill Survey 2020-2021

Table 3.7 depicts the desired level of education, experiences the enterprises want their employees to have. A perusal of this table along with the earlier Table 3.6 and shown here as Table 3.7b, for science graduates (for which there appears to be the main demand) only shows the apparent match or mismatch by groups of people employed by enterprises. We immediately see that for managers, professionals and technicians, there does not seem to be any large mismatch for basic educational qualifications or in the years of education but the entry level experience desired seems to be somewhat higher than actual supply. On the other hand, a closer focus shows that for the entry level science education (at SSC level), for manager the desired percentage is 73 while the actual supply is 54, a huge gap. This is important because later educational attainment and qualifications do depend somewhat on this entry level qualification. This is the case for all types of employees. On the other hand, as stated for managers, the gaps sometime between job entry level experience that is desired and actually supplied is also somewhat wide, and most so for elementary occupations. For elementary

occupations the desired level of education is up to S.S.C or equivalent for 80% or so instances. The reason for this, as expressed by entrepreneurs at Key Informant Interviews, to preserve, deliver and even be associated with agro-food one needs to have some sort of knowledge about storing food in different types of temperature and reading the labels in English. For example, if a driver and delivery man does not have the knowledge the temperature of storage for different types of agro processed food he carries in the delivery van (for example milk needs to be stored within 2 to 4 degree Celsius, while frozen meat should always be kept in a freezer at -18 degrees Celsius or below), then quality of the products may fall or event rot during the process of delivery. Hence, some sort of basic science education background and reading in English knowledge is necessary even for the lower types of jobs in this sector.

Table 3.9: Comparison of Demand and Supply of Education and Experiences for Science Background at entry level

Occupation (At 1-Digit Level)	Average qualification level desired (Percentage)		Average qualification level currently held (Percentage)		Desired years of qualification (avg. class studied)	Actual year of qualification (avg. class studied)	Average experience desired at entry level (years)	Average actual experience at entry level (years)
	S.S.C	H.S.C	S.S.C	H.S.C				
Managers	73.24	70.14	53.62	72.14	15.54	14.84	8.09	6.57
Professionals	84.7	82.92	68.81	79.35	14.46	13.77	5.74	4.47
Technicians and associate professionals	80.34	81.03	63.83	76.52	13.39	12.49	4.31	3.9
Craft and related trades workers	88.24	84.85	48.89	74.07	12.04	10.05	4.85	2.73
Plant and machine operators & assemblers	76.85	72.64	58.14	69.89	11.9	11.65	3.6	3.47
Elementary occupations	81.4	79.41	25.88	82.61	9.44	7.75	3.46	1.23
Full Sample	78.89	76.54	57.27	75.03	14.05	13.31	6.15	4.84

Source: BIDS-Skill Survey 2020-2021

In Table 3.8 we see that the enterprises prefer graduates who have passed from Public Universities for Managers (48.11%), Professional (40.19 %) and Technicians and associate professionals (22.96 %), followed by Private and National Universities. The reluctance to hire graduates from Open University and agricultural universities is noticeable and need to be understood thoroughly.

In reality both graduates from public and private universities are dominating the current job field for managers, professionals and technicians' level. On the other hand, graduates from National University

are working in Plant and machine operators, and assemblers (43.7 percent) and Elementary occupations (33.3 percent).

Table 3.10: Actual and Preferred type of Higher Educational Institutions

Occupation (At 1-Digit Level)	Preferred Education Institute by Employees (% of responses)						Actual Education Institute of the employers (% of responses)					
	Public University	Private University	National University	Open University	Agricultural University	Others	Public University	Private University	National University	Open University	Agricultural University	Others
Managers	48.11	19.12	12.39	1.89	0.63	18	44.4	38.7	12	1.3	0.87	2.83
Professionals	40.19	26.37	17.04	1.93	0.96	14	35.4	37	17.9	3.57	0	6.17
Technicians and associate professionals	22.96	12.59	30.37	8.15	1.48	24	27.1	29.3	34.6	0	0	9.02
Craft and related trades workers	22.86	25.71	22.86	0	0	29	34.4	37.5	15.6	0	3.13	9.38
Plant and machine operators, and assemblers	11.71	18.02	31.53	11.7	0.9	26	16.5	9.71	43.7	5.83	2.91	21.36
Elementary occupations	9.3	9.3	34.88	18.6	4.65	23	19.1	7.14	33.3	16.67	2.38	21.43
Full Sample	36.9	20.07	18.99	4.23	0.99	19	35.7	33	20.4	2.78	0.83	7.24

Source: BIDS-Skill Survey 2020-2021

In the enterprises surveyed, job changes through hiring and leaving at during 2019 and 2020 had been rather on the low side (Table 3.11). In total in the 117 surveyed agro-food enterprises 5, 796 people were appointed in 2019 and 4,489 people were hired in 2020; also 2371 workers left jobs in 2019 and 2414 in 2020 (details in Table 2 of Appendix Section 1). Thus, on average, in the 117 enterprises 10.31 employees were hired in 2019 and 9.35 in 2020 and about 7.34 persons on average has left their jobs in 2019 and 7.18 persons left their jobs in 2020 from their designated post in the surveyed enterprises.

Hiring of new employees were lower in managerial, professional, technicians and associate professionals, and Plant and machine operators' posts in both these years. On average 2 to 7 employees were hired in these posts. On the other hand, for Plant and machine operators, and assemblers and Elementary occupations 12 to 33 people were hired in these posts. Also, not many employees left jobs in all the occupation categories except for elementary occupation where people

seemed to be more mobile between jobs. On average 17 to 18 people in elementary occupations left their jobs, while on average 2 to 6 people in other occupation categories did in 2019 and 2020.

Table 3.11: Employment Changes in the surveyed agro-processing enterprises
(average number per enterprise)

Occupation (At 1-Digit Level)	Workers appointed in the years		Workers left in the years	
	2019	2020	2019	2020
Managers	2.01	2.68	3.09	3.10
Professionals	2.94	2.93	3.04	3.05
Technicians and associate professionals	4.14	4.00	2.77	2.69
Craft and related trades workers	33.15	12.78	3.78	4.61
Plant and machine operators, and assemblers	5.95	7.29	6.11	6.91
Elementary occupations	28.35	27.14	17.64	17.97
Full Sample	10.31	9.35	7.34	7.18

Source: BIDS-Skill Survey 2020-2021

3.4 Critical Jobs that are Important for Production

In Table 3.12 we list the top four critical job titles listed by the enterprises that are crucial for the process of production for each product line. The column responses are number of times this job title was mentioned by the enterprises, hence it's not equal to 117.

Table 3.12: List of Critical Jobs according to the Product Lines of the Surveyed Enterprises

Product Line	List of TOP Critical Job Titles for production	Responses
1. Sugar Processing	Senior chemist	3
	Senior Engineer	4
	Skilled operator (Oven)	5
	Officers to maintain SOP (standard operating procedures)	7
	Day Labourers	3
2. Edible Oil	Officers to maintain SOP (standard operating procedures)	5
	Senior Engineer	5
	Shift in charge	5
	Skilled operator (Oven)	9
	Workers to Control Industrial Product and Quality Management	10
3. Starch	Senior Engineer	2
	Workers to Control Industrial Product and Quality Management	2
	Skilled operator (Oven)	2
	Trade retail	3
	Workers to maintain SOP (standard operating procedures)	3
4.Spices	Senior Engineer	3

Product Line	List of TOP Critical Job Titles for production	Responses
	Officers to maintain SOP (standard operating procedures)	5
	Workers to Control Industrial Product and Quality Management	5
	Senior quality control officer	5
	Skilled operator (Oven)	5
5.Milk and Dairy Products	Temporary seasonal worker	4
	Workers to Control Industrial Product and Quality Management	5
	Senior Engineer	8
	Skilled operator (Oven)	9
	Senior quality control officer	10
6.Automated Bakery	Service holders/ Office workers	7
	Workers to Control Industrial Product and Quality Management	9
	Senior quality control officer	11
	Skilled operator (Oven)	19
	Senior Engineer	21
7.Meat Processing	Workers to Control Industrial Product and Quality Management	2
	Senior Engineer	3
	Service holder	3
	Senior quality control officer	3
	Officers to maintain SOP (standard operating procedures)	5
8.Fruit Processing	Service holder/ Office Worker	4
	Officers to maintain SOP (standard operating procedures)	5
	Senior Engineer	8
	Senior quality control officer	10
	Skilled operator (Oven)	10
9.Industries Supporting Agro-Food Sector	Soft drink specialist	1
	Skilled operator (Oven)	1
	Officers to maintain SOP (standard operating procedures)	2
	Senior Engineer	2

Source: BIDS-Skill Survey 2020-2021[At 4 Digit Level of Occupation Code of BSCO 2019]

Among the 209 job titles that were mentioned in this survey, the above table describes the list of top four critical jobs that the enterprises think absolutely crucial for their production process. Senior Engineer, Senior quality control officer, Officers to maintain SOP (standard operating procedures), Skilled operator (Oven) and Workers to Control Industrial Product and Quality Management: these five job titles were mentioned more often than other titles as very important for the industrial production of the agro-processing sector in most of the product lines. This also indicates where much of the specific high-level experience and trainings as well as educational backgrounds might be needed.

3.5 Existing Skill Shortage: Reasons, Impact and Response

To find out the existing skill shortage across different occupation categories, we asked the enterprises to assess the skill proficiency of the currently employed workers for each job title from a scale of 1 to 10 for both male and female employees. We divided the scale in three categories scale number 1 to 3 indicates low proficiency, 4 to 6 indicates medium proficiency and 8 to 10 indicates high proficiency. The results are given in Table 3.13.

The table shows that for already employed workers in managerial position 75.5 percent of male managers are recorded as highly proficient, 27.9 percent medium proficient and only 3.4 percent low efficient. However, for female managers only 42.1 percent are recorded as highly proficient, around 41 percent as medium and 16.9 as low proficient. Overall, we can see that enterprises regard male employees more proficient than the female employees. Also, among the surveyed enterprises 52.2 % or the highest responses recorded their current male employees among high proficient group. It's been also observed that among the maximum responses in the highest proficiency category: Managing directors and chief executives (75.6%), Production managers in agriculture, forestry and fisheries (79.7%), Physical and earth science professionals (83.3 %) and Finance professionals (100 %) high proficient. Among medium proficiency level of male employees, we found Retail and Wholesale Trade Managers (100%), Life Science Professionals (72.2%), Sales, Marketing and Public Relation Professionals (75%) are medium proficient. In the surveyed agro-food processing industries average efficiency score is lower among the three occupation categories: 'Artistic, Cultural and Culinary Associate Professionals', 'Assemblers' and 'Agricultural, Forestry and Fishery Labourers'. Overall Plant, Machine Operators and Assemblers (58.5%), and Elementary Occupation (57.9%) belong to medium proficiency level. In total 51.2% male employee are highly proficient, where 28.7% female employee are highly proficient. Low proficiency level is higher among female (25.9%) than their male (11.2%) counterpart.

Table 3.13: Current Proficiency Level of the Employees as Stated by Enterprises

SL.	Occupation	Proficiency Level of the employees (Male) (%)			Proficiency Level of the employees (Female) (%)		
		Low proficiency (Score 1 to 3)	Medium Proficiency (Score 4 to 7)	High Proficiency (Score 8-10)	Low proficiency (Score 1 to 3)	Medium Proficiency (Score 4 to 7)	High Proficiency (Score 8-10)
	Managers	3.38	27.89	75.55	16.87	40.96	42.17
1	Managing directors and chief executives	3.38	27.89	75.55	N/A	N/A	N/A
2	Business services and administration managers	1.67	14.17	84.17	0.00	53.33	46.67
3	Sales, marketing and development managers	7.79	35.06	57.14	20.69	41.38	37.93
4	Production managers in agriculture, forestry and fisheries	1.29	18.97	79.74	15.00	30.00	55.00
5	Manufacturing, mining, construction, and distribution managers	9.52	57.14	33.33	14.29	57.14	28.57
6	Retail and Wholesale Trade Manager	0.00	100.00	0.00	N/A	N/A	N/A
7	Other services managers	30.77	30.77	38.46	33.33	33.33	33.33
	Professionals	8.18	41.69	50.13	23.31	45.11	31.58
8	Physical and earth science professionals	0.00	16.67	83.33	N/A	N/A	N/A
9	Life science professionals	1.85	72.22	25.93	25.00	0.00	75.00
10	Engineering professionals (excluding electro technology)	14.37	34.13	51.50	27.91	36.05	36.05
11	Electro technology engineers	7.69	15.38	76.92	50.00	50.00	0.00
12	Architects, planners, surveyors	0.00	50.00	50.00	0.00	100.00	0.00
13	Finance professionals	0.00	0.00	100.00	0.00	0.00	100.00
14	Administration professionals	4.50	46.85	48.65	16.67	60.00	23.33
15	Sales, marketing and public relations professionals	0.00	75.00	25.00	N/A	N/A	N/A
16	Database and network professionals	0.00	100.00	0.00	N/A	N/A	N/A
17	Social and Religious Professionals	0.00	100.00	0.00	N/A	N/A	N/A

SL.	Occupation	Proficiency Level of the employees (Male) (%)			Proficiency Level of the employees (Female) (%)		
		Low proficiency (Score 1 to 3)	Medium Proficiency (Score 4 to 7)	High Proficiency (Score 8-10)	Low proficiency (Score 1 to 3)	Medium Proficiency (Score 4 to 7)	High Proficiency (Score 8-10)
	Technicians and associate professionals	18.14	43.14	38.73	30.91	35.45	33.64
18	Physical and engineering science technicians	12.50	57.50	30.00	26.32	47.37	26.32
19	Mining, manufacturing and construction supervisors	21.62	43.24	35.14	32.00	36.00	32.00
20	Life science technicians and related associate professionals	26.14	38.64	35.23	33.33	31.75	34.92
21	Sales and purchasing agents and brokers	0.00	50.00	50.00	N/A	N/A	N/A
22	Administrative and specialized secretaries	0.00	19.23	80.77	0.00	0.00	100.00
23	Artistic, Cultural and Culinary Associate Professionals	33.33	33.33	33.33	N/A	N/A	N/A
24	Information and communications technology operations and user support technicians	0.00	100.00	0.00	N/A	N/A	N/A
	Craft and related trades workers	23.33	43.33	33.33	38.24	41.18	20.59
25	Painters, building structure cleaners and related trades workers	33.33	26.67	40.00	50.00	40.00	10.00
26	Electrical Equipment Installers and Repairers"	0.00	100.00	0.00	0.00	100.00	0.00
27	Food processing and related trades workers	27.78	50.00	22.22	50.00	12.50	37.50
	Plant and machine operators, and assemblers	19.50	58.49	22.01	25.51	53.06	21.43
28	Other craft and related workers	16.67	41.67	41.67	33.33	41.67	25.00
29	Food and related products machine operators	18.18	61.54	20.28	24.42	55.81	19.77
30	Assemblers	33.33	33.33	33.33	33.33	33.33	33.33
31	Locomotive engine drivers and related workers	25.00	25.00	50.00	N/A	N/A	N/A
	Elementary occupations	28.42	57.89	13.68	27.94	58.82	13.24

SL.	Occupation	Proficiency Level of the employees (Male) (%)			Proficiency Level of the employees (Female) (%)		
		Low proficiency (Score 1 to 3)	Medium Proficiency (Score 4 to 7)	High Proficiency (Score 8-10)	Low proficiency (Score 1 to 3)	Medium Proficiency (Score 4 to 7)	High Proficiency (Score 8-10)
32	Agricultural, forestry and fishery labourers	30.49	58.54	10.98	27.87	60.66	11.48
33	Manufacturing labourers	20.00	100.00	40.00	33.33	33.33	33.33
34	Food preparation assistants	0.00	75.00	25.00	0.00	100.00	0.00
35	Refuse workers	25.00	50.00	25.00	33.33	33.33	33.33
	Total	11.21	37.57	51.21	25.86	45.44	28.71

Source: BIDS-Skill Survey 2020-2021[At 3 Digit Level of Occupation Code of BSCO 2019]

Enterprises try to manage skill shortages through hiring new employees which may not always be easy but the situation varies by type of occupation as well as nature of skill demanded. Table 3.14 reports the time needed by enterprises to fill up the vacant positions across BSCO Code in 1-digit level in the Occupation categories and then divided in 3-digit level of job titles for the sample enterprises. Irrespective of occupational categories, overall, 54% of the enterprises state that it takes more than a week to less than a month to fill up the vacant positions. It takes more than a month to fill up the vacant positions for managers in about 12 % cases, while for professional it is just short of 11 percent. For most other categories, however, it takes in less than a week. These include Craft and related trades workers (39%), Elementary occupations (27%) and Technicians and associate professionals (25%). Overall, 16.2 % to 21.7 % of the vacant positions in the agro-processing are filled-up “immediately” and “less than a week”, respectively. This finding shows that vacant positions do not take usually long time to be filled up. However, Business services and administration managers (12.36%), Production managers in agriculture, forestry and fisheries (13.27%), Engineering professionals (15.24 %) and Painters, building structure cleaners and related trades workers (14.29 %); for these occupations more than a month time is required to fill up as stated by 12 to 15 percent of the respondent enterprises.

Table 3.14: Time needed to fill up current vacancies in agro-processing Sector

Occupation (in BSCO 3 digit)	Immediately (% of responses)	Less than a week (% of responses)	More than a week but less than a month (% of responses)	More than a month (% of responses)
Managers (in 1digit)	9.43	18.11	61.29	11.17
Managing directors and chief executives	3.85	0	84.62	11.54
Business services and administration managers	15.73	14.61	57.3	12.36
Sales, marketing and development managers	8.77	28.07	59.65	3.51
Production managers in agriculture, forestry and fisheries	6.64	16.59	63.51	13.27
Manufacturing, mining, construction, and distribution managers	6.25	50	37.5	6.25
Other services managers	60	20	20	0
Professionals (in 1digit)	14.33	19.45	55.63	10.58
Physical and earth science professionals	0	0	100	0
Life science professionals	7.69	25	59.62	7.69
Engineering professionals (excluding electro technology)	21.9	19.05	43.81	15.24
Electro technology engineers	8.33	0	91.67	0
Finance professionals	0	8.33	66.67	25
Administration professionals	14.29	23.47	54.08	8.16
Sales, marketing and public relations professionals	0	0	100	0
Database and network professionals	0	0	100	0
Technicians and associate professionals (in 1digit)	25.23	28.97	43.93	1.87
Physical and engineering science technicians	26.32	26.32	47.37	0
Mining, manufacturing and construction supervisors	43.75	18.75	37.5	0
Life science technicians and related associate professionals	32.61	41.3	21.74	4.35
Sales and purchasing agents and brokers	0	0	100	0
Administrative and specialized secretaries	0	20	80	0
Artistic, Cultural and Culinary Associate Professionals	0	0	100	0

Occupation (in BSCO 3 digit)	Immediately (% of responses)	Less than a week (% of responses)	More than a week but less than a month (% of responses)	More than a month (% of responses)
Information and communications technology operations and user support technicians	0	0	100	0
Craft and related trades workers (in 1digit)	38.89	19.44	38.89	2.78
Painters, building structure cleaners and related trades workers	14.29	14.29	57.14	14.29
Electrical Equipment Installers and Repairers	80	20	0	0
Food processing and related trades workers	33.33	44.44	22.22	0
Other craft and related workers	42.86	7.14	50	0
Plant and machine operators, and assemblers (in 1digit)	22.5	30	45	2.5
Food and related products machine operators	21.43	30.36	45.54	2.68
Assemblers	75	25	0	0
Locomotive engine drivers and related workers	0	25	75	0
Elementary occupations (in 1digit)	27.54	27.54	43.48	1.45
Agricultural, forestry and fishery labourers	31.15	26.23	42.62	0
Manufacturing labourers	0	50	50	0
Food preparation assistants	0	25	50	25
Refuse workers	0	50	50	0
Total	16.25	21.69	53.99	8.07

Source: BIDS-Skill Survey 2020-2021[At 3 Digit Level of Occupation Code of BSCO 2019]

Table 3.15 explores the extent of difficulties of the enterprises for each occupational category based on the physical labour involved to do the job. Fortunately, as table 3.13 suggests it does not take more than a month to hire more than fifty percent of the enterprises to fill up vacant positions for all occupations in agro-processing sector and that's why the enterprises reported on average 3 as the difficulty for hiring an employee (on a scale of 1-10 where 1= no difficulty and 10 =very difficult) in. Unfilled vacancies constitute roughly 3.58 % of total current employment in the agro-processing enterprises. It may imply that this sector is filled with low skilled and semi-skilled workers that are

available for hiring within a short period of time. Also, Table 3.15 tells us that elementary occupations need the highest extent of physical labor (8.30), followed by Plant and machine operators, and assemblers (7.54) and then Technicians and associate professionals (7.30). This indicates that employees directly related to production process of the agro-processing factories have higher physical labor involvement and this industry is still labor intensive in nature.

Table 3.15: Extent of Difficulties in Filing up the Vacancies

Occupation (At 1-Digit Level)	Avg. extent of physical labor involved (1 to 10)	Avg. difficulties in filling up the vacancies (1 to 10)	Present unfilled vacancies per enterprise
Managers	5.94	3.33	2.60
Professionals	5.93	3.86	3.55
Technicians and associate professionals	7.30	2.52	1.74
Craft and related trades workers	6.84	3.59	2.77
Plant and machine operators, and assemblers	7.54	2.72	3.03
Elementary occupations	8.30	3.20	6.88
Full Sample	6.44	3.33	3.58

Source: BIDS-Skill Survey 2020-2021

While apparently on an average, the difficulties faced by enterprises in filling up vacant positions may be at most of medium level on average as shown above, it may sometime be quite hard to fill up some of the critical vacant positions Table 3.16 illustrates the main three causes for hard-to-fill vacancies across all levels of occupations in the agro processing industry. The major three reasons for the current hard to fill vacancies are: “Lack of qualifications the company demands (57.7%)”, lack of work experience the company demands (54.8%) and low number of applicants generally (48.1 %)] Closer inspection reveals that primarily white-collar jobs such as managerial and professional positions, “lack of qualifications and experiences” is the key hurdle for not hiring. Interestingly, these are also the top two reasons for hard to fill vacancies for mainly blue-collar jobs like: “Craft and related trades workers”, “Plant and machine operators, and assemblers”, & “Elementary occupations”. Also, it’s been found that low number of applicants are the top reasons (75%) for the vacant positions in “Technicians and associate professionals” category. It indicates that in near future “Technicians and associate professionals” who are closely associated in managing the machines, in charge of packaging or quality control are of high demand and necessary skills regarding these aspects are missing in current job applicants.

Table 3.16: Major Reasons behind the Hard to Fill Vacancies

Occupation (At 1-Digit Level)	MAIN CAUSES BEHIND HARD-TO-FILL VACANCIES		
	Cause 1	Cause 2	Cause 3
Managers	Lack of work experience the company demands (51.06%)	Lack of qualifications the company demands (51.06%)	Low number of applicants with the required skills (48.94%)
Professionals	Lack of qualifications the company demands (60.98%)	Lack of work experience the company demands (56.10%)	Low number of applicants generally (51.22%)
Technicians and associate professionals	Low number of applicants generally (75.00%)	Lack of work experience the company demands (50.00%)	Lack of qualifications the company demands (50.00%)
Skilled agricultural, forestry and fishery workers	Lack of work experience the company demands (100.00%)	Poor career progression/lack of prospects (100.00%)	Low number of applicants with the required attitude, motivation or personality (100.00%)
Craft and related trades workers	Lack of work experience the company demands (100.00%)	Lack of qualifications the company demands (100.00%)	Low number of applicants with the required skills (100.00%)
Plant and machine operators, and assemblers	Lack of qualifications the company demands (100.00%)	Lack of work experience the company demands (75.00%)	Low number of applicants with the required attitude, motivation or personality (50.00%)
Elementary occupations	Lack of qualifications the company demands (66.67%)	Lack of work experience the company demands (50.00 %)	Not enough people interested in doing this type of Job (50.00%)
Full Sample	Lack of qualifications the company demands (57.69%)	Lack of work experience the company demands (54.81%)	Low number of applicants generally (48.08 %)

Source: BIDS-Skill Survey 2020-2021

Note: The percentage inside the table is based on multiple responses so they will not be equal to 100% in total.

The impact of not having the vacant positions filled is discussed in the following Table 3.17. The top three impact of hard to fill vacancies mentioned by the enterprises are: 1) Loose business or orders to competitors (National/International) (59.6%), 2), Delay in developing new products or services (56.7%), and 3) Have difficulties meeting quality standard (51.9%). It may be noted that for specific categories the impacts may be much higher. Take for example, categories skilled workers to elementary workers. Losing business is a very major concern because the shortage of these categories of people is likely to halt the whole production process.

Table 3.17: Major Impacts because of the Hard to fill Vacancies

Occupation (At 1-Digit Level)	Three Main Impacts of hard to fill vacancies		
	Impact 1	Impact 2	Impact 3
Managers	Delay developing new products or services (53.19%)	Have difficulties meeting quality standard (53.19%)	Loose business or orders to competitors (National/International) (53.19%)
Professionals	Loose business or orders to competitors (National/International) (60.98%)	Delay developing new products or services (53.66%)	Have difficulties meeting quality standard (51.22%)
Technicians and associate professionals	Have difficulties in introducing new working practice (75%)	Delay developing new products or services (50%)	Have difficulties meeting quality standard (25%)
Skilled agricultural, forestry and fishery workers	Have difficulties in introducing new working practice (100.00%)	Increase workload for other staff (100.00%)	No response
Craft and related trades workers	Have difficulties meeting quality standard (100.00 %)	Delay developing new products or services (100.00 %)	Loose business or orders to competitors (National/International) (100.00 %)
Plant and machine operators, and assemblers	Loose business or orders to competitors (National/International) (100.00 %)	Delay developing new products or services (75.00 %)	Have difficulties meeting quality standard (50.00%)
Elementary occupations	Loose business or orders to competitors (National/International) (100.00 %)	Have difficulties meeting quality standard (66.00%)	Delay developing new products or services (50.00%)
Full Sample	Loose business or orders to competitors (National/International) (59.62%)	Delay developing new products or services (56.73%)	Have difficulties meeting quality standard (51.92%)

Source: BIDS-Skill Survey 2020-2021

Note: The percentage inside the table is based on multiple responses so they will not be equal to 100% in total.

The actions that the enterprises indicated that they will take for reducing the impact of hard to fill vacancies are: 1) Increasing the training given to your existing workforce (57.7%), 2) Increasing salaries (54.8 %), and 3) Using new recruitment methods or channels (42.3%) (Table 3.18).

Table 3.18: Main Actions that will be taken to solve the Hard to fill Vacancies

Occupation (At 1-Digit Level)	Three Main Actions that will be taken to solve the problem of hard to fill vacancies		
	Action 1	Action 2	Action 3
Managers	Increasing salaries (59.57%)	Increasing the training given to your existing workforce (59.57%)	Using new recruitment methods or channels (40.43%)
Professionals	Increasing the training given to your existing workforce (56.10%)	Increasing salaries (51.22%)	Using new recruitment methods or channels (36.59%)
Technicians and associate professionals	Using new recruitment methods or channels (75.00%)	Increasing / expanding trainee programs (e.g., partnership with local or international (75.00%)	Redefining existing Jobs (50.00%)
Skilled agricultural, forestry and fishery workers	Increasing salaries (100.00%)	Increasing advertising/recruitment spend (100.00%)	No response
Craft and related trades workers	Redefining existing Jobs (100.00%)	Increasing advertising/recruitment spend (100.00%)	Offering training to less qualified recruits (100.00%)
Plant and machine operators, and assemblers	Using new recruitment methods or channels (75.00%)	Increasing salaries (50.00 %)	Increasing the training given to your existing workforce (50.00 %)
Elementary occupations	Increasing salaries (83.33%)	Increasing the training given to your existing workforce (83.33 %)	Using new recruitment methods or channels (66.67%)
Full Sample	Increasing the training given to your existing workforce (57.69%)	Increasing salaries (54.81 %)	Using new recruitment methods or channels (42.31%)

Source: BIDS-Skill Survey 2020-2021

3.6 Current Skill Gap: Reasons and Actions to Minimize the Gap

Up to the previous section, we discussed the overall situation of the vacancy situation across different categories of occupations and how it impacts the enterprises and what are the possible actions that enterprises are thinking to fill the gaps in hiring the currently vacant jobs. In this Current Skill Gap section, we will discuss in details what are the responses of the enterprises about the skill gap of the employees currently employed, the reasons behind this skill gap, whether proper trainings can minimize this skill gap and what sorts of trainings the enterprises are seeking for their employees.

Table 3.19 shows the responses of the enterprises regarding the currently employed persons under each job title. In section H.1 of the survey Questionnaire we asked the enterprises “Do you think that there is skill gap? Responses were YES=1, NO=2”. Based on their responses we explored further the yes responses. Interestingly 45.07 percent of the enterprises replied that the current employees have one or other kind of skill gap. On probing, they identified two major reasons for skill gap of the

currently employed persons. These are: 1) Lack of Knowledge on food safety, sanitation and food testing procedures (28.7%) and 2) Lack of Technical Skills in food handling and processing (16%). The job titles with highest responses of skill gap identified by the enterprises are: i) Physical and earth science professionals (88.9 %), ii) Sales, marketing and public relations professionals (87.5%), iii) Database and network professionals (100%), iv) Process Control Technician (100 %), v) Information and communications technology operations and user support technicians (100 %) and vi) Electrical Equipment Installers and Repairers (100 %) and vii) Refuse workers (100 %). The top five reasons behind these skill gap identified by the enterprises are: i) Lack of Technical Skills in food handling and processing, ii) Lack of proper skills of doing the Job from the educational degree, iii) Lack of competency in basic English Skills, iv) The Curriculum taught in educational institutions are backward and don't support the industry's current need and v) Lack of Knowledge in food safety, sanitation and food testing procedures. Although, some of these jobs are related with technology, electronics and sales and marketing but as the nature of the agro food processing industry is such that for different types of food products one needs to know the standard temperature, hygiene guidelines etc. to maintain the quality of the product not only in production stage, but also in packaging, preserving, storing and distribution in all these stages. As several interviewees mentioned that hygiene, temperature guidelines for milk industry wouldn't be same as the bakery industry. Hence, technicians, drivers and elementary workers need to have basic knowledge to handle different types of agro food products differently.

Table 3.19: Reasons for Current Skill Gap Identified by the Agro-processing Enterprises

Occupation (in BSCO 3 digit)	Enterprises Responses on current skill gap (%)	Reasons for skill gap (Top 2 reasons)	
		Reason 1	Reason 2
Business services and administration managers	18.48	Lack of proper skills of doing the JOB from the educational degree (28.6%)	Lack of proper skills of doing the JOB because of lack of specialized training (28.6%)
Sales, marketing and development managers	54.93	Lack of Knowledge in food safety, sanitation and food testing procedures (25.0%)	The Curriculum taught in educational institutions are backward and don't support the industry's current need (20.8%)
Production managers in agriculture, forestry and fisheries	21.03	Lack of proper skills of doing the Job because of lack of specialized training (42.0%)	Lack of Knowledge in food safety, sanitation and food testing procedures (16.0)
Manufacturing, mining, construction, and distribution managers	56.25	Lack of Knowledge in food safety, sanitation and food testing procedures (45.5%)	Lack of proper skills of doing the Job from the educational degree (36.4%)
Other services manager	80	Lack of Technical Skills in food handling and processing (40%)	The Curriculum taught in educational institutions are backward and don't support the industry's current need (60%)
Physical and earth science professionals	88.89	Lack of competency in basic English Skills (25%)	Lack of Knowledge in food safety, sanitation and food testing procedures (50%)
Life science professionals	43.64	Lack of Knowledge in food safety, sanitation and food testing procedures (25%)	Lack of Technical Skills in food handling and processing (19.4%)
Engineering professionals (excluding electro technology)	38.89	Lack of competency in basic English Skills (23.9%)	Lack of Knowledge in food safety, sanitation and food testing procedures (15.5%)
Electro technology engineers	42.86	Lack of proper skills of doing the Job from the educational degree (50%)	Lack of proper skills of doing the Job because of lack of specialized training (33.3%)
Finance professionals	33.33	Lack of competency in basic mathematics Skills (75%)	Lack of proper skills of doing the Job from the educational degree (25%)
Administration professionals	52.29	Lack of proper skills of doing the Job from the educational degree (19.2%)	Lack of proper skills of doing the Job because of lack of specialized training (23.3%)

Occupation (in BSCO 3 digit)	Enterprises Responses on current skill gap (%)	Reasons for skill gap (Top 2 reasons)	
		Reason 1	Reason 2
Sales, marketing and public relations professionals	87.5	Lack of competency in basic English Skills (50%)	The Curriculum taught in educational institutions are backward and don't support the industry's current need (33.3)
Database and network professionals	100	Lack of Knowledge in food safety, sanitation and food testing procedures (100%)	N/A
Physical and engineering science technicians	50	Lack of competency in basic English Skills (22.7%)	Lack of Knowledge in food safety, sanitation and food testing procedures (22.7%)
Mining, manufacturing and construction supervisors	57.89	Lack of Knowledge in food safety, sanitation and food testing procedures (33.3%)	Lack of competency in basic mathematics Skills (16.7%)
Process Control Technician	100	Lack of Technical Skills in food handling and processing (100%)	N/A
Life science technicians and related associate professionals	71.43	Lack of proper skills of doing the Job because of lack of specialized training (13.2%)	Lack of Technical Skills in food handling and processing (31.6%)
Administrative and specialized secretaries	28.57	Lack of proper skills of doing the Job from the educational degree (40%)	Lack of Knowledge in food safety, sanitation and food testing procedures (40%)
Artistic, Cultural and Culinary Associate Professionals	50	Lack of Knowledge in food safety, sanitation and food testing procedures (100%)	N/A
Information and communications technology operations and user support technicians	100	Lack of proper skills of doing the Job from the educational degree (100%)	N/A
Electrical Equipment Installers and Repairers	100	Lack of Technical Skills in food handling and processing (100%)	N/A
Food processing and related trades workers	80	Lack of competency in basic English Skills (26.7%)	Lack of Knowledge in food safety, sanitation and food testing procedures (53.3%)
Other craft and related workers	42.86	The Curriculum taught in educational institutions are backward and don't support the industry's current need (30%)	Lack of competency in basic mathematics Skills (20%)

Occupation (in BSCO 3 digit)	Enterprises Responses on current skill gap (%)	Reasons for skill gap (Top 2 reasons)	
		Reason 1	Reason 2
Food and related products machine operators	66.17	Lack of Technical Skills in food handling and processing (29.5%)	Lack of Knowledge in food safety, sanitation and food testing procedures (26.2%)
Assemblers	75	Lack of proper skills of doing the Job because of lack of specialized training (75%)	Lack of Knowledge in food safety, sanitation and food testing procedures (25%)
Locomotive engine drivers and related workers	66.67	Lack of Knowledge in food safety, sanitation and food testing procedures (75%)	Lack of Technical Skills in food handling and processing (25%)
Agricultural, forestry and fishery labourers	58.18	Lack of Knowledge in food safety, sanitation and food testing procedures (65.7%)	Lack of Technical Skills in food handling and processing (13.9%)
Manufacturing labourers	25	Lack of Knowledge in food safety, sanitation and food testing procedures (66.7%)	Lack of proper skills of doing the JOB because of lack of specialized training (33.3%)
Food preparation assistants	75	Lack of proper skills of doing the job because of lack of specialized training (50%)	Lack of Technical Skills in food handling and processing (50%)
Refuse workers	100	Lack of Technical Skills in food handling and processing (33.3%)	The Curriculum taught in educational institutions are backward and don't support the industry's current need (66.7%)
Total	45.07	Lack of Knowledge in food safety, sanitation and food testing procedures (28.7%)	Lack of Technical Skills in food handling and processing (16%)

Source: BIDS-Skill Survey 2020-2021[At 3 Digit Level of Occupation Code of BSCO 2019]

At the next step we asked the enterprises how would they like to address the identified and existing skill gaps and told them to mention three important actions they want to take for the five types of occupation category. The results are shown in Table 3.19.

From Table 3.18 it can be seen that the major three actions that the enterprise want to take to minimize the current skill gaps are: 1) Increase training activity / spend or increase / expand trainee programs, 2) Launching mentorship for new & low skilled staffs under efficient supervisors and 3) Using more supervision methods on workers. The enterprises responded to take actions differently for “Service and sales workers” as they mentioned more supervision on them rather than training. Also, for “Skilled agricultural, forestry and fishery workers” the most preferred action was

reallocation to work. It's understandable from the Key Informant Interviews that though there is a need for 'skills regarding food, hygiene, safety, quality assurance, food testing issues' yet it's not possible for the enterprises to provide proper training to their employees. Because out of 9,434 agro-food processing enterprises, only 78 are large and 163 medium industries (SMI, 2019, page 71). Most (97.5 %) enterprises of the agro-food industry are micro and small in nature who are unlikely to have capacity neither the resources to fund these trainings. In such a situation, it is best to spend resources for training for the really critical production process positions and reallocate those not so critical. In any case, in such a situation, the course wise training of SEIP in collaboration with Bangladesh Agro Processors Association (BAPA) and the large industries may come in handy for capacity building and skill spill over for the agro-food processing sector.

Table 3.20: Actions will be taken to minimize the Skill-gap

Occupation (At 1-Digit Level)	Actions that will be taken by enterprise to minimize the skill gap		
	1 st Action	2 nd Action	3 rd Action
Managers	Increase training activity / spend or increase / expand trainee programs	Increase recruitment activity in social media, advertisement etc.	Using more supervision methods on workers
Professionals	Increase training activity / spend or increase / expand trainee programs	Launching mentorship for new & low skilled staffs under efficient supervisors	Using more supervision methods on workers
Technicians and associate professionals	Increase training activity / spend or increase / expand trainee programs	Implementing strict performance reviews of the staffs on a regular basis	Launching mentorship for new & low skilled staffs under efficient supervisors
Service and sales workers	Using more supervision methods on workers	No responses	No responses
Skilled agricultural, forestry and fishery workers	Reallocating work	Sending the existing workers for training	No responses
Craft and related trades workers	Increase training activity / spend or increase / expand trainee programs	Reallocating work	Launching mentorship for new & low skilled staffs under efficient supervisors
Plant and machine operators, and assemblers	Increase training activity / spend or increase / expand trainee program	Reallocating work	Launching mentorship for new & low skilled staffs under efficient supervisors
Elementary occupations	Increase training activity / spend or increase / expand trainee programs	Using more supervision methods on workers	Sending the existing workers for training
Full Sample	Increase training activity / spend or increase / expand trainee programs	Launching mentorship for new & low skilled staffs under efficient supervisors	Using more supervision methods on workers

Source: BIDS-Skill Survey 2020-2021

3.7: Trainings need to address the skill gap of agro-food processing sector

Since, the enterprises emphasized that increasing training activities is the number one solution that they think can minimize the skill gap, we asked them about the Technical and Vocational Education and Training (TVET) programmes and training courses on agro-food processing sector under Skills for Employment Investment Program (SEIP). Their responses are arranged in the following tables:

Table 3.21: Trainings demanded by the enterprises to be included in TVET

1	Quality Control training in handling agro food products	10	Mechanical training
2	Biscuit processing and handling machine related to this sector	11	Training on innovation to develop new products
3	Food packing and packaging training	12	Training on finished product checking
4	Food processing, and handling with hygiene training	13	Fabrication and safety training
5	GMP, GHP related training	14	Product specialization training
6	HACCUP training	15	Production management and production strategy related training
7	Life skill training to increase productivity and career development in this sector	16	Training related to food microbiologist
8	Machine technical training	17	Training on Quality Control and Quality Assurance
9	Meat processing training	18	Research & development, food processing

Source: BIDS-Skill Survey 2020-2021

Table 3.21 lists the training needs mentioned by the enterprises. This list tells that the enterprises want to train their employees to act and handle machines safely in the factories, they are looking for skilled manpower with first-hand knowledge in production management, strategy development and innovation of agro-food products and finally they want to improve the food handling, hygiene and safety condition of the factories. Hence, trainings on Quality Assurance, Quality Control, GMP, GHP, HACCUP are on the priority list of enterprises. Also, they want trainings related to meat processing industry and handling the new machines for their employees. The top three training needs of each product lines is depicted at Table 3 in Annex 1.

Given the requirements for trainings, the enterprises were asked if they had been aware of the skill trainings programs provided by TVET and SEIP and whether they have sent or hired people who finished courses from these two trainings providers. Table 3.22 shows their answers. It is seen that most (85.5 %) of the surveyed enterprises know about trainings programs provided by TVET, while only 56.4 % know about the training courses provided by SEIP. However, the percentage of

enterprises who sent workers are not that high though similar for both TVET (37.6%) and SEIP (35.8%). It seems SEIP trainings have gained popularity among the enterprises as the trainings are provided by BAPA and the leading agro-food companies like PRAN, IFAD, MEGHNA, WELL FOOD etc. (listed in Table 3.21) provide trainings in this sector. Hence, 80.7 % enterprises expressed that they are willing to send their workers in future to undertake trainings under SEIP Training Curriculum. On the other hand, although 90.5 % of the enterprises expressed that they would prefer to hire people having TVET training in their companies, in practice, less than 20% of them have hired apprentices trained from TVET in their factories.

Table 3.22: Knowledge about existing trainings by the enterprises

Knowledge of the Surveyed Enterprises about TVET and SEIP training programmes in Bangladesh	TVET Training Programme (Number)	SEIP Training Courses
Percentage of Enterprises knowledge about training programmes	85.47% (100)	56.14% (64)
Percentage of Enterprises who sent workers for training to these centers	37.61% (44)	35.79% (34)

Currently under the SEIP- BAPA Project five types of training courses on Quality Control, Packing Technician, Food Processing, Baking Technology and Sales & Marketing are provided for three months with a duration of twenty hours of training per week. The trainees are also provided with a transportation allowance of 6000 BDT and meal allowance of 3000 BDT. Successful trainees are also promised jobs in the agro-food sector after assessment and based on their competence. In Table 3.23 the training centers under SEIP-BAPA project are listed. It shows that by providing trainings with trainers from the leading agro-food industries to young workforce who passed class 8 and within the age range of 18 to 35 years, SEIP is creating a linkage between the employees and the employers.

Table 3.23: Training Centers for SEIP

SL.	Name of the Training Centers	Location
1	PRAN Agricultural Marketing Co. Ltd. (AMCL) Training Center	Narsingdi
2	PRAN Habiganj Agro Ltd. (HAL) Training Center	Habiganj
3	PRAN Agro Ltd. (PAL) Training Center	Natore
4	PRAN Industrial Park -1 (PIP-1) Training Centre	Narsingdi
5	PRAN Industrial Park -2 (PIP-2) Training Centre	Narsingdi
6	Banaful and Kishwan Training Center	Natore
7	Lalmai Food Products Training Center	Comilla
8	Eurasia Foods Processing Training Center	Savar, Dhaka
9	Deshbandhu Training Center	Narsingdi
10	IFAD- Multi Products Training Center	Savar, Dhaka
11	Rani Food Industries Training Center	Gazipur
12	Sajeeb Training Center by Hashem Foods Ltd.	Narayanganj
13	Meghna Food and Beverage Training Center	Narayanganj
14	Prince and Paradise Food Products Training Center	Savar, Dhaka
15	Well Food and Beverage Co. Ltd.	Gazipur

Source: SEIP 2022(<https://seip-fd.gov.bd>)

PRAN, Kishwan, IFAD, Sajeeb, Meghna Food, Prince and Well food etc. are all large agro food producing enterprises which are involved in these training programmes facilitated by SEIP.

Table 3.24 depicts the training outcome provided by SEIP in the last three phases known as TRANCHE.SEIP. The training programme began in the second phase or TRANCHE-2 with four courses, which expanded to five courses in TRANCHE-3. Since then a total of 18, 506 youths have been enrolled in the programme and 16, 912 completed (91.4% completion rate) the course successfully with certification. Also, out of those graduates 16, 891 or practically all have been offered job placement in different agro-food processing factories.

However, it should be reiterated that the agro food processing industry is a diverse sector and in these survey we collected nine different product lines (Edible Oil, Automated Bakery, Starch, Spices, Dairy Products etc.), out of which these trainings target more specifically ‘Automated bakery industry’, since it is a thriving and fast growing production activity. Hence, targeting the training needs of other product lines and creating similar linkages of the factories with the unemployed and interested youths would contribute to expanding the output and quality of other product lines under API.

Table 3.24: Course Wise Training Summary of SEIP in three phases

TRANCHE-2

SL.	Course Name	Target	Enrollment		Assessment			Certification	Job Placement	Percentage (JP Window End) (%)
			Total	Female	Total	Absent	Dropout		Total	
1	Quality Control	1,726	1,726	787	1,666	19	41	1,666	1,664	99.88
2	Packing Technician	3,894	3,894	2,011	3,778	18	68	3,769	3,764	99.87
3	Food Processing	3,480	3,480	1,696	3,341	24	115	3,341	3,339	99.94
4	Baking Technology	1,900	1,900	893	1,869	14	41	1,869	1,863	99.68
5	Total	11,000	11,000	5,387	10,654	75	265	10,645	10,630	99.86

ADDITIONAL TRANCHE-2

SL.	Course Name	Target	Enrollment		Assessment			Certification	Job Placement	Percentage (JP Window End) (%)
			Total	Of Which Female	Total	Absent	Dropout		Total	
1	Baking Technology	600	600	258	531	-	69	531	531	100.00
2	Food Processing Technology	500	501	208	472	-	29	472	472	100.00
3	Packing Technology	600	605	2(in 1digit)97	570	-	35	570	570	100.00
4	Quality Control	300	300	133	290	1	9	290	290	100.00
5	Total	2,000	2,006	896	1,863	1	142	1,863	1,863	100.00

TRANCHE -3

SL.	Course Name	Target	Enrollment		Assessment			Certification	Job Placement	
			Total	Of Which Female	Total	Absent	Dropout		Total	Percentage (JP Window End) (%)
1	Quality Control	1,500	825	305	712	3	35	712	712	100.00
2	Packing Technician	3,850	1,525	691	1,239	2	34	1,239	1,239	100.00
3	Food Processing	4,800	1,800	801	1,428	14	59	1,428	1,423	100.00
4	Baking Technology	3,850	1,350	469	1,025	12	64	1,025	1,024	100.00
5	Sales & Marketing	2,000	-	-	-	-	-	-	-	-
6	Total	16,000	5,500	2,266	4,404	31	192	4,404	4,398	100.00

Source: SEIP 2022(<https://seip-fd.gov.bd>)

Interestingly, although enterprises mention that the number one action to minimize the current skill gap is increased training, yet they think that it can only partially minimize the skill gap. Overall, 58.5% enterprises think that training can partially solve the skill gap and 37.6 % think it can fully solve the problem (Table 3.25). Note that the “partial” issue arises most for higher level employees such as managers and professionals but goes down substantially for other groups. One wonders what makes a majority of enterprises choose the response that trainings may be only a partial solution to the existing skill gap among employees.

Table 3.25: Extent of Skill Gap that can be minimized by Trainings (% of responses)

Occupation categories	Fully	Partially	Not at all
Managers	19.43	74.49	6.07
Professionals	29.37	67.29	3.35
Technicians and associate professionals	41.28	55.05	3.67
Craft and related trades workers	48.57	42.86	8.57
Plant and machine operators, and assemblers	53.03	44.7	2.27
Elementary occupations	70.59	28.57	0.84
Full Sample	37.65	58.51	3.84

Source: BIDS-Skill Survey 2020-2021

Key Informant Interviews shed some light on the issue when the top officials of the enterprises mentioned that they are reluctant to have their employees sent for more trainings because they fear that the trained employee may leave the job for a better paying position to another company after learning the skill. Since, providing trainings in technology and machine learning requires skilled instructors and sometimes foreign training, not many enterprises are willing to spend that amount of money on employees without the guarantee of how long they are going to serve them. So, proper training from the employers can't be achieved and since trainings are costly employees are also reluctant to spend on trainings on self-finance, until they get the assurance from their companies that they will pay those employees better who have certain trainings. Hence, there is a gap of “signaling” the training need and the “willingness to pay” for the training from both the employers and employees' side. The Government can work as a mediator in this case to design appropriate training strategies and costs, that would help in creating skilled and efficient agro-processing work force while ensuring certain protection of the interests of both enterprises as well as employees.

3.8: Trainings arranged by the leading Agro-food Processing Enterprise:

In this section a list of current trainings provided by the four leading Agro-food processing enterprises are compiled. Analyzing the current trainings provided by these leading companies; it's clear that they are targeting food safety, hygiene and maintaining international standard for the type of agro-food products they are producing. Therefore, trainings are arranged primarily for division and activities related to quality control, quality and production management, quality assurance and research & development related workers.

Table 3.26: Current Trainings Arranged by the Leading Agro food enterprises

Name of the Enterprise	Occupation/Activities	Training Name	Duration of the Training	Training Instructor	Name of the Training Institutions
PRAN Agro Limited	Research and Development	British Retail Consortium (BRC) Certificate	4 weeks	Dr. Maruf Ahmed	H Dickinson, UK
	Production management development	International Standard Organization (ISO) Certificate	4 weeks	Mr. Imrul (CEO-BD)	Alcumus, German (Integrity, Technology , Quality , Safety)
	Quality Control Manager/Officer	Food Safety and Preventive Control Alliances (FSPCA) Certificate	3 weeks	Dr. Maruf FDA , Illinois institute of technology for food safety and health	Director Quality Assurance, PRAN , Accredited trainer of FSPCA
		Food Safety Management system (FSMS)	4 weeks	Dr. Nozir Ahmed	Bangladesh Standards & Testing Institution (BSTI) , Bangladesh
		Permissible limit of food products (HALAL Certification)	2 weeks	Malaysia International Halal Showcase (MIHAS)	Islamic Foundation Bangladesh

Name of the Enterprise	Occupation/Activities	Training Name	Duration of the Training	Training Instructor	Name of the Training Institutions
		American national slandered institute Certificate (ANSI)	4 weeks	ANSI Institute, USA	Uncertainty for lab management, technical staff
	Workers to Control Industrial Product and Quality Management	Occupational Health and Safety Assessment (OHSAS) 18001	6 weeks	Dr. Robert, International Standard organization (ISO) , Geneva, Switzerland	British Standard Institution (BSI) Group, UK
	Quality Assurance Officer	Food and Drug Administration Certificate (FDA)	4 weeks	Mr. Robert M. Califf	Director General FDA Office, USA
Ispahani Foods Limited	Quality Control Officer /Officers to maintain standard operating procedures (SOP)	Hazard Analysis Critical Control Point (HACCP) Certificate	7 days	Mr. Imrul Hasan	Alcumus, Germany
	Quality Management and Quality Assurance Officers	International Organization for Standardization (ISO) 9000 Certificate	3 days	Dr. Robert	International Standard organization (ISO), Geneva, Switzerland
		Food Safety Management system (FSMS)	4 weeks	Dr. Nozir Ahmed	Bangladesh Standards & Testing Institution (BSTI), Bangladesh
		Food and Drug Administration Certificate (FDA)	3 days	Mr. Robert M. Califf	Director General FDA Office, USA
	Quality Control and Research &	Hazard Analysis Critical Control Point (HACCP)	2 weeks	External Resources	Alcumus, German

Name of the Enterprise	Occupation/Activities	Training Name	Duration of the Training	Training Instructor	Name of the Training Institutions
Square Food & Beverage Limited (SFBL)	Development Departments				(Integrity, Technology, Quality, Safety)
	Quality control Department	Food Safety Management system (FSMS)	1 week	Local Team: Mr. Arif	Bangladesh Standards & Testing Institution (BSTI), Bangladesh
		ISO 9001 certification	3 weeks	Dr. Nozir	Bangladesh Standards & Testing Institution (BSTI), Bangladesh
		Food and Drug Administration (FDA) ⁹ Certificate	3 days	Mr. Robert M. Califf	Director General, FDA Office, USA
		Asian Productivity Institute (API) Certificate: Training on productivity outcome through agro based field post harvesting activities	2 weeks	Directorate of Ministry of Industry Productivity cell	Ministry of industry
		Good Hygiene Practices Certification (GHP)	4weeks	Kingcert International Certification LTD	Region Triaditsa, G.K. "Manastirski Livadi" 12A, Office 1. Sofia Bulgaria

⁹ **Food and Drug Administration** is responsible for protecting the public health by ensuring the safety, efficacy, and security of human and veterinary drugs, biological products, and medical devices; and by ensuring the safety of our nation's food supply, cosmetics, and products that emit radiation

Name of the Enterprise	Occupation/Activities	Training Name	Duration of the Training	Training Instructor	Name of the Training Institutions
Well-Food Limited	Quality Control Office	Hazard Analysis Critical Control Point (HACCP) Certificate	2 weeks	External Resources	Alcumus, Germany (Integrity, Technology, Quality, Safety)
		Food Safety Management system (FSMS)	4 weeks	Local Team: Mr. Arif	Bangladesh Standards & Testing Institution (BSTI), Bangladesh
		British Standard Certificate	2 weeks	External Resources	British Standard Institution (BSI) Group, UK
		ISO 9001 certification	3 weeks	Dr. Nozir	Bangladesh Standards & Testing Institution (BSTI), Bangladesh.
		HALAL Certification	2 weeks	Malaysia International Halal Showcase (MIHAS)	Islamic Foundation Bangladesh

Table 3.26 also shows that trainings are provided by both national and international instructors and agencies working for standardization and quality assurance. Sometimes the international organizations work with Bangladeshi organization to provide trainings; for example, Malaysia International Halal Showcase (MIHAS) work with Islamic Foundation Bangladesh in arranging trainings on HALAL Certification and Directorate of Ministry of Industry Productivity cell, work with Asian Productivity Institute (API) in arranging training on productivity outcome through agro based field post harvesting activities. Accordingly, the certificates under these trainings are: i) ISO 9001 Certificate and British Standard Certificate, ii) British Retail Consortium (BRC) Certificate, iii) American National Slandered Institute Certificate (ANSI), iv) Food Safety and Preventive Control Alliances (FSPCA) Certificate, v) Occupational Health and Safety Assessment (OHSAS)

18001Certificate, vi) Food and Drug Administration (FDA) Certificate, vii) Hazard Analysis Critical Control Point (HACCP) Certificate and certificates related Good Hygiene Practices (GHP), Food Safety Management system (FSMS) and HALAL Certification.

3.9: Extent of Automation, Labor Demand 3.9: Extent of Automation, Labor Demand in the Next 10 Years

Given all these issues of skill shortages and the various related problems, how do the enterprises visualize the future in terms of expansion of their activities, output and demand for labour? Will they try to automate to resolve the labour problem? We asked the enterprises about their expansion plan for their units in the next ten years and on that process how shall they embrace or utilise the automation or artificial intelligence in the production process that are going to be increasingly the norm in future. The digitization in terms of quality control, temperature measurement and automation in packaging will start dominating the agro food industries for perishable items like meat and fruit processing industry and dairy products. The majority enterprises in this API for now are dominated by automated bakery items, spices, fruit processing, edible oil etc. Some of these may be easily automated while others may not be so.

Almost 70 percent of the surveyed enterprises want to expand their business in the next 10 years, but quite interestingly, only about 13% want to continue doing what they are doing now. More than two-thirds or 68% of them want to concentrate on producing better quality output. While nearly 20% want to diversify into other products. Since, majority of the enterprises are focused on producing similar type of output with better quality, the extent of automation will mainly happen in large and medium industries who will probably try to expand their export share in foreign countries.

Table 3.27: Expansion Plan of the Agro-processing Enterprises

SL. no	Expansion Plan	Responses (percentage)
1	Percentage of Enterprises that wants to expand their business in the next 5 to 10 years (%)	70.94
2	Producing more output of similar type (%)	12.87
3	Producing better quality output (%)	68.32
4	Producing different types of output (%)	18.81

In this table (Table 3.27 we asked the enterprises about what jobs they think will be automated (in a scale of 1 to 10 (1= No automation, 10 =Fully automated). On average the extent of automation will be around 6, means that automation will be there but not to large extent but note that much of the automation will be in routine and physical nature of jobs of elementary workers which is not surprising. On the other hand, skilled agriculture, forestry and fishery workers who work in fields, ponds, rivers the extent of automation is lowest for their cases as such works have to be of necessity while manual is not exactly routine. In any case, all these This means people with low skill and low education qualification may lose their jobs to machines. Remarkably, the enterprises respond that ‘Professionals; especially administrative level professionals may have the highest scale of displacement (6.06) rather than people working in elementary occupations (5.67), may be because digitization of food processing software, using computers to monitor and supervise quality may need more technically skilled professionals, but adopting these new technologies also mean hiring few professionals to do these tasks. As automation and digitization will be somewhat at medium level, it is likely that over the next 10 years such changes may take place even in some of the small enterprises but it is also likely that such transformation will be confined mainly to a few leading groups of industries.¹⁰

Table 3.28: Jobs that will be Subject to Automation in the Next 5 to 10 Years

Occupation Name (at 1-digit Level)	Avg. extent of automation (scale of 1 to 10)	Avg. extent of job displacement (scale of 1 to 10)
Managers	6.00	5.29
Professionals	6.31	6.06
Technicians and associate professionals	6.28	4.92
Skilled agricultural, forestry and fishery workers	5.47	4.88
Craft and related trades workers	6.78	4.89
Plant and machine operators, and assemblers	6.38	5.67

¹⁰ Digitization means converting information from an analog format to a digital format, for example, making a digital version of paper-based inspections and saving them to an online database where real-time reports are generated. Digitalization is the process of adopting digital technology like end-to-end food processing software to enhance existing work processes, for instance, creating dashboards that display real-time KPIs on a processing line’s performance.

Digital transformation involves more profound and widespread changes to how a business uses digital technology. It’s about understanding and implementing the true potential of digitalization to not only improve existing processes, but to transform how you do business. Source: MAREL 2022 ;<https://marel.com/en/news/digitalization-essential-food-processing?>

Occupation Name (at 1-digit Level)	Avg. extent of automation (scale of 1 to 10)	Avg. extent of job displacement (scale of 1 to 10)
Elementary occupations	7.6	5.67
Full Sample	6.29	5.32

Source: BIDS-Skill Survey 2020-2021

Table 3.29 indicates the resultant demand for jobs consequent to the various transformations that may take place in the API in 3-digit level of job titles for 2023, 2025 and 2035. From the table it is observed that in the surveyed factories in the upcoming ten years, categories of production managers in agriculture, forestry and fisheries, engineering professionals (excluding electro-technology), administration professionals, manufacturing and construction supervisors, food and related products machine operators and agricultural, forestry and fishery labourers will have more demand compared to other jobs.

Table 3.29: Labor Demand Projection up to the year 2035 in the surveyed Enterprises

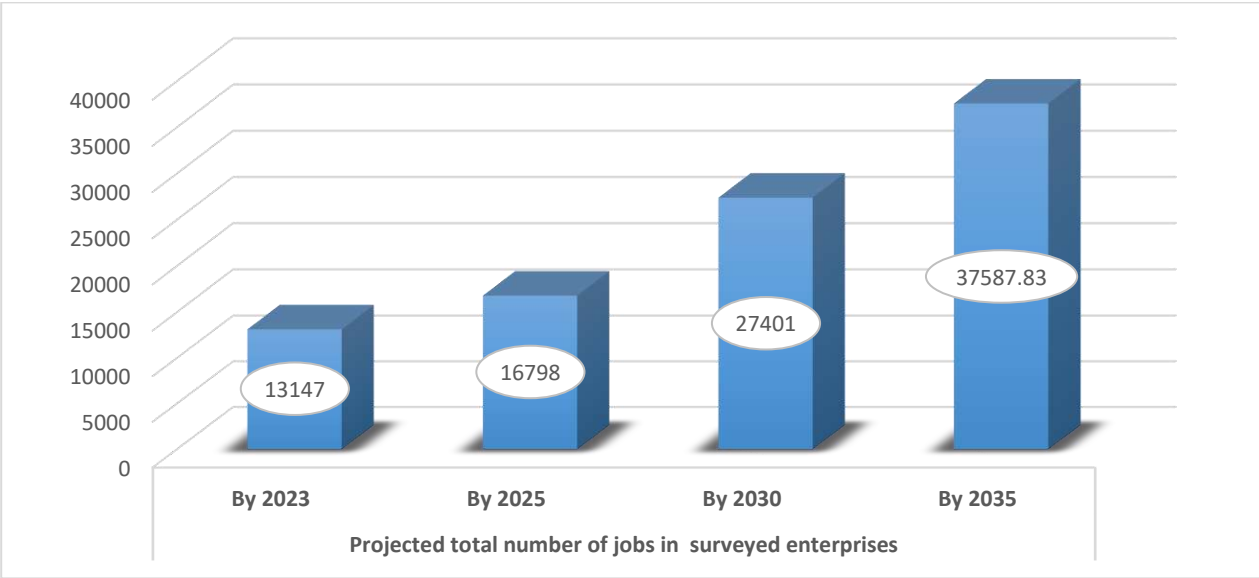
SL.	Occupation	Projected total number of jobs in each occupation for surveyed enterprises			
		By 2023	By 2025	By 2030	By 2035
1	Managing directors and chief executives	70	107	157	219
2	Business services and administration managers	303	400	512	661
3	Sales, marketing and development managers	373	503	790	1088
4	Production managers in agriculture, forestry and fisheries	838	1276	1771	2435
5	Manufacturing, mining, construction, and distribution managers	136	213	336	479
6	Retail and Whole	6	7	6	6
7	Other services manager	18	143	283	472
8	Physical and earth science professionals	2	6	8	12
9	Life science professionals	170	231	319	425
10	Engineering professionals (excluding electro technology)	458	652	1041	1457
11	Electro technology engineers	50	44	58	64
12	Finance professionals	31	40	49	62
13	Administration professionals	376	542	1093	1606
14	Sales, marketing and public relations professionals	55	88	135	192
15	Software and application	4	7	10	14
16	Creative and Performing Artists	4	16	30	49
17	Physical and engineering science technicians	81	166	254	377

SL.	Occupation	Projected total number of jobs in each occupation for surveyed enterprises			
		By 2023	By 2025	By 2030	By 2035
18	Mining, manufacturing and construction supervisors	1623	2244	3763	5291
19	Life science technicians and related associate professionals	279	541	991	1499
20	Administrative and specialized secretaries	98	137	180	238
21	Artistic, Cultural and Culinary Associate Professionals	23	26	29	33
22	Information and communications technology operations and user support technicians	44	68	92	126
23	Painters, building structure cleaners and related trades workers	26	73	175	281
24	Electrical Equipment Installers and Repairers"	58	100	137	193
25	Food processing and related trades workers	63	70	78	89
26	Other craft and related workers	60	108	180	266
27	Food and related products machine operators	873	1130	1805	2471
28	Assemblers	24	100	200	325
29	Locomotive engine drivers and related workers	628	637	670	700
30	Agricultural, forestry and fishery labourers	6106	6672	10875	14292
31	Manufacturing labourers	203	305	607	896
32	Food preparation assistants	15	21	33	46
33	Refuse workers	49	125	734	1225
	Total	13147	16798	27401	37588

Source: BIDS-Skill Survey 2020-2021[At 3 Digit Level of Occupation Code of BSCO 2019]

Figure 3.1 shows that the new number of jobs that will be demanded by the surveyed 117 enterprises by the year 2023, 2025, 2030 and a forecast for 2035. The current total employment is 41, 546 persons in the enterprise but by 2035 an additional 37, 587 new jobs will be created in these enterprises. The details of projected number of jobs in 3-digit level of occupation list of BSCO 2019 code are given at Table 4 in Annex 1.

Figure 3.1: Labor Demand Projection for the next 15 years



Source: Author’s calculation based on BIDS-Skill Survey 2020-2021

We also asked the enterprises about their perception of job growth for the occupations as the whole agro processing industry. Table 3.30 shows the perception of the most of the enterprises (76.42%) are that occupations in this sector will grow at a moderate rate, except that there may be a high demand for professionals in new future. This perception matched with the demand projection forecasted in figure 3, where 37,587 number of jobs are predicted to be created in the next 12 years.

Table 3.30: Growth of the Occupation in Next 5 to 10 Years

Occupation (in BSCO 3 digit)	Degree of occupation growth (Perception in %)			
	1 = No growth (as usual)	2 = Moderate growth	3 = High growth	4 = Very high growth
Managing directors and chief executives	0	63.64	36.36	0
Business services and administration managers	0	100	0	0
Sales, marketing and development managers	7.14	92.86	0	0
Production managers in agriculture, forestry and fisheries	20.83	66.67	12.5	0
Manufacturing, mining, construction, and distribution managers	100	0	0	0
Life science professionals	23.53	70.59	5.88	0
Engineering professionals (excluding electro technology)	5.88	82.35	8.82	2.94
Finance professionals	0	85.71	14.29	0
Administration professionals	12.82	84.62	2.56	0
Software and application professionals	28.57	71.43	0	0
Database and network professionals	0	33.33	66.67	0
Physical and engineering science technicians	0	100	0	0
Process Control Technicians	0	100	0	0
Life science technicians and related associate professionals	0	0	100	0
Administrative and specialized secretaries	0	100	0	0
Other craft and related workers	62.5	25	12.5	0
Food and related products machine operators	0	88.24	11.76	0
Agricultural, forestry and fishery labourers	0	100	0	0
Total	14.23	76.42	8.94	0.41

Source: BIDS-Skill Survey 2020-2021[At 3 Digit Level of Occupation Code of BSCO 2019]

Chapter 4: Findings from the Employee Survey

So far, the information that has been analyzed about the existing skill gap was collected from enterprises. As skill and training related issues also involve the employees who receive them, it's also important to know their perspective on this issue. This will help in understanding the challenges the workers face in acquiring skill and training. For collecting such information, we picked two employees from each occupation/task in an enterprise in consultation with the manager in such a way that one is the skilled one and the other is the unskilled one in manager's view.

From the 117 factories in the sample, a total of 547 employees were surveyed. The employees were asked for information regarding their current occupation and occupation history, academic performance, any vocational training received, need for training, job progression at the current enterprise, self-assessed skill & skill demand, extent of formality, employee's job satisfaction, health status, impact of covid-19 and coping mechanism etc.

4.1 Salient Socio-economic Characteristics of Employees

Table 4.1 summarizes the salient characteristics of the respondents (employees) of API. The table indicates that on an average the workers are around 30. Most of them (85%) were male and the rest female employees. The average monthly income of the sampled workers was 15776 Tk. While their household income was somewhat more at 17278 Tk. per month. This means that on average the employees are mostly the main breadwinner in the family. In both cases, of course there is some variation across employee occupation groups but by not much.

Table 4.1: Salient Socio-economic Characteristics

Occupation (at 1-digit level)	Age (Average)	Sex		Monthly Personal Income (Tk.)	Monthly Household Income (Tk.)
		Male	Female		
Managers	31.15	88.5	11.5	22267	25273
Professionals	32.64	91.04	8.96	21483	22267
Technicians and associate professionals	27.63	81.36	18.64	15355	16077
Service and sales workers	44.50	100	0	13750	13750
Skilled agricultural, forestry and fishery workers	27.50	80.49	19.51	8570	9736
Craft and related trades workers	28.30	75	25	13734	15060
Plant and machine operators, and assemblers	29.26	95.87	4.13	13394	15319
Elementary occupations	24.84	68.42	31.58	13853	13950
Total	29.38	85.74	14.26	15776	17378

Source: BIDS-Skill Survey 2020-2021

4.2 Education

Table 4.2 provides distribution of the respondents/employees by educational level. With regard to distribution of the respondents by educational level, it is seen that more than ten percent of respondents passed primary level, about 16% passed JSC (up to class 8), level, 16.6 % passed SSC, 22.5 % passed HSC and 13.8 % obtained diploma certificate. Bachelor and Master's degree holders comprise roughly 12 and 10 percent. Thus, by education level, the employees are somewhat evenly distributed. As expected, highest percentages of people passed masters level are among Managers and Professionals (Table 4.2). Almost fifty percent Service and sales workers have Diploma degree, which is a good sign of employing people with basic skill. Average years of schooling is more than ten years for all such services occupations.

Table 4.2: Distribution of the Respondents by Educational Level

Occupation (at 1-digit level)	Average years of Schooling	PSC	JSC	SSC	HSC	Diploma	Honors	Masters
Managers	12.29	1.9	3.81	11.43	27.62	19.05	13.33	22.86
Professionals	13.01	1.54	6.15	9.23	4.62	24.62	26.15	27.69
Technicians and associate professionals	11.25	5.56	11.11	7.41	42.59	16.67	11.11	5.56
Service and sales workers	12.00	0	0	50	0	50	0	0
Skilled agricultural, forestry and fishery workers	8.71	19.67	26.23	18.03	27.87	3.28	3.28	1.64
Craft and related trades workers	9.50	11.29	24.19	16.13	6.45	16.13	20.97	4.84
Plant and machine operators, and assemblers	10.05	11.01	22.94	30.28	25.69	6.42	3.67	0
Elementary occupations	7.21	41.67	33.33	8.33	16.67	0	0	0
Total	10.62	8.94	15.74	16.6	22.55	13.83	11.91	10.43

Source: BIDS-Skill Survey 2020-2021

4.3 Training

Respondents were asked whether they attended vocational training or not. Training related other important information has also been collected. Only 17.6 % of sample respondents received any kind of vocational training and the rest, a huge majority of 82.4 % did not any such training (Table 4.3). But there is a wide variation among job categories. All electric engineers in the sample received some vocational training. Others with somewhat high percentage of positive responses included mainly those with different kinds of managerial functions. The over-all low percentage of positive response means many did not receive any vocational training. However, one group which did not receive such training is critical which is Process Control Technicians. Trainings were arranged by SEP and also by employers. Among SEIP trainees, one may mention occupation Life science professionals (20%), Business services and administration managers (18.8%) and Food and related products machine operators (15.8 %). Employers arranged training mainly for marketing related people for retail and wholesale marketing indicating that after production services seem more important to employers.

Table 4.3: Vocational Training

Occupation (BSCO 3-digit level)	Ever attended vocational Training		Vocational Training by SEIP		Vocational Training arranged by employers	
	Yes	No	Yes	No	Yes	No
Managing directors and chief executives	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Business services and administration managers	43.8%	56.3%	18.8%	81.3%	31.3%	68.8%
Sales, marketing and development managers	15.7%	84.3%	13.0%	87.0%	20.0%	80.0%
Production managers in agriculture forestry and fisheries	26.7%	73.3%	0.0%	100.0%	26.7%	73.3%
Manufacturing, mining, construction, and distribution managers	33.3%	66.7%	16.7%	83.3%	16.7%	83.3%
Information and Communications Technology Service Managers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Professional Services Managers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Retail and Wholesale Trade Manager	50.0%	50.0%	16.7%	83.3%	66.7%	33.3%
Other services managers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Physical and earth science professionals	18.2%	81.8%	0.0%	100.0%	18.2%	81.8%
Life science professionals	20.0%	80.0%	20.0%	80.0%	20.0%	80.0%
Engineering professionals (excluding electro technology)	29.2%	70.8%	8.3%	91.7%	45.8%	54.2%
Electro technology engineers	100.0%	0.0%	0.0%	100.0%	0.0%	100.0%
Architects, planners, surveyors and designers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Medical Doctors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Finance professionals	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Administration professionals	17.6%	82.4%	5.9%	94.1%	23.5%	76.5%
Sales, marketing and public relations professionals	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Software and applications developers and analysts	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Database and network professionals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Social and Religious Professionals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Creative and Performing Artists	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Physical and engineering science technicians	9.5%	90.5%	5.0%	95.0%	10.0%	90.0%
Mining, manufacturing and construction supervisors	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Process Control Technicians	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Life science technicians and related associate professionals	5.3%	94.7%	0.0%	100.0%	5.3%	94.7%
Other Health Associate Professionals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sales and purchasing agents and brokers	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Administrative and specialized secretaries	0.0%	100.0%	5.9%	94.1%	5.9%	94.1%
Artistic, Cultural and Culinary Associate Professionals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Information and communications technology operations and user support technicians	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Street and Market Salespersons	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Protective Services Workers	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Market Gardeners and Crop Growers	8.6%	91.4%	4.9%	95.1%	7.4%	92.6%

Occupation (BSCO 3-digit level)	Ever attended vocational Training		Vocational Training by SEIP		Vocational Training arranged by employers	
	Yes	No	Yes	No	Yes	No
Fishery Workers, Hunters and Trappers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subsistence Crop Farmers	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Painters, building structure cleaners and related trades workers	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Electrical Equipment Installers and Repairers	12.5%	87.5%	0.0%	100.0%	12.5%	87.5%
Food processing and related trades workers	2.9%	97.1%	5.9%	94.1%	5.9%	94.1%
Other craft and related workers	17.4%	82.6%	8.7%	91.3%	39.1%	60.9%
Other craft and related workers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Food and related products machine operators	30.8%	69.2%	15.8%	84.2%	30.0%	70.0%
Assemblers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Locomotive engine drivers and related workers	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Domestic, Hotel and Office Cleaners	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Agricultural, forestry and fishery labourers	0.0%	100.0%	12.5%	87.5%	12.5%	87.5%
Manufacturing labourers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Food preparation assistants	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Refuse workers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Elementary Workers	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
Total	17.6%	82.4%	9.2%	90.8%	19.6%	80.4%

Source: BIDS-Skill Survey 2020-2021

Table 4.4 illustrates some information related to training which was not arranged by the employers. If we consider duration of the course, there exists variation among different occupation categories. The short duration courses of less than one week were reported by just more than a quarter (27%) of respondents. Comparatively longer duration course of one to three months was reported by 45% of respondents. Craft and related trade workers paid training cost from their own pocket. All of technicians and associate professionals, and also skilled agricultural, forestry and fishery workers received fund from Govt. for their training.

Table 4.4: Vocational Training Information (not arranged by the employers)

Occupation (in 1-digit level)	Duration of the course						Certified		BTEB Certified		Expenditure borne by		
	< 1 week	1-2 weeks	3-4 weeks	1-3 month	4-6 month	>6 months	Yes	No	Yes	No	Self	Govt.	NGO & Other s
Managers	23.68	21.05	21.05	28.95	5.26	0	89.74	10.26	86.49	13.51	41.03	48.72	10.26
Professionals	25	29.17	4.17	16.67	25	0	75	25	38.1	61.9	18.18	59.09	22.73
Technicians and associate professionals	0	0	100	0	0	0	100	0	100	0	0	100	0
Skilled agricultural, forestry and fishery workers	37.5	12.5	37.5	12.5	0	0	62.5	37.5	83.33	16.67	0	100	0
Craft and related trades workers	30	10	20	30	10	0	90.91	9.09	50	50	45.45	45.45	9.09
Plant and machine operators, and assemblers	31.91	0	17.02	36.17	14.89	0	78.72	21.28	74.47	25.53	14.89	63.83	21.28
Elementary occupations	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	27.48	12.98	19.85	27.48	12.21	0	81.95	18.05	71.2	28.8	24.43	60.31	15.27

Source: BIDS-Skill Survey 2020-2021

Table 4.5 illustrates some training related information which is arranged by the employers. If we consider duration of the course, there also exists variation among different occupation categories. If we consider overall situation, about majority of the respondents 89.4% completed less than one-week training arranged by the employers.

Table 4.5: Vocational Training Information (arranged by the employers)

Occupation (in 1-digit level)	Duration of the course						Certified	
	< 1 week	1-2 weeks	3-4 weeks	1-3 months	4-6 months	>6 months	Yes	No
Managers	83.06	11.29	2.42	3.23	0	0	52.42	47.58
Professionals	87.85	9.35	2.8	0	0	0	34.95	65.05
Technicians and associate professionals	86.21	10.34	1.72	0	0	1.72	24.14	75.86
Service and sales workers	100	0	0	0	0	0	100	0
Skilled agricultural, forestry and fishery workers	94.29	5.71	0	0	0	0	30.99	69.01
Craft and related trades workers	90.28	6.94	1.39	1.39	0	0	9.72	90.28
Plant and machine operators, and assemblers	95.24	2.72	2.04	0	0	0	25.17	74.83
Elementary occupations	50	0	0	50	0	0	50	50
Total	89.37	7.38	1.89	1.2	0	0.17	31.72	68.28

Source: BIDS-Skill Survey 2020-2021

4.4 Self Assessed Skill & Skill Demand

Respondents were asked about self-assessed skill & skill demand. Table 4.6 indicates their opinion regarding these issues. If we see overall results of their opinions regarding the issues indicated in first row in the table, we find that 60.9% employees identified themselves as medium proficient. Around 40% think that their experience in the present enterprise has helped in fully increase their skill whereas 58.6% think that their experience in this enterprise has increased skill only somewhat. When they have given chance to assess the market demand of their skill in the industry, only one third 25% assessed their skill has high demand and 72.4% think that their skill has medium demand. Despite some variations over the occupation categories, on the whole there seems to be a medium level of achievement and a medium level of expectation which perhaps may not induce them to go out of their way to get training and be proficient in their jobs as there may not be much demand for such improved skill.

Table 4.6: Self Assessed Skill & Skill Demand

Occupation (in 1-digit level)	Level of proficiency in performing job			Experience in this enterprise has improved skill			Assessment of the market demand of skill in the industry		
	No Proficiency	Medium Proficient	Highly Proficient	Not at all	Somewhat	Fully	No demand	Medium Demand	High demand
Managers	.9%	52.2%	46.9%	.9%	51.3%	47.8%	2.7%	67.3%	30.1%
Professionals	0.0%	59.7%	40.3%	0.0%	65.7%	34.3%	0.0%	73.1%	26.9%
Technicians and associate professionals	0.0%	88.1%	11.9%	1.7%	78.0%	20.3%	8.5%	74.6%	16.9%
Service and sales workers	0.0%	0.0%	100.0%	0.0%	50.0%	50.0%	0.0%	100.0%	0.0%
Skilled agricultural, forestry and fishery workers	0.0%	75.6%	24.4%	2.4%	67.1%	30.5%	4.9%	76.8%	18.3%
Craft and related trades workers	0.0%	70.2%	29.8%	0.0%	50.0%	50.0%	0.0%	67.9%	32.1%
Plant and machine operators, and assemblers	1.7%	47.1%	51.2%	1.7%	54.5%	43.8%	1.7%	76.9%	21.5%
Elementary occupations	10.5%	21.1%	68.4%	0.0%	44.4%	55.6%	0.0%	63.2%	36.8%
Total	.9%	60.9%	38.2%	1.1%	58.6%	40.3%	2.6%	72.4%	25.0%

Source: BIDS-Skill Survey 2020-2021

4.5 Coping with the Shock of Covid-19

Like other industries of the world, Agro-Food Processing sector began facing serious problems from March 2020 due to the Covid-19 pandemic. Supply chains of raw materials for food processing factories were hampered. Some of the enterprises had to halt production. Workers were also did not get paid. A month later they started production processes again and paid full payment to the employees. Against such a backdrop, workers were asked what type of support they had received at that initial time of difficulties.

Table 4.7: Coping with the Shock of Covid-19

Occupation (in 1-digit level)	Average amount of loan in BDT/Employee	State of Economic Condition (on average in percentage)			State of Anxiety		
		1 to 4 (No hardship)	5 to 7 (Average hardship)	8 to 10 (Terrible hardship)	1 to 4 (Low anxiety)	5 to 7 (Medium anxiety)	8 to 10 (High anxiety)
Managers	983	45.13	35.4	19.47	16.81	45.13	38.05
Professionals	18135	47.76	40.3	11.94	22.39	49.25	28.36
Technicians and associate professionals	1559	20.34	30.51	49.15	13.56	28.81	57.63
Service and sales workers	0	50	50	0	0	100	0
Skilled agricultural, forestry and fishery workers	2134	7.32	70.73	21.95	2.44	50	47.56
Craft and related trades workers	750	14.29	46.43	39.29	5.95	30.95	63.1
Plant and machine operators, and assemblers	2231	36.36	52.89	10.74	13.22	61.16	25.62
Elementary occupations	0	26.32	63.16	10.53	15.79	57.89	26.32
Total	3521	29.8	47.35	22.85	12.43	46.62	40.95

Source: BIDS-Skill Survey 2020-2021

Survey results show that on an average all employee took loan Tk. 3521 to overcome the hardship during full Covid-19 period during January to September 2020. Of course, the amount varied by occupation groups which also denote a kind of financial capacity. Thus, managers did not take much loan Professionals, however, took the largest loans. Had it been not for them, the average loan would have been much smaller. Nearly one half of the employees faced average financial hardship while less than a quarter faced severe financial hardship at that time. The result of the hardship had been anxiety. Nearly one half experienced medium level of anxiety while for nearly 41%, it was quite severe.

The above situation had been a consequence of what the employees had been through due to the Covid-19 pandemic which started in early March 2020 and was in peak from April to June 2020 in Bangladesh. Employee survey show that highest percentage of employee had no employment in Agro Food Processing sector during March, April and May 2020 respectively 7.8%, 13.3% and 7.9%. Their overall average salary and family income dropped at the same time. Higher number of employees (2.4%, 4.4% and 3.3%) took loan to survive during these three months.

Table 4.8: Employment, Income and Loan Situation during January/2020 to September/2020

All-Occupation	Employed (%)			Salary	HH Income	Loan (%)		Loan
	Fully	Partially	Not at all	Mean BDT	Mean BDT	Yes	No	Mean BDT
January	95.9%	1.3%	2.8%	15894	20506	2.6%	97.4%	17524
February	95.9%	1.3%	2.8%	15922	20525	1.5%	98.5%	15126
March	84.8%	7.4%	7.8%	15928	20308	2.4%	97.6%	12000
April	76.7%	10.0%	13.3%	15871	20214	4.4%	95.6%	9234
May	83.5%	8.5%	7.9%	15892	20115	3.3%	96.7%	8667
June	90.2%	5.7%	4.1%	15929	20139	1.3%	98.7%	9376
July	92.5%	4.0%	3.5%	15919	20208	1.3%	98.7%	9438
August	93.4%	3.7%	2.9%	15930	20306	1.1%	98.9%	8429
September	93.6%	3.5%	2.9%	15930	20278	.9%	99.1%	9715

Source: BIDS-Skill Survey 2020-2021

4.6 Conclusion

Employees self-assessment shows that high proficiency in their jobs was not high while at most half of them, for some occupations pretty less received some skill improvement scope in the enterprises they had been working. Thirdly, they may not have much of demand for training either because they most do not think that there would high demand for their jobs in future. If such a mindset persists even among managers and professionals who should know better, this bodes ill for further development of the API as those who would run them from the front are not that hopeful about the future.

Chapter 5: Qualitative Findings from KIIs and FGDs

This chapter deals with the qualitative findings on some of the critical issues discussed in Chapters 3 and 4 above to understand the issues and challenges and their nuances as revealed during KII with ten of association leaders/industrialists/authorities, one Focus Group Discussion (FGD) with BAPA, and one FGD with BSFIC (Annex-2).

5.1 Lack of Good Agricultural Practices and Supply Chain Management

Good quality raw materials and their well-functioning supply chains are the basic to any processing industry like agro-food processing. Agro-food processing industries are totally dependent on local agricultural products for their main raw materials. There is a general lack of properly skilled manpower from production of agricultural goods to sales of the final product. The main problems faced by the enterprises in agro-processing are (i) safety of food supplied by farmers, (ii) lack of or limited standardization in supply from farm level to enterprises, (iii) lack of or limited logistics and infrastructure support in preservation of seasonal fruits and vegetables etc. There are not enough cold storages in Bangladesh to preserve the seasonal agro-food products to be used as inputs for further processing. As stated by them, it is not possible for the private entrepreneurs to build this cold chain system in every district as there are varieties of products to store each of which necessitate different kinds of temperature control and storage space. Moreover, cold chain supply system is also necessary for finished products from the factory to the consumer through the marketing system. Obviously, the cold chain supply system for the raw agricultural products from farm to the processor and that for finished products from processor to the consumers are somewhat different and may need different systems of infrastructure and delivery system. Infrastructure in sense is the easier part, but as revealed during the KII, because of lack of proper training and education, even the apparently educated people enterprises hire don't have sufficient knowledge of temperature control and preservation of the finished products.

5.2 Impact of Covid-19

All the enterprises of agro-food sector were open during Covid-19 pandemic and general holidays declared by the government. But juice and spices industries paid 10 to 40 percent less salary to their employees at the time of Covid-19 to adjust the losses of suffered by enterprises. When the industry

leaders were asked about if new skills were required in their enterprises because of Covid-19 situation, all of them answered negatively. That means the special situation due to Covid-19 do not required any new skills in their sectors to continue current level of production.

5.3 Skill Gap

Another major challenge is the lack of expertise and knowledge of the employees in the production process in the shop floor in the factories. Workers in this field learn about production process not from curriculum or educational institutions, rather they learn from on-the job experiences. If one worker choses to work at different plants (like from dairy production plant to automated bakery production plant) the expertise in one product does not accumulate nor become useful and applicable. Therefore, skilled and experienced people are needed in quality control and production management with appropriate degrees in food engineering and food processing of specific products, but this is rare. Lack of good machine operators, food technologist, mixture man, chemist, quality control officer, packaging supervisor, graduates in B.S.C engineering or diploma on food processing in the automated bakery industry is hampering the production in bakery sector. In general, what has come out is that the trainings, some of which may be general, most at least in production part for the whole process has to be specific and tailor-made.

5.4 Training in Supply Chain Management

Training and awareness of food preservation, specially maintaining the temperature need to be spread from the farmers, to suppliers (freezing van) to consumers. For example, after slaughtering an animal it needs to be kept at a certain temperature for 12 hours and then it can be processed. However, the farmers and laborers engaged in this work don't have this knowledge. The result is that the food may become unsafe and may not be preserved for long. Also, the entrepreneurs need laborers who at least passed the S.S.C level to understand the labeling and temperature control of each product. Because of this requirement a large part of the workforce even at the lower level has been seen to have passed SSC.

5.5 Technological Problem

While the issue of technological upgradation applies to every kind of agro-processing, sugar milling is a special case. In Bangladesh only government owned sugar mills have the capacity to crush the sugar canes, extract sugar cane juice and then transform it into sugar. The private owned sugar processing factories, however, are not engaged in the full process of transforming the raw sugar cane to sugar. They buy the crushed juice and then transform it into sugar.

However, the public sugar mills, though they have the full range of processes for making sugar, the technology is quite outdated. Lack for capital for investment in modern technology is the main problems of government own sugar industries. This is embodied in old machineries which have lost their earlier production capacity and are deteriorating fast. As found by us, the machines used for sugar production in these sugar mills are more than 50 to 60 years old, which have substantially lost their production capacity due to depreciation while new technology which are far more productive have not been invested in. Little renovation has taken place and remains the crying need of the hour for raising sugar processing capacity.

5.6 Automation and Future of the Sector

While automation is uneven as all processing activities may not need it so much, here are others where this may be the future. Training on automation, technological knowledge and programming knowledge on Programmable Logic Controllers (PLC), at least how to understand and interpret the machine code of this system needs to be introduced in polytechnic institutes, engineering universities and colleges. Another important skill is having basic mathematical skills to do yield calculation, productivity and loss measurements. These need to be taught to employees through training for keeping track of the production process to avoid losses.

5.5 Conclusion

The KIIs, FGDs and consultation with agro-food processing leaders indicate that there are a number of skill gaps in workers in different occupations. This sector has high potential for growth but this will require that the identified skill gaps and shortages are adequately addressed. Also in specific cases such as sugar processing investments for acquisition of new technology to raise productivity is

the need of the hour. A minimum basic training and understanding is necessary for safe and healthy food production at every level beginning from agricultural production in farms, supplying raw materials in proper condition through appropriate supply chain management and investment for the same, post-processing packaging, storage and transportations and their upgradation. It is not that these are not known. What is less appreciated is that the basic level 10-15 years back is now outdated partially or fully. The present basic level of understanding is at a higher level than what it was previously, particularly with changes in technology, automation and more sophisticated supply chain management. Add to that the more sophisticated skills that are needed in future to address the automation of industries and even more sophisticated supply chain to cater to the needs of consumers in general and export market in particular. All these point to a good, practical and easy to understand training system along with a practical education system for which new and expanded investments are absolutely necessary.

Chapter 6: Conclusion and Recommendation

The discussion and analyses based on quantitative and qualitative information from employers and employees in 117 factories engaged in production of several product lines have brought out with quite some clarity the situation related to the present situation related to workers' skill (including formal education and training) and their desired level and thus the present gap, the future of the sector as a whole and for specific industries and the challenges ahead and how the skills need to be developed to close the present and future possible gaps. First, the enterprises have generally agreed that the current employees at various levels have skill gap of various kinds.

Higher paid jobs like Managers and Professionals, as noted by the enterprises, suffer from higher skill gaps. The perception of enterprises about skill gap decreases for lower paid jobs like Elementary Occupations. Similarly, Service and sales workers, Craft and related trades workers and Plant and machine operators, and assemblers have an average of only 6 percent responses saying yes to the current skill gap. The KIIs, FGDs and consultation with leaders in agro-food processing also corroborates with the survey results that there are a number of skill gaps in workers in different occupations in this sector.

The API has high potential for growth but this will require that the identified skill gaps and shortages are adequately addressed. Agricultural production, packaging, storage and transportations require some minimum level of basic skills. More sophisticated and varied types of skills are needed in future to address the automation of industries and also appropriate supply chain management as identified by the leaders of three associations in this sector.

In future, most of the newly hired people will be hired in elementary positions and then Technicians and associate professionals i.e., those with low to somewhat medium level of technical skill. This resonates with our earlier findings of the expansion plan of the enterprises as they want to maintain their production as usual just improving better qualities of the product so they don't need other types of occupations much. More sophisticated, higher technology-based production process is not what most of them are looking forward to.

On average the extent of automation in future will be at most of medium level while for elementary occupations it is likely to be somewhat more as automation is easier for routine type of physical jobs that these people do. On the other hand, skilled agriculture, forestry and fishery workers who work in fields, ponds, and rivers the extent of likely automation is lowest for their cases possibly because

though much of the work is physical, the actual operation has to be decided on the spot, not a routine kind of job. All these mean that people with low skill but doing routine jobs and with low education qualification around J.S.C or up to grade 8 may lose their jobs to machines. Remarkably, the enterprises respond that Professionals specially administrative level professionals may have the highest scale of displacement rather than people working in elementary occupations, may be because installing machines to do these jobs will be costly for more enterprise, but developing software or artificial intelligence to do some professional jobs may be more convenient for them.

Among trainings those organized under SEIP have gained popularity among the enterprises as the trainings are provided by BAPA and the leading Agro-food Industries like PRAN, IFAD, MEGHNA, WELL FOOD etc. (listed in Table 3.21) provide trainings in this sector. Hence, 80.7 % enterprises expressed that they are willing to send your workers in future to undertake trainings under SEIP Training Curriculum.

On the other hand, although 90.5 % of the enterprises expressed that they would prefer to hire people having TVET training in their companies, only just about 20% actually did so. It may be reiterated here, however, that the agro-food processing industry is a diverse sector and, in this survey, we collected information from only nine different product lines including Automated Bakery. As these trainings provided by SEIP are more specifically targeted towards ‘automated bakery’ enterprises, these facilities need to be expanded to other agro food processing sectors. Thus, there is a need for training targeted at more of the product lines in future.

The major three actions that the enterprise wants to take to minimize the current skill gap are: 1) increase in training activity, 2) launching mentorship for new & low skilled staffs under efficient supervisors and 3) using more supervision of workers. However, not all types of occupation groups may be treated similarly. For “Service and sales workers” they expect to have more supervision over them while in case of “Skilled agricultural, forestry and fishery workers” it may be more of reallocating them to other works.

Recommendations:

- 1) Since, the enterprises emphasized that increasing training activities is the number one solution that they think can minimize the skill gap we asked them what types of trainings they need for the current occupations. Based on the responses we listed eighteen trainings that the agro processing enterprises think that their employees currently need (see Table 3.19 and 3,24 for

the list). Among those trainings on Quality Assurance, Quality Control, GMP, GHP, HACCP are on the priority list of enterprises and should be expanded.

- 2) Trainings should be for management and processing and management of different product lines, not just the ones which are most demanded at the moment. And this should take into account the future expansion plans of the enterprises. However, for this to happen with some foresight, it would be advisable to depend not only on what enterprises think, but there should be projections of demand for agro-processed foods both for home consumption and exports. This should also examine where automation mainly for raising productivity but without much labor displacement may happen. Results for such studies should be disseminated to the investors for helping them taking forward looking decisions for investment in expansion and hiring people with appropriate skill.
- 3) Regarding one issue that has come up is the unwillingness of enterprises to spend money or send people for training because of the fear that the newly trained people may not join back. This needs to be looked into and find out based on present industrial laws and policies if there is a way out. One way could be that the association of enterprise should have a gentlemen's agreement among themselves not to engage such newly trained people from another firm at least for a year or so. Additionally, the employees may have to execute a bond with the employees that after training depending on costs and who bear them as well as length for training or its nature, to serve the mother organization for a specified period. On the other hand, employers too should think about raising salaries for the newly trained people if after a certain time after training it is found that their productivity has actually raised.
- 4) Training and awareness raising related to food preservation, specially maintaining the temperature for storage and during supply/delivery should be a priority activity among all actors in the supply chain from the farmers to the processing enterprise as well as for the finished products from the enterprise to the consumer. To make this happen, apart from awareness raising and training simultaneously investment for cold supply chain should be geared up either by the enterprises on their own or through third party (private/public or a mixed PPP). It is likely that while large enterprises may invest on their own, for the small and even medium enterprises, this may not be possible to manage not just finance but also actual management of the supply chain on a day to day basis. A third-party supply chain system including appropriate cold chains should be the order of the day. Appropriate credit may be arranged for such investment.

- i. ***Specific Recommendation for arranging Training for job titles in Edible Oil Enterprises***
 Operator (Oven)
 Workers to Control Industrial Product and Quality Management
 Officers to maintain SOP (standard operating procedures)
 Senior Engineer
 Sales person
- ii. ***Specific Recommendation for arranging Training for job titles in Starch Enterprises***
 Operator (Oven)
 Workers to maintain SOP (standard operating procedures)
 Workers to Control Industrial Product and Quality Management
 Senior Engineer
- iii. ***Specific Recommendation for arranging Training for job titles in Spices Producing Enterprises***
 Skilled Operator (Oven)
 Workers to maintain SOP (standard operating procedures)
 Workers to Control Industrial Product and Quality Management
- iv. ***Specific Recommendation for arranging Training for job titles in Milk and Dairy Products Enterprises***
 Skilled Operator (Oven)
 Workers to Control Industrial Product and Quality Management
 Senior quality control officer
 Temporary seasonal worker
 Packing workers
- v. ***Specific Recommendation for arranging Training for job titles in Meat Processing Enterprises***
 Workers to Control Industrial Product and Quality Management
 Senior Engineer
 Senior quality control officer
 Cold chain management officer
- vi. ***Specific Recommendation for arranging Training for job titles in Fruit Processing and Beverage Enterprises***

Workers to Control Industrial Product and Quality Management

Senior Engineer

Workers to maintain SOP (standard operating procedures)

Soft drink specialist

Packing workers

vii. *Specific Recommendation for arranging Training in Automated Bakery Enterprises*

Workers to Control Industrial Product and Quality Management

Senior quality control officer

Operator (Oven)

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Annex 1

Table 1: Location of the Enterprises

	Districts	Numbers	Percentage
1	CHITTAGONG	4	3.42
2	CHUADANGA	1	0.85
3	COMILLA	2	1.71
4	DHAKA	47	40.17
5	FARIDPUR	1	0.85
6	GAZIPUR	13	11.11
7	HABIGANJ	2	1.71
8	JAMALPUR	1	0.85
9	JOYPURHAT	1	0.85
10	KHULNA	1	0.85
11	KISHOREGANJ	4	3.42
12	MYMENSING	1	0.85
13	NARAYANGANJ	14	11.97
14	NARSINGDI	4	3.42
15	NATORE	6	5.13
16	NOAKHALI	1	0.85
17	PABNA	5	4.27
18	RAJSHAHI	2	1.71
19	RANGPUR	2	1.71
20	SIRAJGANJ	4	3.42
21	TANGAIL	1	0.85
	Total	117	100

Table 2: Total Job titles mentioned in the Enterprise Survey

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
1	Owner /Chairman, Managing director	1120	1
2	Chairperson, HR department	1120	1
3	Director, Director Operations	1120	1
4	Executive director	1120	1
5	Managing Director	1120	1
6	Chief Executive Officer (CEO)	1120	1
7	Chief Financial Officer (CFO)	1211	1
8	Senior vice president	1211	1
9	General Manager	1219	1

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
10	Deputy general manager	1311	1
11	Senior general manager	1311	1
12	Deputy general manager (DGM) Plant, Deputy general manager (ENI), DGM (Agri, electrical, mechanical)	1311	1
13	Senior assistant general manager	1311	1
14	Head of manufacturing, Mechanical Engineer	2144	2
15	Head of quality assurance/Head of quality control	2421	2
16	Senior manager	1311	1
17	Senior manager (production)	1311	1
18	General Manager	1311	1
19	Assistant General Manager	1311	1
20	Manager	1311	1
21	Deputy manager, Deputy Production Manager	1311	1
22	Assistant manager/ Manager assistant	1221	1
23	Assistant manager distribution	1221	1
24	Sub assistant manager	1221	1
25	Area manager	1311	1
26	Senior operator	8160	8
27	Senior production manager	1311	1
28	Senior production officer	1311	1
29	Senior quality control manager	3115	3
30	Senior quality control officer	7543	7
31	Senior supervisor	2133	2
32	Senior technical officer	3142	3
33	Senior technician	3142	3
34	Manager Admin/ Admin Manager	1212	1
35	Manager HR & Admin	1212	1
36	HR Manager	1212	1
37	Distribution manager	1311	1
38	Senior Executive	1212	1
39	Executive	1212	1
40	Deputy executive	3343	3
41	Designer	2163	2
42	Dyeing	9211	9
43	HR head	1212	1
44	Senior executive, HR and Admin	1212	1
45	Admin manager. HR and Admin Manager	1212	1
46	Assistant Manager, HR	1212	1

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
47	Manager (Production)/Production manager	1311	1
48	Head of manufacturing, Manager-compliance	1311	1
49	Senior officer	1213	1
50	Officer	1213	1
51	Assistant officer	3343	3
52	HR Admin	1212	1
53	HR Executive and Admin	1212	1
54	HR and admin	1212	1
55	Admin officer	1212	1
56	Executive assistant of CEO (Food department)/Assistant chief	3343	3
57	Deputy production manager/Deputy manager (production)	1311	1
58	Factory manager	1311	1
59	Deputy manager (Factory)	1311	1
60	Senior manager (production),	1311	1
61	Assistant general manager (production)	1311	1
62	Assistant manager(production)/Assistant production manager/Assistant production officer	1321	1
63	Factory manager	1321	1
64	Executive production officer	1212	1
65	Factory in charge	2141	2
66	Shift in charge	2424	2
67	Production officer	2141	2
68	Assistant production officer	2141	2
69	Production in charge	2141	2
70	Facilities supervisor	3122	3
71	Floor in charge	7543	7
72	Floor man/ cleaner/sweepers	9613	9
73	Food analyst, Chemist food	2113	2
74	Fore man	3122	3
75	Junior executive	3343	3
76	Junior manager	3343	3
77	Junior Officer	3343	3
78	Office assistant/helper	3343	3
79	Factory worker	9211	9
80	Fitter (instrument)	2421	2

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
81	Junior operator	8160	8
82	Junior production officer	8160	8
83	Junior supervisor	2132	2
84	Junior technical officer	3142	3
85	Market analyst/Financial analysts	2413	2
86	Marketing manager	1221	1
87	Manager quality assurance/ Quality assurance manager	2421	2
88	Deputy manager Quality Control (QC)	2421	2
89	Executive officer QC/ Quality control executive	1212	1
90	Officer (senior chemist)	2113	2
91	Chemist	2113	2
92	Quality control manager	2421	2
93	Hazard analysis/ Environmental Engineer/ Analyst/Waste Management engineer	2143	2
94	Head karigor/ agriculture technician	7233	7
95	Assistant quality control manager	7543	7
96	Junior quality control manager	7543	7
97	Quality control officer/ Quality assurance officer/ Quality Officer	2421	2
98	Junior quality control officer	7515	7
99	Quality controller	2421	2
100	Production in charge Quality control	2421	2
101	Quality control analyst	2421	2
102	Quality control specialist	7543	7
103	Quality control supervisor	7543	7
104	Quality controller	7543	7
105	Quality engineer	2144	2
106	Research & development (R&D)	2422	2
107	Researcher	2422	2
108	Safety manager	1433	1
109	Sales manager	1221	1
110	Scientist	2132	2
111	Security manager	1433	1
112	Innovation Officer /Advertising and public relations managers	1223	1
113	Online Quality Control	7543	7

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
114	IT officer/System administrator /Network administrator /Administrator, computer/Officer (computer systems: managing system/support network administration	2522	2
115	Lab Analyst/Chemist analytical, food	2655	2
116	Lab executive	2655	2
117	Labour	9211	9
118	Line incharge		9
119	Loader/Garbage and recycling collectors	9611	9
120	Material analyst	2143	2
121	Microbiological manager	2131	2
122	Microbiological officer	2131	2
123	Microbiologist	2131	2
124	Chain management/Farming, forestry and fisheries advisers	2132	2
125	Chief officer	1212	1
126	Coordinate officer	2432	2
127	Head of sales	2431	2
128	Accountant	2411	2
129	Accounting manager/Accounts manager	2411	2
130	Accounts Officer	2411	2
131	Analyst	2431	2
132	Brand manager	2431	2
133	Finance manager	2411	2
134	Engineer	2141	2
135	Senior Engineer	2141	2
136	Engineering manager	2141	2
137	Maintenance engineer	2141	2
138	Electrical engineer	2151	2
139	Mechanical engineer, Machine engineer	2144	2
140	Chief engineer	2142	2
141	Civil engineer	2142	2
142	Programmer	2512	2
143	Operation engineer	2141	2
144	Manager of maintenance/ Maintenance Manger	1311	1
145	Compliance manager	1213	1
146	Senior electrical officer	3122	3

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
147	Senior engineer	2432	2
148	Assistant maintenance manager	7543	7
149	Maintenance technician	3142	3
150	Maintenance in charge	7543	7
151	Assembler	8211	8
152	Assistant Engineer	3142	3
153	Manufacturing employee	3122	3
154	Electrician	7411	7
155	Assistant Computer Operator	3114	3
156	Assistant head karigor/Assistant karigor/Assistant technician	3142	3
157	Junior electrical officer	3114	3
158	Purchasing manager/Purchaser merchandise/Officer, procurement/Officer, purchasing/Officer,	3323	3
159	Machine Operator / Machine man, machinist	8160	8
160	Assistant Operator	8160	8
161	Extruder operator	8160	8
162	Cook, sauces and condiments/ Chef, pastry/Cook, chief/Cook, head/Saucier/Sous- chef	3434	3
163	Maker, food preparers, making man	9411	9
164	Assistant pastry man	9411	9
165	Bakery specialist	8160	8
166	Beverage specialist	3122	3
167	Band show/ operator	8160	8
168	Lab Analyst	2113	2
169	In charge of milk production	7513	7
170	Auto mechanic	3115	3
171	Helper	9211	9
172	Computer operator	3511	3
173	Mechanic, Mechanical fitter, Mechanical helper	3115	3
174	Operator (machine, filter, turbine)/Operation incharge/Operation worker	8160	8
175	Mixer man	7512	7
176	Mixer specialist	7512	7
177	Oven man	7512	7
178	Delivery man/ Driver	8311	8
179	D.C.S Officer	what	
180	Monitor/Supervisor sales, organizer	1221	1

SL. No	Job Title	BSCO Code (4 digit)	BSCO Code (1 digit)
181	Assistant supervisor	3343	3
182	Mousumi worker	9211	9
183	Cleaner	7133	7
184	Packaging supervisor	3122	3
185	Packaging worker/Packaging worker/Packing helper/Packing officer	9321	9
186	Packing man	7555	7
187	PAN cum crystalized helper	8160	8
188	Pan man	8160	8
189	PAN Operator	8160	8
190	Panclist	8160	8
191	Pastry man	3434	3
192	Dough mixer	7512	7
193	Planning manager	1213	1
194	Product analyst/Power analyst	7543	7
195	Product developer/business development /manager research	1223	1
196	Product innovation	1223	1
197	Product representor	1223	1
198	Product specialist	1223	1
199	Production associate	1439	1
200	Production developer	1223	1
201	Production Engineer	2141	2
202	Production in charge	2141	2
203	Production Manager	2141	2
204	Production officer	3116	3
205	Production operator	3116	3
206	Production supervisor	3116	3
207	Production worker	7511	7
208	Senior fitter	7233	7
209	Service holder	2421	2

Table 2: Employment Changes in the surveyed agro-processing enterprises (AT BSCO 3-Digit Level Occupation Code)

Occupation	Workers appointed in the years (Total for each occupation)		Workers left in the years (Total for each occupation)	
	2019	2020	2019	2020
Managing directors and chief executives	1	1	0	1
Business services and administration managers	60	83	54	63
Sales, marketing and development managers	63	89	65	91
Production managers in agriculture, forestry and fisheries	99	92	53	46
Manufacturing, mining, construction, and distribution managers	21	29	14	16
Other services managers	5	0	0	0
Physical and earth science professionals	1	2	0	1
Life science professionals	50	44	29	37
Engineering professionals (excluding electro technology)	207	181	119	133
Electro technology engineers	49	43	8	14
Finance professionals	7	5	3	3
Administration professionals	93	79	61	59
Sales, marketing and public relations professionals	7	2	1	0
Database and network professionals	1	1	0	0
Social and Religious Professionals	2	1	1	0
Physical and engineering science technicians	55	80	36	31
Mining, manufacturing and construction supervisors	60	29	4	8
Life science technicians and related associate professionals	104	48	31	36
Administrative and specialized secretaries	13	19	12	11
Painters, building structure cleaners and related trades workers	52	51	17	23
Electrical Equipment Installers and Repairers	1	26	4	6

Occupation	Workers appointed in the years (Total for each occupation)		Workers left in the years (Total for each occupation)	
Food processing and related trades workers	798	219	27	23
Other craft and related workers	44	49	20	31
Food and related products machine operators	480	503	320	382
Assemblers	5	0	0	0
Locomotive engine drivers and related workers	21	7	16	12
Agricultural, forestry and fishery labourers	3393	2699	1458	1331
Food preparation assistants	6	2	4	23
Refuse workers	88	94	2	30
Total	5796	4489	2371	2414

Table 3: Top Three Training Needs by Product Lines (based on the highest responses)

	Product Lines	Training 1	Training 2	Training 3
1	Sugar Processing Enterprises	Habituated with new technology (27.8%)	Finished product checking (8.2%)	Fittings (5.2%)
2	Edible Oil Processing Enterprises	Finished product checking (26.3%)	Habituated with new technology (12.0%)	Fabrication and safety (6.8%)
3	Starch Processing Enterprises	Finished product checking (28.2%)	Habituated with new technology (15.4%)	Fabrication and safety (7.7%)
4	Spice Processing Enterprises	Finished product checking (27.4%)	Habituated with new technology (6.3%)	Fabrication and safety (5.3%)
5	Dairy Product Processing Enterprises	Finished product checking (22.1%)	Habituated with new technology (11.4%)	Basic training (7.9%)
6	Automated Bakery Enterprises	Finished product checking (23.3%)	Habituated with new technology (14.2%)	About perfect packing (4.1%)
7	Meat Processing Enterprises	Finished product checking (34.4%)	Habituated with new technology (6.6%)	Develop to hygiene (4.9%)
8	Fruit Processing Enterprises	Finished product checking (26.4%)	Habituated with new technology (12.1%)	GMP (3.8%)
9	Agro processing Supporting Enterprises	Basic training (25.0%)	Finished product checking (12.5%)	Management training (12.5%)

Annex-2

FGD Participants List from Bangladesh Sugar and Food Industry Corporation (BSFIC)

Sl	Name	Designation	Organization
1	Mr. Md. Rfiqul Islam	Secretary	BSFIC
2	Eng. Md. Aatur Rahman Khan	Chief of Personnel	BSFIC
3	Md.Aynul Haque	Chief (Planning & Development)	BSFIC
4	Mohammed Alamgir Hossain	Chief (MIS)	BSFIC
5	Shahrina Tanaz	GM Incharge (Administration)	BSFIC
6	Faruk Ahmed	GM Incharge (Mills Farm)	BSFIC
7	Md. Akhlasur Rahman	GM Incharge (PDM)	BSFIC
8	Mrs.Afroza Islam	Deputy General Manager (MIS)	BSFIC

FGD Participants List from Bangladesh Agro-Processors Association (BAPA)

Sl	Name	Designation	Association
1	Mr. Md. Iqtadul Hoque	General Secretary	BAPA
2	Mr. Evance Rozario	Executive Marketing	BAPA
3	Mrs. Shahanaz Begum	Deputy Secretary (Process)	BAPA
4	Md. Taibur Rahman	Secretary	BAPA

List of KIIs Participants

Sl.	Name	Designation	Industry/Association
1	S .M. Momtazul Islam	Chief Executive Officer	Golden Harvest
2	Anup Kumar Saha	Deputy Executive Director	ACI Foods Limited
3	Md. Ashraf Ali	Managing Director	Zeal Bangla Sugar Mills Ltd.
4	Mossabber Hossain Badhon	Production Manager	Nourish Poultry and Hatchery
5	Md. Humayun Kabir	General Manager	Masafi Biscuit and Bread
6	A.M.M Nurul Alam	General Manger Operations	Paragon Agro Ltd.
7	Md. Lulu Imtiyaz	Head of Factory Operation	Abdul Monem Sugar Refinery Limited
8	Syed Nurul Islam	Chairman & CEO	Well Food
9	Md. Rafiqul Islam	Chief of Personnel	BSFIC
10	Md. Iqtadul Hoque	General Secretary	BAPA

Annex-3

Checklist for KII and FGD/Consultation

Covid-19 Related:

1. Due to COVID-19 pandemic, did you shut down the operations of your factory?
Not at all -----; for some time -----; If so, from when to when -----
2. If not all, did you have full or partial operation?
Full operation -----; Partial operation-----
3. If partial operation, what was the output on average relative to normal output?
Less than 25% _____; 25-50% _____, 50-75% _____
4. What strategies or coping mechanisms you used to minimize the impact of Covid-19 on your business?
Kept producing main products only _____; Laid off some workers _____;
Lowered salaries of workers _____; others _____
5. During Covid-19 Pandemic did you face any problems in worker attendance, or getting skilled workers?
Problems of attendance _____; skilled worker availability _____
6. If the answer is the “latter”, then please state the problem in details.
7. Discuss problems of management in the time of Covid-19, particularly labor employment and skill issues as these affect the enterprises generally and how they recovered from it.

Skill Related

1. List the four critical JOBS for continuing industrial production (except administrative & accounting jobs) in your factory.
2. Have you faced any problem to ensure full time production due to skill shortage of labors? If yes how much (in percent) in 2018 or 2019?
3. If the Enterprise states “Low number of applicants with the required skills” then write down the reasons for lower applicants?
4. Reasons for skill gap
 - (a) Lack of proper skills of doing the JOB from the educational degree (like: team work, verbal and writing skills etc.)

- (b) Lack of proper skills of doing the JOB because of lack of specialized training (like food certification, food handling and testing techniques that are not available in the country)
 - (c) Lack of Technical Skills in food handling and processing
 - (d) The Curriculum taught in educational institutions are backward and don't support the industry's current need
5. How to address the problems of skill gap?
 6. Have you arranged any training for employees of this enterprise over the last two (2018 and 2019) years?
 7. Mention 5 (five) most important occupations that require further training.
 8. Mention 5 most important occupations that you think will be/ may be subject to automation, fully or partially, in next 5 to 10 years.
 9. Do you have any plan to expand your business in next 5 to 10 years?
 10. What is your vision of expansion of production in your factory in the next 10 years?
 11. The name of occupations/trade that ARE NOT CURRENTLY EMPLOYED in your enterprise but you would like to hire them now or in near future to expand your business or increase productivity or cutting labor cost.

General

1. Discuss the overall general problems you are currently facing in your industry or sector.
2. Your suggestions to overcome those problems.
3. Overall recommendations for this sector in next 5 and 10 years.