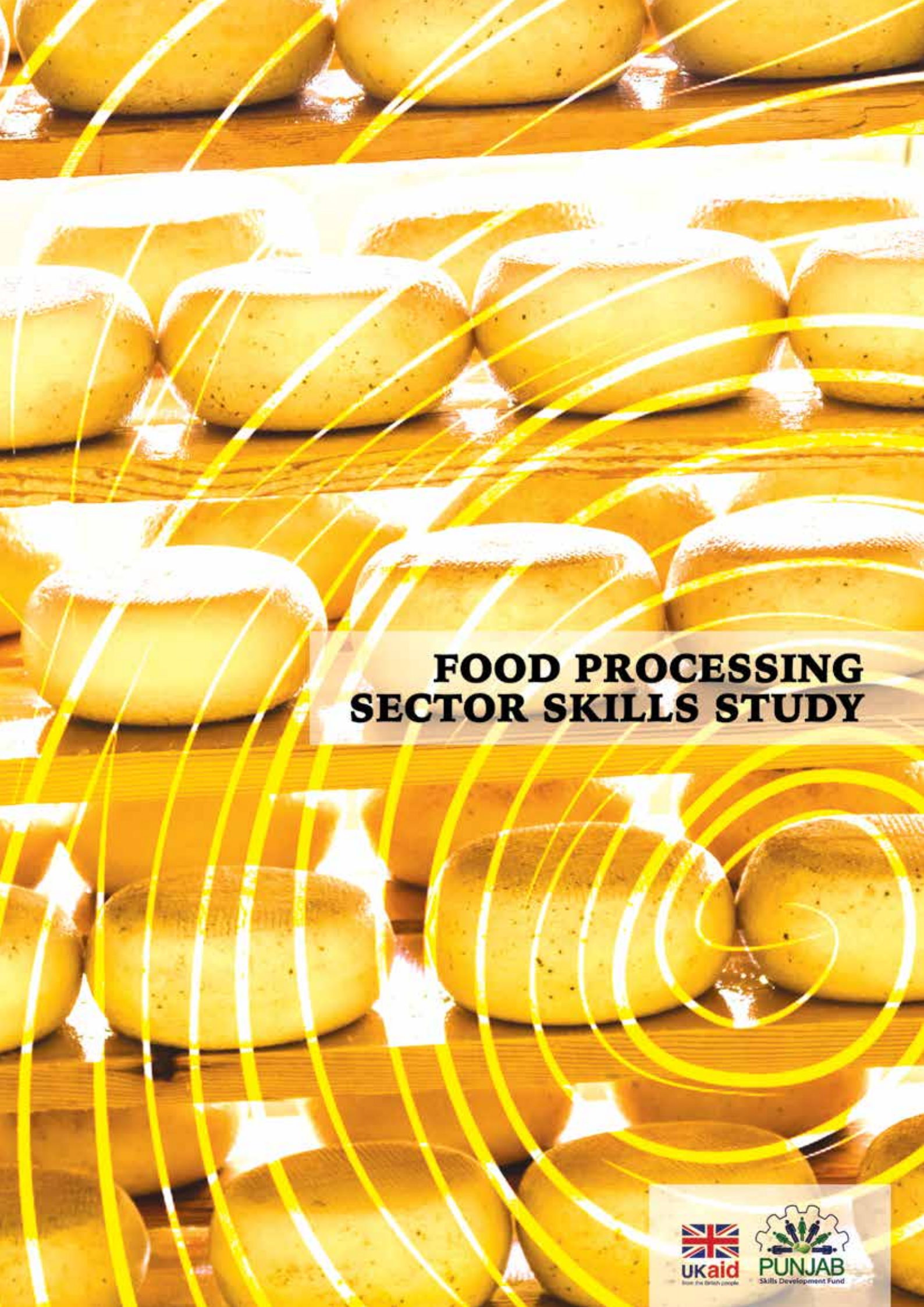




FOOD PROCESSING SECTOR SKILLS STUDY





Disclaimer

Sidat Hyder Morshed Associates (Pvt.) Ltd. has taken due care in conducting this survey and analyzing and reporting the findings. Applicable Quality Assurance processes have been applied to ensure that information, retrieved from our respondents during the survey, and provided in the body of this report is accurate and consistent.

Information in this report may be subject to update, modification and amendment. Bulk of the information for this survey was provided by the survey respondents including government ministries/organizations, associations; senior management at organizations, training service providers, sector experts and other stakeholders associated with the food processing industry (see Annexes). Additional information was obtained through desk research. The information contained herein is believed to be accurate as reported by the respondents.

Views presented herein belong to the survey respondents and the secondary sources of information and do not necessarily reflect the views of the consultants unless otherwise explicitly stated.

Acronyms

CAGR	Compound Annual Growth Rate
CIP	Cleaning in Place
COTHM	College of Tourism &Hotel Management
CY	Calendar Year
DAE	Diploma of Associate Engineering
DFID	Department For International Development
EBM	English Biscuit Manufacturers
FPCCI	Federation of Pakistan Chambers of Commerce & Industry
FY	Financial Year
HACCP	Hazard Analysis and Critical Control Points
HEC	Higher Education Commission
HIRC	Halal Industry Research Centre Pakistan
HRD	Human Resource Development
ICT	Information & Communication Technology
IFTECH Pakistan	International Food Technology Exhibition
LCCI	Lahore Chamber of Commerce & Industry
NAVTTTC	National Vocational & Technical Training Commission
OJT	On the Job Training
PAMCO	Punjab Agriculture and Meat Company
PARC	Pakistan Agricultural Research Council
PBIT	Punjab Board of Investment and Trade
PBTE	Punjab Board of Technical Education
PCSIR	Pakistan Council for Scientific and Industrial Research
PSDF	Punjab Skills Development Funds
PEORA	Pakistan Edible Oil Refiners Association
PFA	Punjab Food Authority
PFMA	Pakistan Flour Mills Association
PIDE	Pakistan Institute of Development Economics
PITAD	Pakistan Institute of Trade and Development
PSQCA	Pakistan Standards and Quality Control Authority
PTA	Pakistan Tanners Association
PVMA	Pakistan Vanaspati Manufacturers Association
SMEDA	Small and Medium Enterprises Development Authority
QC	Quality Control
TDAP	Trade Development Authority of Pakistan
TSPs	Training Service Providers
TVET	Technical and Vocational Education and Training

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The Food Processing Sector in the Punjab represents the potential to drive employment over the coming years by virtue of its continued growth in the province. Punjab Skills Development Fund (PSDF) has commissioned Sidat Hyder Morshed Associates (Pvt.) Ltd to conduct a survey of Food Processing establishments within the province in order to determine current and projected food processing related technical and vocational training requirements. What follows is a summary of the emergent findings of the survey.

The methodology was developed in response to the Terms of Reference (TOR) and scope of work¹ provided by PSDF. The study comprised of both qualitative (36 in-depth interviews with sector experts and 12 in-depth interviews with Training Service Providers) and quantitative (185 structured interviews with the Food Processing establishments in Punjab) data gathering supported by extensive desk research. The survey instruments (Survey Questionnaire and discussion guidelines for In-Depth Interviews with TSPs and sector experts) were designed by SHMA and approved by PSDF. Both the In-Depth Interviews’ guides and questionnaire were pre-tested before its final application in the field. The study, as per TOR document, covers establishments involved in the production of primary processed food and value added processed food mentioned in ‘Table -7, Chapter- 1’ of this report.

The Food Processing units under study were mostly sole proprietors (60% of the total 185 respondent companies) followed by private limited companies (27%). In terms of ‘company size’ category, majority of the units were micro and small size (up to 30 employees: 71% of the total respondents companies). Further annual sales turnover of majority of the respondent companies (78%) was less than 10 million and 71% of the total surveyed companies were using manual with hand and machine tools operations. A summarized picture of “Respondent Companies’ Profile” is depicted in the following table.

The workforce under study was mapped as per ISCO (International Standard Classification of Occupation) Standard. It was observed that the major workforce in the food processing sector (66%) falls under skill level 3, comprising clerical and support workers, plant/machine operators, craft and trade related workers and other skilled workers (semi-skilled). Though the food sector is mainly male dominated, women have their representation at all levels. The study found that the level of education for each job group was lower than the desired level. Moreover, workforce with food-related qualifications, diplomas or degrees was minimal.

Based on the quantitative survey findings, placing advertisements in leading newspapers is the most preferred mode of hiring workers at all levels. However, notices at factory gates are usually put up to hire semi/unskilled workers. Labor inter-

Company Size (No. of Employees)	%	Annual sales turnover	%	Industry Representation	%	Type of Ownership	%	Level of Automation	%
Less than 10 employees	39	Less than 1 Million	62	Processed Foods	59	Proprietorship	60	Manual with hand tools	47
11 – 30 employees	32	1-10 Million	16	Edible Oils	6	Partnership	12	Manual by Machine	24
31 – 99 employees	14	11-30 Million	9	Beverages	5	Private limited	27	Fully Automated	16
100 and above employees	15	30 and Above	13	Bakers and Confectionery	30	Public Limited	1	Semi-Automated	13
TABLE 1: SNAPSHOT OF RESPONDENT COMPANIES’ PROFILE									

¹ Please see attached Annexure 12-Scope of Work

mediaries play a negligible role in the hiring process. Around 3700 workers were hired during the last 2 years across all levels. Major recruitment (for both new hires as well as replacement workers) was made for ‘plant and machine operators’ and ‘other skilled workers’ categories. Survey results also indicate that majority of the workers hired under these categories were at least Higher School Certificate (HSC) qualified, whereas, workers hired under managers’ and Technicians/Associate Professional categories were mostly bachelors or technical diploma holders. Furthermore, the major proportion of the currently available vacancies falls in the same job group (plant and machine operators and food processing related skills) which is also considered as ‘Hard to Fill’. And in views of quantitative survey respondents and sector experts major reasons of having these ‘Hard to Fill’ vacancies are; lack of required skills/specialized skills and qualifications, lack of theoretical and practical trainings at institutes, and lack of hand on exposure to a variety of materials and tools, etc.

The nature of work in the food processing sector is process based rather than people based and employers in flatter structures mostly prefer to hire raw hands and train them as per their requirements. Workers at these entities are required to perform multiple tasks and are trained over a period of time by working closely under direct supervision of trained personnel/ Ustaads/Karigars.

It was found that out of total 185 respondents, on the job trainings (OJTs) are being provided by 50% of the participating organizations, whereas, the other half (92 establishments) are not providing OJTs to their staff. The most common reasons cited for this are; lack of trained personnel and expertise to provide the trainings (54% - 49 out of 92 establishments), lack of facilities required to provide OJTs (34%) and the nature of work that does not require trainings (7%).

Majority of the organizations (82% - 152 respondent companies) do not provide off-site training to employees. The main reasons cited are in line with the comments made by the sector experts on the availability of off-site training options and are as follows.

- Lack of funds for trainings
- Trained employees switch jobs, are poached by others, or demand impractical raises in salary
- Limited training options for desired skills and employers prefer on-the-job trainings
- Training level does not meet the standards required by the industry

Off-site training options are available only to senior level employees (manager / technical staff) of large sized firms. They mostly attend training/seminars/workshops on latest devel-

Type of Workers Hired	Total Number of Workers Hired	Hired on New Positions	Hired as Replacement	Still Working	No. of Current Vacancies	No. of Hard-To-Fill Vacancies
Managers	219	104	115	181	84	45
Technicians and Associate Professionals	445	324	121	382	11	7
Craft & Related Trade Workers	388	194	194	352	8	5
Plant and Machine Operators	532	266	266	469	31	25
Clerical Support Workers	430	215	215	379	17	11
Other Skilled Workers	1116	558	558	906	206	69
Elementary Occupations	548	388	160	458	182	60
Total	3,678	2,049	1,629	3,407	539	222

TABLE 2: OVERALL RECRUITMENT SCENARIO – FOOD PROCESSING SECTOR

opment in food processing i.e. Food Preservation, Food Science and Engineering and Latest Technology in use. These organizations generally have pre-approved annual budgets for training. The vendors (for new plant and equipment acquired by firms) provide both on-site and off-site trainings to staff. However it is usually limited to senior staff only.

Awareness for Training Service Providers (TSPs)- The level of awareness for training service providers both amongst establishments and sector experts is very low. Majority of the respondents claimed that they have not received any kind of information from these institutes in the past 4-5 years. They have displayed a lack of interest in hiring graduates in food related disciplines as in their opinion; the students not only lack practical expertise but are unable to apply the theoretical knowledge gained into practical experience. The skills mainly taught are neither desired by the industry nor are up to the mark.

Two third of the respondents from the establishments’ survey have shown unwillingness to provide any kind of practical training to university students/graduates in food related disciplines. Key reasons highlighted are; poor attitude of the interns (unwilling to work/learn, poor response to supervisors /co-worker) and unavailability of training resources (training expertise and facilities). They have also shown lack of interest in establishing training facilities within their premises.

Emergent Training Needs - Based on the quantitative survey findings, a list of top most requested training courses (provided for core, non-sector specific and sector specific skills) for each sub-sector is given below:

CORE AND NON SECTOR-SPECIFIC SKILLS

- Managerial and Administrative Skills
- Communication Skills
- Problem Solving Skills
- Numeracy Skills
- Food Technologist / Bio technologist

- Food Preservation techniques
- Food Quality Assurance/Quality Control
- Plant and Machine Operating and repairing Skills

SECTOR SPECIFIC SKILLS

Value added and frozen food processing

- Cooking and Frying techniques
- Food Tasting and Food Grading Skills
- Visual Examination for Quality Product/ Sorting /Grading

Edible Oils and Fats

- Technical knowledge of the products
- Oil expeller operating skills

Beverage Production

- Bottling Skills
- Transportation skills

Bakery and Confectionery

- Baking Skills
- Pastry Cooking Skills
- Chocolate Making Skills
- Biscuits Dough and Batter making Skills

INTERVIEWS WITH TRAINING SERVICE PROVIDERS AND SECTOR EXPERTS

The formal training options related to food processing sectors under study are generally advanced level programs being offered at Universities in Punjab, leading to Bachelors and Masters Degrees in Food Science and Food Technology. Some universities are offering Ph.D. in Food Science and Technology as well.

Short Term Courses, though minimal are available in some

universities. While there is a strong presence of Technical and Vocational Training Centers with more than 700 institutes (both from public and private sector) across Punjab, training options in the desired skills are negligible.

Selection of trades, curricula development and selection, recruitment and training of trainers are strictly made as per policies and procedures outlined by the Higher Education Commission and are followed by both the Government and Private institutes. It is for this reason uniformity in course content is observed. The curriculum is designed in a way to cover major aspects of food processing industry along with mandatory subjects followed by an internship at the end of the program.

Low level of ‘industry and Training Service Providers (TSPs) relationship’ is identified at all levels by both, TSPs and Sector Experts. Both feel a dire need for a close and strong relationship and active participation of industry representatives at all levels.

The summary presented below indicates a need for skill building at all levels in production units across all segments under study. The combined results of survey with Establishments and IDIs with Sector Expert and secondary research reveal that majority of the skill requirements fall under two major groups -Skill Level 1 and 2. Other skills in demand are related to; technical expertise in food processing and preservation, quality assurance, research and development, maintenance engineering, and fall under Skill Level 3²

2 Skill Levels have been classified as per ISCO standard

Skills Required Non sector Specific	Skill level 1	Skill level 2			Skill level 3		Skill level 4	
	Elementary occupation s	Clerical and support workers	Service and sales workers	Craft and trade relat- ed workers	Managers	Technical and Associates Professionals	Professionals	Senior Managers
Research and De- velopment Skill								
Food Technologist/ Food Chemistry/ Bio technologist/ Food Processor/ Food Preservation Expert-								
Food Quality Assurance /Quality Control								
New Product Development Skill/ Copying Recipes								
Product Knowl- edge-								
Sale And Marketing Skills -								
Procurement Skills								
People Manage- ment Skills/Training Skills/Coaching Skills -								
Supervisory Skills -								
Technical Skills-								
Plant Operating Skills-								
Machine Operating Skills-.								
Tools And Equip- ment								
Plant/Machinery/ Tools and Equip- ment Maintenance, Repair and Saniti- zation								
Processing Skills								
Batch Making/ Control of Batch Operations								
Packaging Skills-								
Storage, supply and stock control of goods and materials in food operations								
Good Manufactur- ing Practice								
Good Hygiene Practice								
Health and Safety at Work Place								
Transportation								
TABLE 3: SKILLS REQUIRED AT ALL LEVELS-NON SECTOR SPECIFIC ³								

3 Non Sector Specific skills are the common skills that can be applied anywhere in the food processing industry

In views of most of the sector experts, food scientist and researchers are required to possess Masters or Doctoral degrees and are considered ‘hard to fill’ vacancies. With limited education and training opportunities available in the food processing sector, very few of them opt for building careers in food processing. Therefore, the current industry demand is being met by either employees who are Diploma/certificate holders in food processing techniques, or employees who have gained expertise due to their long association in the field. Further expert machine /plant operators with sound knowledge of plant /machine operations (repair and maintenance, sanitization, ability to train juniors etc.) are also difficult to find for the same reasons in views of sector experts.

Based on the results of interviews conducted, the major skills required within each sub sector under study are:

Skills Required-Sector Specific- Major Job Groups	Major Job Group
Value Added and frozen Food Processing- Knowledge of food preservation and processing techniques, cooking techniques Basic handling of fruits and vegetables- safe transportation, washing Visual examination -grading ,sorting Performing cutting operations peeling/cutting/slicing, dic- ing, chopping, coring, pulping Knives /cutting instruments handling techniques Preparing work station	☐ Craft And Trade Related Workers ☐ Elementary Occupations ☐ Technicians And Associate Professionals
Edible oil and fat- Technical Knowledge of the product	☐ Plant And Machine Operators And Assemblers ☐ Technicians And Associate Professionals
Beverage Production – bottling skills	☐ Plant And Machine Operators And Assemblers
Bakery and Confectionery- Knowledge of making bakery products, increasing shelf life of bakery products, cake decoration and garnishing tech- niques, knowledge of working with chocolates, creating new product, retail management skills , creation of new variety	☐ Plant And Machine Operators And Assemblers ☐ Craft And Trade Related Workers ☐ Technicians And Associate Professionals ☐ Sales and services workers ☐ Elementary Occupations
Agri based Products Research and development Knowledge of production process, use of efficient technology, Value addition, product enrichment Visual examination, grading , sorting, cleaning , packing , storage	☐ Technicians And Associate Professionals Plant and Machine Operators And Assemblers ☐ Elementary Occupations

TABLE 4: SKILLS REQUIRED WITHIN EACH SUB-SECTOR

Similarly the overall skills employers look for are summarized as follows⁴ ;

⁴ Based on the results of Quantitative Survey and in-depth interviews with Sector Experts and TSPs

Skill Level	Job Group	Desired Skills
Skill Level 1	Elementary Jobs	The employees at this level are desired to possess the physical capacity to perform the assigned duties; able to carry out simple routine tasks requiring manual dexterity; basic literacy and numeracy skills; ability to understand and carry out simple verbal instructions. The employers look for employees with basic knowledge of food hygiene and understanding of basic quality control procedures.
Skill Level 2	Sales and Service Workers	Employers look for multi skilled staff capable of managing routine functions at retail outlets- display, sales, customer handling, delivery of bulk orders , customized packing etc.
	Craft And Trade Related Workers	Employers look for multi skilled “KARIGARS” with expertise in their field .Other skills employ- ers look for, are the ability to create new products, efficient use of resources, ability to work independently and within groups , train the assistant/helpers, cause minimum wastage. The employers feel a strong need for craft related workers to be conversant with Good Hygiene Practice and Good Manufacturing practice, knowledge of how to work safely in the work envi- ronment and ability to deal with unforeseen events such as fire/accidents. Knowledge of First Aid in food processing industry is also desired.
	Plant And Machine Operators And Assemblers	The employers feel a need that the machine/plant operators , besides being physically fit to operate a machine should be able to read and understand the written policies and guidelines to operate the plant/machine, maintain simple records and prepare simple reports where desired. They should be able to follow detailed written instructions and procedures (operating manuals where there is one) and have an understanding of product and process specifications applicable to the work. Employers mostly look for technical skills to operate the plant and perform routine and standard functions associated with it (cleaning, minor repairing & mainte- nance). Ability to train /pass on knowledge to sub-ordinates is also desired.
Skill Level 3	Technical and Associates Professional	A strong need is felt to develop good quality food researchers, product developers, quality assurance and quality control technicians, food preservers, food processors etc. Quality Management being a regulatory requirement in the food processing industry and for obtaining certifications, the demand for qualified Quality Assurance employees demand is increasing and will see a rise in future too.

TABLE 5: OVERALL SKILLS – EMPLOYERS’ PERSPECTIVE

CONCLUSIONS

The food and beverage industry in Pakistan is experiencing a significant change in its workforce profile with ‘technological advancements in the production process,’ operatives being the key contributors. As the presence of technology is increasing, more and more workers are now operating machinery. Hence, a considerable shift in production workers from Skill Level 1 to Skill level 2 has been reported. Similarly a structural change in the retail operations has been creating more job opportunities for trained sales force.

Our research also indicates a scarce supply of skilled/craft related workers across all sub sectors under study and an ample supply of raw labor. Less skilled laborers generally start as helpers for experienced workers and learn the skills on the job.

Training options for the above mentioned job levels will not only provide better opportunities to the employees, by giving them an edge on raw/untrained staff, but will create awareness on how they can build up their career in Food Processing industry. On the other hand, it will become easier for employers who look for good, reliable and willing workers by hiring trained staff from reputable training institutes as per their requirements. It will save them the cost of recruitment and training.

RECOMMENDATIONS

The training needs of the above mentioned skills can mostly be acquired through technical and vocation training programs and can broadly be categorized into two major groups:

- A. Where practical training needs can mostly be met at the training facilities- Vocational Training (short term courses)
- B. Where high level of industry exposure is required at various stages of training– Technical Training (2-3 years programs)

For the skills that fall in group B, PSDF may encourage industry and TSPs’ collaboration by inviting joint proposals and devise a mechanism of assessment for them, ensuring an improved, stronger future and growth opportunities for trained workers, training institutions and the food processing industry as a whole.

DEMAND AND SUPPLY OF SKILLS/TRAININGS IN SECTOR

It has been derived (through demand projection exercise conducted for the study) that the cumulative demand for trainings in coming 5 years (2015-2020) is estimated to be 1,185,552. The year wise breakup of skills/trainings demand in food processing sector is depicted below:

Fiscal Year (July-June)	Training Demand in numbers
2015	210,142
2016	222,920
2017	236,504
2018	250,944
2019	265,042
Cumulative Demand for Training	1,185,552

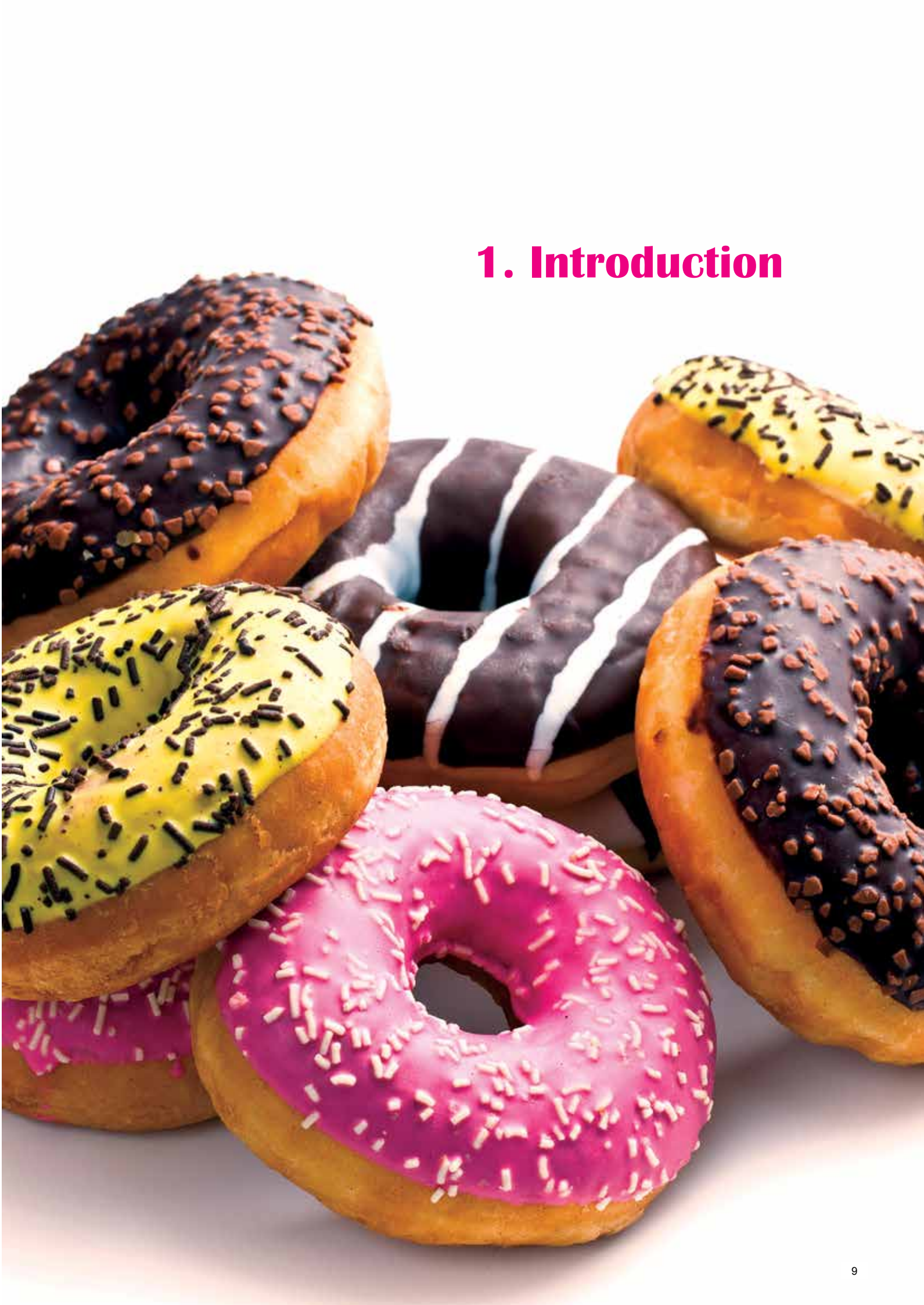
TABLE 6: TRAININGS DEMAND IN NEXT 5 YEARS

Further it can be seen from the table above and table 55 (chapter 7) that during 2019-2020 (5 years from now) the demand for trainings in the Food Processing Sector would be about 265,042. Further, majority of the trainings during 2019-2020 would be required for Cooking and Frying Techniques (37,580), followed by Plant and Machine Operating and repairing Skills (28,907), Food Preservation techniques (22,875), Food Technologist/ Bio technologist (22,007) and Visual Examination for Quality Product/ Sorting /Grading (19,607). Moreover, the demand and supply scenario for Food Processing key skills’ trainings during 2019-2020 illustrates a wide gap in demand (skills’ training demand) and supply (an estimated 6,233number of seats would be available in TSPs, related to Food Processing Sector, during 2019-2020) and this shows a substantial potential for trainings and capacity building in this sector⁵.

Survey results (both quantitative and qualitative) also reveal that almost all the TSPs covered are offering bachelors and Masters/PHD programs (apart from the Star Farms). None of the TSPs (apart from the Star Farms) offering specific TVET related courses for Food Processing Sector related skills (core and sector specific) and therefore short term training programs must be introduced by the TSPs associated with the Food Processing Sector for narrowing the skills supply gap (depicted in figure 26, chapter 7).

5 Chapter 7, Section 7.3 and Tables 55& 56

1. Introduction



1.1 Importance of the Sector

1.1.1. The food and beverage processing industry is the 2nd largest industry of Pakistan after textiles, accounting for 27% of the value-added production, and 16% of employment in the manufacturing sector. According to sector specific data for July 2013-March 2014 the food and beverage industry has been one of the major contributors (12.37%) to the overall growth of large scale manufacturing in Pakistan. The items which have shown positive growth in the food and beverages industry include; Sugar 10.88%, Soft drinks 34.03%, Juices, Syrups & Squashes 13.69% and Vegetable Ghee 4.05%⁶.

1.1.2. As projected in the ‘Pakistan Economic Survey 2013-2014; food processing exports are likely to grow manifold in the coming years, due in part to Pakistan being awarded the Generalized Scheme of Preferences Plus status (zero/low duty export) by the European Union. There are opportunities for Pakistan to push its exports and diversify markets for its products globally. Pakistani manufacturers can take advantage of access to relatively cheaper raw materials as well as more enhanced market access being sought through strengthening of trade relations⁷.

1.1.3. The food sector in Pakistan, like many of its other industrial counterparts, remains highly labor intensive. In addition to the presence of large scale, mechanized processing units, there is a multitude of informal, labor intensive, unregistered and retail set ups within the local market⁸. Moreover, as was rightly noted in the ‘Terms of Reference (TOR)’ document, the industry operates in a globally competitive environment of increasing technological change and the proliferation of mechanized interventions. This has great implications for how the workforce in these sectors is structured in terms of education and training. This structuring needs to correspond to specific requirements in technology, design, product development, adoption of food and health safety standards for export purposes, quality testing, and other pre- and post-production processes. There is also parallel urgency to incorporate higher levels of manual operating skills. This necessitates a coordinated and well-considered strategy to enhance skills levels so that the food processing industry may fully benefit from emerging export and local-market penetration opportunities.

1.2 Background and Purpose of the Study

1.2.1 Punjab Skills Development Fund (PSDF) is a Section 42, not-for-profit Company set up under the Companies Ordinance 1984 by the Government of the Punjab in partnership with Department for International Development (DFID), United Kingdom. PSDF aims to provide quality skills and vocational training to the poor and economically vulnerable members of the population in the districts in which it operates. PSDF is a ‘funding body’ established with the purpose of ensuring effective and efficient usage of existing training and development resources both in the public and private sector. It is expected that through this mechanism, a training market will germinate and take hold in the province that is

6 Data retrieved from: Pakistan Economic Survey 2013-2014 – Chapter on ‘Manufacturing and Mining’
7 Data retrieved from: Pakistan Economic Survey 2013-2014 – Chapter on ‘Growth and Investment’
8 A report by: Professor Dr. Fakir Muhammad Anjum on “Value addition in Pakistan-Challenges and Opportunities”, National Institute of Food Science and Technology, University of Agriculture Faisalabad, Pakistan

flexible enough to respond to the needs of the market with sufficient quality and efficiency, both for the industry and for the population.

1.2.2 The organization covers districts in Southern, Central and Northern Punjab, which include Bahawalpur, Bahawalnagar, Muzaffargarh, Lodhran, Lahore, Sargodha, Gujranwala, Faisalabad, Chiniot, Sheikhupura, Rahim Yar Khan, Vehari, Khanewal, and Narowal. These districts possess well-established industrial and agricultural clusters. PSDF intends to identify and address technical and vocational training needs in employment-intensive sectors, of which food processing is one. This timely intervention by the PSDF is a welcome step in the right direction as the provincial government has identified the food processing industry as a potential growth sector, and asserts that this sector calls for a coordinated and well-considered strategy to fully benefit from emerging export opportunities.

1.2.3 PSDF has commissioned Sidat Hyder Morshed Associates (Pvt.) Ltd. to conduct a food processing sector-specific study of emergent skill development needs that would explore broader skill needs and offer a comprehensive and holistic view of skills needed across specific food processing sub-sectors. This information will supplement PSDF’s overarching objectives concerning skills development in the Punjab. This study aims to also contribute to the organization’s goal of raising skills levels and competencies to provide impetus for enterprise and creating more and better jobs in the province.

1.2.4 The outcome of this Sector Skills Study will help in the assessment of skill needs in the food processing sector through the assessment of the current skill levels, development of plans for strengthening the skill potential of workers and identification of sector level skills delivery gaps. Moreover the outcome of this study will also help to develop a medium to long-term roadmap for human resource development in the food processing sector focusing on vocational and technical skills.



1.3. Scope of Work

1.3.1 The study, as per TOR document, covers establishments involved in the production of the following primary processed food and value added processed food:

1.3.2 Based on the ‘Terms of Reference’ document and feedback received from PSDF ‘Scope of Work’ for this study is reproduced and is attached as annexure 12.

A. Processed Foods	
Frozen food	Frozen vegetables, snacks and meals
Value-added processed foods	Jams, jellies, pickles, sauces, squashes, concentrates, vinegar, seasonings and spices, dry vermicelli, noodles, macaroni and spaghetti, fruit juices, fruit juice drinks, canned fruits, snack foods (potato crisps, salted nuts, products from rice flakes and corn grits, lentil and gram snacks), cereals (corn flakes, rice cereal, porridge, etc.)
Value-added fruit and vegetable and intermediate products	All value-addition of fresh produce and intermediate products
Edible oils and fats	Fruit and vegetable oils, ghee, margarine
Beverage production	Aerated drinks, juices, bottled water
B. Bakery and confectionery	
Cakes, breads, pastries, biscuits, ethnic confections, other dry bakery products, other confectionery (toffee, candies, bubble gum and chocolate).	
C. Agri-food processing (primary processed foods)	

CHAPTER	PURPOSE
Chapter 1: Introduction	This chapter explains the background and importance of food processing sector along with objectives and scope of work.
Chapter 2: Methodology	This chapter describes the methodology (including sampling methodology) adopted by us to complete various project tasks.
Chapter 3: Profiling the Food Processing Sector – Literature Review	This chapter provides an overview of global food processing industry trends, and size, production, consumption, structure and nature of several sub-sectors of food processing industry in Pakistan. This chapter also highlights key challenges facing the sector, sector growth, trade and major trading partners, employment and skills demand in the sector, policy initiatives and training supply.
Chapter 4: Findings of the Formal and Informal Establishments ‘Survey	This chapter provides the findings obtained from the survey of formal and informal food processing establishments.
Chapter 5: Detailed Findings –Training Service Providers	This chapter provides the findings obtained from the qualitative survey of TSPs providing training to the food processing sector. It provides key findings on courses, affiliations, accreditations, selection and recruitment of training staff, post-training facilities offered to graduates, plans for expansion and international certifications.
Chapter 6: Detailed Findings –Sector Experts	This chapter provides the views and opinions of industry representatives and sector experts interviewed for this survey. It provides their views on trends in the global food processing industry, Pakistan’s food processing industry, food processing’s; sector specific, non-sector specific and common skills (among several sub-sectors) required, assessments of skills requirement and skills gaps, on-the-job and off –the-job training opportunities, off –the-job training, TVET and the food processing sector
Chapter 7: Summary of Findings	This section of the report provides a summary of findings derived from In-depth interviews and quantitative survey of respondents companies. Recommendations on closing skills gaps, enhancing supply of skills, policy interventions required, opportunities for private sector participation, etc. are also presented in this chapter

TABLE 8: SUMMARY OF CHAPTERS

All food produced agriculturally; this will include primary processing of fruit and vegetable fresh produce, flour, sugar, pulses, and grains.

TABLE 7: PRIMARY AND VALUE ADDED PROCESSED FOOD COVERING IN SCOPE OF STUDY

1.4. Objectives of the Study

1.4.1 The overall objectives of this study, as per discussions with client and provided in the TOR, are to:

- a. Assess current skill levels (both vocational and professional) in the food processing sector of Punjab (not limited to the fourteen districts where PSDF operates);
- b. Inform PSDF’s plan to strengthen the skill potential of workers in the food processing sector; this will include identification of trades in demand, training courses required and training delivery options;
- c. Identify sector-level skills delivery gaps and the contribution required of other industry players,
- d. Develop medium- to long-term targets for human resource development (HRD) for the food processing sector focusing on vocational and technical skills, and;
- e. Identify key actions for technical and vocational education and training (TVET) policy and practice that will strengthen the sector and indicate complimentary policy actions to deal with HRD issues.

1.5. Structure of the Report

1.5.1 This report is structured as follows:

2. Methodology

2.1. Detailed Methodology

2.1.1 This section of the report provides a detailed look at the methodology employed for the conduct of the survey. The methodology itself was developed in response to the Terms of Reference (TOR) and scope of work provided by the client (PSDF) and was further crystallized during subsequent discussions with our points of contact within PSDF.

2.1.2 We have organized our methodology into the following components as illustrated below:



2.2. Initial Meeting/Stakeholder Meeting

2.2.1 Upon commencement, the consultants held an introductory meeting with client representatives. During this meeting the consultants discussed and finalized key study details such as objectives, activities, deliverables, timelines, responsibilities, roles, etc. Additionally, the sampling strategy and geographic distribution of sample including food processing sector establishments, business experts; TSPs, etc. were also discussed. During this meeting a point of contact was also identified from the client’s end with whom the consultants coordinated matters pertaining to the conduct of the survey.

2.2.2 During the initial meeting the consultants also requested for any relevant documents, research materials etc. that might be available with PSDF and could be useful to the consultants. PSDF highlighted a few online materials relevant to the study which provided an initial understanding of the requirements for survey questionnaire design, sampling methodology and geographic distribution of sample.

2.2.3 Soon after the kick-off meeting, the project team was mobilized. Within one week of aforementioned meeting, the consultants submitted a final work plan for execution of the project.

2.3. Desk Review of Literature, Data, Information Available

2.3.1 As part of the survey, a desk review of available literature, data and information was conducted. This included regional and national reports and other background information relating to context of the survey:

2.3.2 The secondary research covered:

- Industry structure and sector mapping of the processed foods sector in terms of size and products,
- Number of formal and informal establishments and their distribution in Punjab,
- Current industry status, current or upcoming changes; particularly changes like technology, organizational changes, price competition etc.
- Documentation pertaining to existing and future skill gaps/shortages in existing labors and new recruitments,
- Other data available from government, semi government and private food processing associations

2.3.3 The sources of information reviewed for the purpose of secondary research (of this study) are annexed (Annexure 13) at the end of this report;

2.3.4 Secondary research established the context of subsequent data gathering activities and further crystallization of project goals. This research also aided in identification of areas of exploration that were covered in subsequent meetings with relevant stakeholders (including food processing sector establishments, sector experts and TSPs) and in the

identification of key stakeholders tapped for the conduct of interviews.

2.4. Sample Design and Selection

Quantitative Survey (Formal/Informal Establishments)

2.4.1 We carried out extensive desk reviews of data available from different government, semi-government departments and private food processing sector associations. Based on these reviews and our discussions with PSDF during the course of study, our sampling was organized into the following three criteria/stages:

- i. Sub sector/Value Chain wise distribution
- ii. Category and type of the entity (as defined by SMEDA and several associations in the food processing sector)
- iii. District wise distribution - Southern, Central and Northern Punjab

Sub Sector/Value Chain Wise Distribution

2.4.2 As per the TOR document and based on our desk research, we have broadly classified the food processing industry (with respect to raw material used and industry sub-sectors) as follows:

- i. **Value added and frozen food processing units** (includes; ‘vertically integrated units’ in terms of operations and raw material used, ‘Frozen Foods’ including frozen vegetables, snacks and meals, ‘Value added Processed Food’ including jams, jellies, pickles, sauces, concentrates, fruit juice drinks, canned fruits, lentils, cereals, snack foods etc. and ‘value added fruit and vegetable and intermediate products’ including all value addition of fresh produce and intermediate products)
- ii. **Edible Oils and Fats Manufacturing/Processing units** (includes but not limited to ‘vertically integrated units’ in terms of operations and raw material used, fruits and vegetable oils, ghee, margarine etc.),
- iii. **Beverage production units** (includes but not limited to ‘vertically integrated units’ in terms of operations/sub sectors and raw material used, aerated drinks, juices, bottled water etc.)
- iv. **Bakery and confectionery manufacturing units** (includes but not limited to ‘vertically integrated units’ in terms of operations and raw material used, cakes, breads, pastries, rusks, doughnuts, pies, pancakes, muffins, toffees, candies, bubble gum, chocolates, specialty mixes and concentrates, breading, pancakes and batter mixes etc.)

2.4.3 The above classifications were supplemented with a further categorization of food processing companies⁹, as follows;

Categories of the Food Processing Companies

⁹ According to estimates provided by SMEDA, PFA, Chamber of commerce, Punjab Development Statistics 2013 and Bureau of Statistics

given representative coverage in the sample.

North	Central	South
Attock	Faisalabad	Multan
Narowal	Lahore/Sheikhupura	Sahiwal
Sialkot	Gujranwala	Muzaffargarh
Rawalpindi/Islamabad	Sargodha	Bahawalpur
		Bhawalnagar
		Vehari
		Lodhran

TABLE 9: GEOGRAPHIC DISTRIBUTION

- i. **Informal/Cottage establishments** (including micro and small scale units) – up to 30 employees and producing not more than 100 units (Kilograms/Liters) a day
- ii. **Formal establishments** (Organized sector means capital-intensive factories or mechanized manufacturing process) – More than 30 employees (including medium size establishments as well) and can produce more than 100units (Kilograms/Liters)a day

Geographic Distribution

2.4.4 Based on the classifications above, a proportionately distributed sample was drawn from 15 selected districts (as listed below).Some 4 districts from North and Central Punjab, and 7 districts from Southern Punjab were included in the survey. District participation in the sample was done based upon the presence of units relevant to the survey within the districts. Another factor for consideration in this regard was to ensure that the units/districts tapped for inclusion in the sample provided coverage to the various value chains identified for the purposes of the survey. This approach ensured comprehensive coverage of the formal and informal sectors as well as ensured that available and active value chains were

Formal Establishments

2.4.5 Based on the classifications above, a proportionately distributed primary sample of formal establishments was drawn from 15 selected districts. We then made an additional pool of formal establishments using the similar sample drawing approach that served as a backup sample in the eventual-ity of drop outs/refusals.

2.4.6 Table 10 below shows the total sample size; 107 establishments for formal sector, with regards to all 4 sub-sectors proportionately distributed amongst regions. The list of formal establishments along with their contact details, surveyed for the purpose of this study is provided at the end of this document as annexure 1.

Region wise sub-sectors’ breakup (Formal Sector)					
Central Punjab		North Punjab		South Punjab	
Processed Food	33	Processed Food	11	Processed Food	15
Edible Oils	8	Edible Oils	2	Edible Oils	2
Beverages Production	0	Beverages Production	1	Beverages Production	1
Bakery and Confectionery	24	Bakery and Confectionery	3	Bakery and Confectionery	7
Total	65	Total	17	Total	25

TABLE 10: REGION WISE SUB-SECTORS’ BREAKUP (FORMAL SECTOR)

Informal Establishments

2.4.7 As per our TOR, the survey sample was to include approximately 78 respondents from the informal food processing sector. The region wise bifurcation of the sample for informal establishments based on the field work findings and secondary research (sample size of each region finalized with PSDF)is depicted in table 11:

Region wise sub-sectors’ breakup (Informal Sector)					
Central Punjab		North Punjab		South Punjab	
Value added Processed Food	23	Value added Processed Food	8	Value added Processed Food	18
Edible Oils	0	Edible Oils	0	Edible Oils	0
Beverages Production	6	Beverages Production	1	Beverages Production	1
Bakery and Confectionery	15	Bakery and Confectionery	3	Bakery and Confectionery	3
Total	44	Total	12	Total	22

TABLE 11: REGION WISE BIFURCATION OF SAMPLE (INFORMAL ESTABLISHMENTS)

2.4.8 Due to the informal undocumented nature of the sector, secondary sources (Industrial Directory 2011, and data from PFA and SMEDA) were used initially to draw up a sample, which was then verified and adjusted (those companies which were not operational or did not exist, were replaced by similar scope companies)where required during the course of fieldwork.

Interviews with business experts and training service providers (TSPs)

2.4.9 As per the scope of work, we conducted interviews of 12 Training Service Providers (TSPs); the list of these TSPs along with their contact details is annexed (Annexure 3) at the end of this report. During the selection of TSPs we kept the following key points in mind:

- Capacity of training firm,
- Level and diversity of skills provided,
- Capacity to provide several trainings relevant to the value chain mentioned above,
- Capacity to provide on-the-job training
- Availability of standard equipment and are regulated with concerned authorities,
- Certifications provided to students/graduates

2.4.10 Furthermore we also conducted interviews of 36 sector experts across Punjab. We organized the Sector Expert sample into the following groups of experts.

Type of Experts	Sample Size
Economists/Government sector experts,	3
Top tier management of elite food processing industries (including edible oil, ethnic confectionery, frozen foods, bakery and confectionery, fresh fruits and vegetables etc. industries)	12
Curriculum developers and	11
Researchers, freelance experts, food quality/standards experts etc.	10
Total	36

Table 12: Sector Experts

2.4.11 The actual number of Quantitative Surveys and IDIs (TSPs and experts) conducted in each district/region is presented in the following table:

Region	Districts	Quantitative Surveys								IDIs	
		Formal				Informal				TSPs	Sector Experts
		PF	EO	BV	BC	PF	EO	BV	BC		
Central	Faisalabad	7	1	0	2	10	0	0	8	4	19
	Sargodha	6	0	0	6	1	0	0	1	1	-
	Gujranwala	1	0	0	3	4	0	0	2	-	-
	Lahore/Sheikhupura	19	7	0	13	8	0	6	4	2	13
	Total	33	8	0	24	23	0	6	15	7	32
Region Total		65				44				7	32
Northern	Rawalpindi/ Islamabad	9	2	1	1	3	0	0	1	1	3
	Narowal	1	0	0	0	2	0	0	0	-	-
	Attock	0	0	0	1	2	0	0	1	-	-
	Sialkot	1	0	0	1	1	0	1	1	-	-
	Total	11	2	1	3	8	0	1	3	1	3
Region Total		17				12				1	3
Southern	Multan	8	0	0	4	14	0	1	1	2	-
	Sahiwal	4	1	0	0	1	0	0	0	1	-
	Bahawalpur	2	0	0	0	2	0	0	0	1	-
	Bhawalnagar	1	0	1	2	1	0	0	0	-	-
	Vehari	0	2	0	1	0	0	0	2	-	-
	Muzaffargarh	0	0	0	0	0	0	0	0	-	-
	Lodhran	0	0	0	0	0	0	0	0	-	-
	Total	15	2	1	7	18	0	1	3	4	-
Region Total		25				22				4	-
Karachi/ Hyderabad	Karachi	-				-				-	1
Total		107				78				12	36

Table 13: Total Quantitative Surveys and IDIs (TSPs and Experts)

PF=Processed/Frozen Food EO=Edible Oils BV= Beverages BC=Bakery & Confectionery

2.5. Survey Instruments

2.5.1 The survey instruments/data gathering methods employed for this engagement are as follows:

Quantitative Survey Questionnaire

2.5.2 As per our various discussions with the client and based on the contents of the TOR document, the survey instrument was administered at the enterprise level to effectively capture information regarding present and future training needs. As per our consultations with the client, and with their approval, one survey instrument was used for the survey across the range of food processing units to be covered under this survey.

2.5.3 The major thrust of the quantitative data gathering effort through this questionnaire was to effectively cover/capture key factors such as;

- Profile of the firm
- Workforce characteristics
- Type and level of skills needed in sector
- Skill gaps in existing workforce
- Current and future demand of skills
- Existing and future skills shortages in new recruitments
- Relationship with TSPs, etc.

2.5.4 The instrument was administered in the form of a structured interview to aid the respondent in filling it out. A copy is provided in the annexure (Annexure 8).

TSPs-Interview Guide

2.5.5 TSP interview guide was administered to identified TSPs / OJTs. We used semi structured, open ended questions in the guide with the goal of gathering as much information as possible from the respondents during the conduct of interviews.

2.5.6 The attached TSP interview guide, which has also been annexed (Annexure 9) to this document, covers the following key factors;

- Profile of the Institute
- Programs/courses offered by the Institute
- Selection criteria for food processing trades for which trainings/courses are offered
- Development and review of curriculum/course content
- Training providers' capacity to develop and adapt curricula,
- Ability to offer new vocational/technical courses,
- Linkages with employers etc.

In-Depth Interview Guide- Sector Experts

2.5.7 The IDI guide served as a guiding document for meetings, discussions and conversation with various sector experts and informed sources. The purpose was to ensure that key areas related to the study received sufficient coverage and benefit from the expertise of the interviewees. The in-depth interview guide was intended to facilitate discussions with

sector experts of food processing industry that included:

2.5.8 Top management/experts from reputed food processing establishments, food processing consultants and researchers, economists and government sector, curricula developers and academia etc.

2.5.9 The annexed (Annexure 10) IDI guide covers the following:

- Global food processing industry- opportunities, challenges etc.
- Pakistan's food processing Industry – challenges, local demand, etc.
- Skills requirement
- Assessments of skills levels and skill gaps
- On-the-Job and Off-the-Job training
- Role of government
- Awareness about PSDF etc.

2.6. Pre-Test / Pilot Test of Survey

2.6.1 We performed 5 pre-tests of the survey instruments prior to the main survey. We then incorporated changes, based upon feedback received during the pre-testing exercise.

2.6.2 Pilot tests ensured the accuracy of data captured, length of survey in terms of time duration and relevance etc. Steps conducted to pre-test the survey instrument included:

Expert review -The survey design specialist and the sector specialist from our own team reviewed the survey instruments to assess its appropriateness to the objectives of the survey and to ensure its alignment with the nature of the data to be gathered.

Industry Experts' Interviews -We conducted number of rounds of in-depth interviews with 3-4 industry experts using the designed survey instrument. At the end of each interview, we diagnosed emergent issues with the instrument, resolved these and conducted final round of interviews prior to instrument finalization.

2.7. Survey Administration Data Collection Methods

2.7.1 A one day training course was developed for the purposes of training enumerators on the survey instruments. The course was divided into a half day review and familiarization component and a half day practical exercise. Each enumerator was also required to perform mock interviews as part of role playing exercise.

2.7.2 Following the training, field work commenced. To set the desired quality standard the Fieldwork Supervisors also accompanied the enumerators on initial field visits.

Survey Management and Questionnaire Administration

2.7.3 For the purpose of the survey we divided data collection into three teams; South Zone, North Zone and Central Zone, as per Table 9 of this chapter. Each team comprised two enumerators, one of which was relatively senior resource

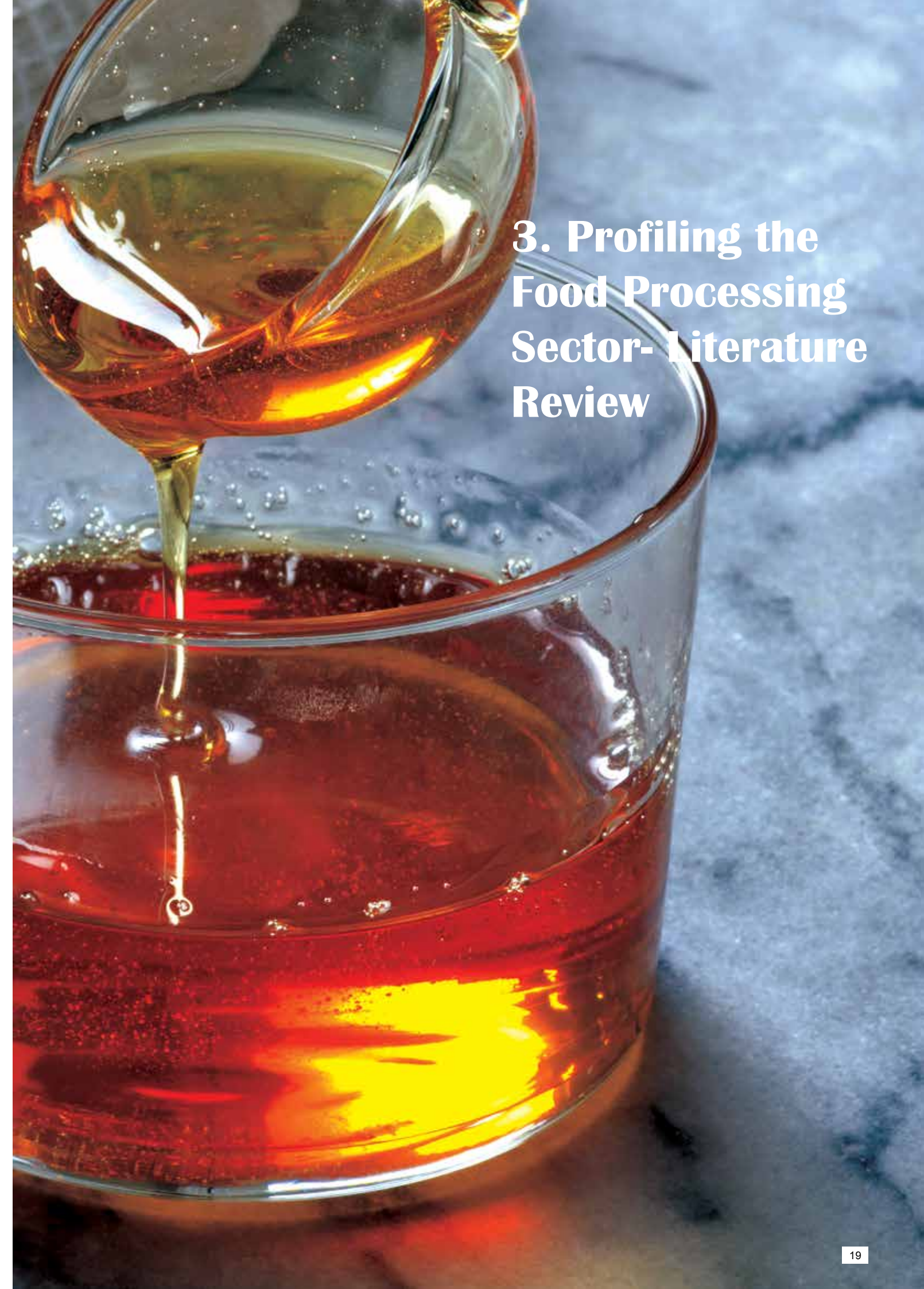
who had at least more than 3 years' experience of administering large scale surveys, while the other had at least 1-2 years' experience of conducting field work of large scale surveys. These teams were headed by a Fieldwork Supervisor/Manager with extensive experience of managing data gathering teams and conducting several large scale surveys of similar nature. The Field Manager and enumerators had back office support for the mailing of introductory letters and setting up of interviews.

2.7.4 Field work began on 24th November 2014, after training had been provided to the team based in a particular zone/city (as depicted above). Field coordination and setting of targets were being managed by Fieldwork Supervisor. It was the responsibility of the Fieldwork supervisor to ensure that field work proceeded as scheduled.

2.7.5 The field teams administered the questionnaires as per their scheduled appointments. On average each enumerator was able to conduct 3-4 interviews a day as permitted by the schedule.

2.7.6 Quality checks on a random selection of 5-6% of the total sample were conducted, in terms of completeness and internal consistency. Furthermore, the findings of qualitative and quantitative data analysis were compiled in the form of weekly reports and submitted to PSDF each week for review and approval.

2.7.7 Data entry began approximately half way through the data collection exercise so that data entry could be completed shortly after the completion of the data collection activity. The data thus gathered by the consultants were then compiled and analyzed after which report writing commenced.



3. Profiling the Food Processing Sector- Literature Review

3.1 Introduction

Industry Snapshot

3.1.1 This chapter provides an overview of the food processing sector in Pakistan specifically in Punjab region. The aim of this chapter is to provide a context wherein demand and supply projections of Technical and Vocational Education Training (TVET) for 5 years can be established. Furthermore, it also discusses the demand drivers for skills in the food processing sector. This chapter will briefly illustrate the current status of the industry and its growth and relevance to Pakistan including; employment potential, production processes, export performance and changes that are beginning to, or are expected to affect the industry, particularly technology.

3.2 Overview of Food Processing Industry

Global Processed Food Trade and Pakistan Share

3.3.1 Global trade in processed food products during 2013 was US\$ 541.69 billion. Pakistan's share of exports in this sector was only US\$ 1.33 billion (less than 0.25%) as mentioned in table 14.

3.3.2 World trade statistics for processed foods are accumulated in 8 sub-sectors. Exports value of Pakistan in each of these sub-sectors during 2009-2013, and comparison of Pakistan's export with world total during 2009-2013 are presented in table below. The overall results (total Pakistan's processed food exports during 2009-2013) as depicted in table below, show an increasing trend of Pakistan's exports during these years. However, the export figures during 2009-2013 show negligible contribution of Pakistan towards World's total exports.

TABLE 14: SORTED BY EXPORT VALUE IN 2013¹⁰

(figures in US\$ '000)																	
HS Code	Sector	Exported value in 2009	World Total 2009	Paki- stan Share % 2009	Exported value in 2010	World Total 2010	Paki- stan Share % 2010	Exported value in 2011	World Total 2011	Pakistan Share % 2011	Exported value in 2012	World Total 2012	Paki- stan Share % 2012	Exported value in 2013	% of Total 2013	World Total 2013	Pakistan Share % 2013
17	Sugars and sugar confectionery	111,893	34,308,229	0.33%	87,956	44,735,324	0.20%	66,650	53,843,447	0.12%	253,535	52,231,706	0.49%	633,568	47.47%	50,953,628	1.24%
22	Beverages, spirits and vinegar	121,561	79,480,197	0.15%	187,455	86,858,059	0.22%	272,750	104,071,442	0.26%	172,771	106,331,168	0.16%	364,159	27.29%	110,830,926	0.33%
15	Animal, vegetable fats & oils, cleavage products	97,373	66,032,003	0.15%	85,926	81,132,041	0.11%	192,509	110,733,390	0.17%	220,910	106,386,990	0.21%	155,066	11.62%	98,622,935	0.16%
19	Cereal, flour, starch, milk preparations and products	21,664	44,637,458	0.05%	24,273	47,911,285	0.05%	49,793	55,881,250	0.09%	47,810	57,931,324	0.08%	74,504	5.58%	64,107,673	0.12%
20	Vegetable, fruit, nut, etc. food preparations	24,430	44,679,182	0.05%	30,974	47,581,580	0.07%	56,028	56,622,295	0.10%	64,867	56,786,984	0.11%	69,313	5.19%	60,516,455	0.11%
21	Miscellaneous edible preparations	13,419	43,562,433	0.03%	14,207	47,405,502	0.03%	19,129	55,318,239	0.03%	25,611	56,385,811	0.05%	25,098	1.88%	62,301,564	0.04%
16	Meat, fish and sea-food food preparations	27,795	34,748,282	0.08%	30,146	37,262,066	0.08%	55,904	44,597,487	0.13%	33,435	47,028,939	0.07%	12,624	0.95%	49,087,544	0.03%
18	Cocoa and cocoa preparations	138	34,119,225	0.00%	37	38,104,162	0.00%	96	43,391,599	0.00%	310	43,701,175	0.00%	209	0.02%	45,270,140	0.00%
	Total processed food	418,273	381,567,009		460,974	430,990,019		712,859	524,459,149		819,249	526,784,097		1,334,541	100.00%	541,690,865	

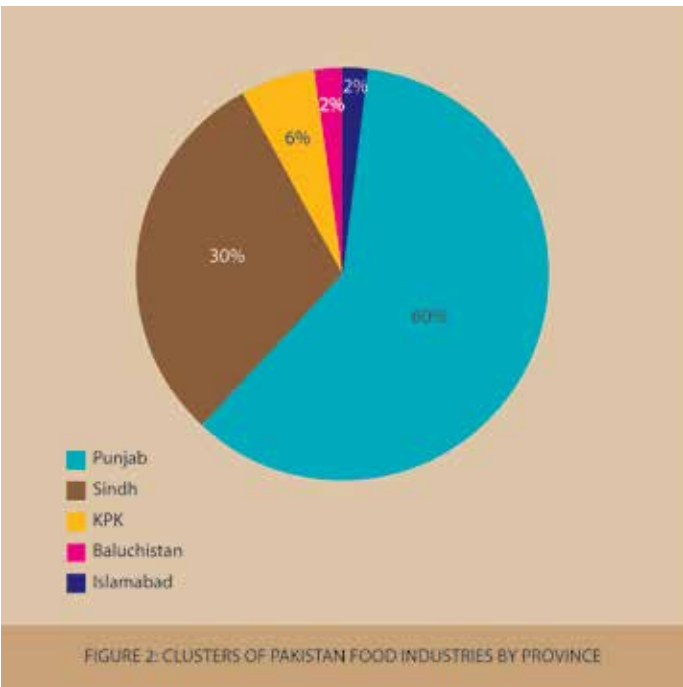
3.2.1 Global food retail sales are about \$4 trillion annual¹¹. Over 60% of total retail processed food sales in the world are accounted by the U.S, EU and Japan together. Despite the large size of the industry, only 6% of the processed food is traded over the world as compared to bulk agricultural commodities where 16% of produce is traded.¹²

3.2.2 The sector has shown the highest growth in developed economies, especially across Western Europe, North America, Japan and Australia¹³. Japan is the largest food processing market in the Asian region, though China and India are catching up fast and are likely to grow more rapidly.

3.2.3 One of the most technically advanced food-processing industries globally is the Australian Food Processing Industry. Countries in the Sub-Sahara African region, Latin America and parts of Asia continue to be on the lower-end of technology competence in food items. Europe, North America, and Japan are on the higher-end of technology, with a sharper shift towards convenience and diet foods.¹⁴

3.3 Clusters of Processed Food Sector in Pakistan

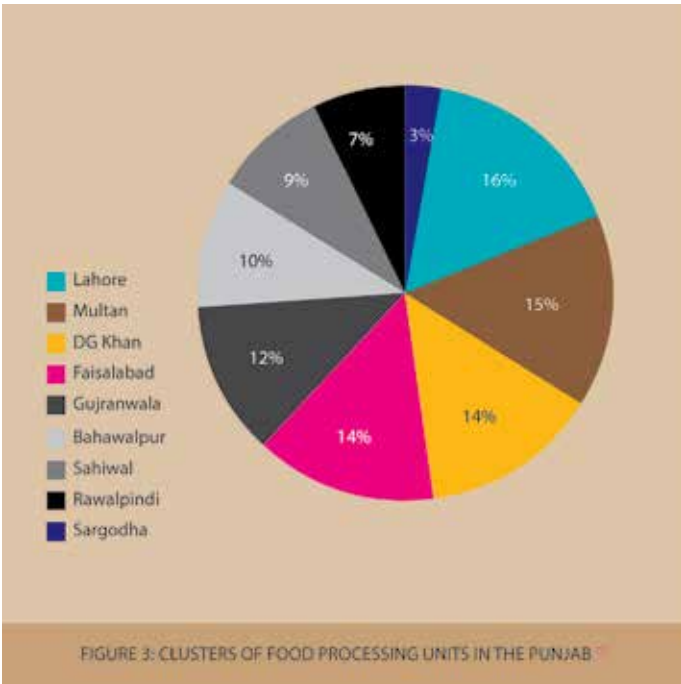
3.3.1 Most of the food industry in Pakistan is concentrated in the Punjab (60%) followed by Sindh (30%). KPK has a 6% share while Baluchistan and Federal capital have 2% each¹⁵,



Regions	Units	%
Punjab	1,928	60%
Sindh	556	30%
KPK	118	6%
Baluchistan	36	2%
Islamabad	29	2%
Total	2,667	100%

TABLE 15: CLUSTERS OF INDUSTRIES – FOOD PRODUCTS AND BEVERAGES ¹⁶

3.3.2 Together the sector includes over 1800 processing units. Within the Punjab, majority of the food processing units (~72%) are located in five divisions of Lahore, Multan, DG Khan, Faisalabad and Gujranwala. Bahawalpur, Sahiwal, Rawalpindi and Sargodha divisions have relatively fewer numbers of units.



3.3.3 Since the food processing sector is very large and includes a diverse range of industries, we will first present the overall status of three major industry groups, i.e.

- a. frozen food,
- b. value addition in major food crops, and
- c. Fruits, vegetables and intermediate products¹⁸

3.3.4 After discussion of the major industry groups we will present a brief view of the sub-sectors within each of the three major industry groups.

A. Frozen Foods

3.3.5 The demand for processed and frozen food is expected to grow. This growth can mainly be attributed to changing urban lifestyles in the country. Another reason for growth is a growing population. Market diversification of traditional brands into this sector, like Dawn Foods, for example, have provided consumers with options that hitherto either did not exist or belonged to the informal sector and more importantly, not in frozen form.

¹⁷ Ibid 16
¹⁸ Arfin, R. Shehla (2011), "Frozen Food Products Marketing And Distribution Challenges in a Developing Country"

3.3.6 A nascent consumer and retail culture is also evolving in urban markets. Malls with supermarkets and hypermarkets like Metro and Hyperstar have also played a key role in attracting customers towards processed and frozen food items in metropolises like Karachi, Lahore and Islamabad. Seasons Foods, a relatively new entrant which started operations in 2006, is also striving to gain a strong footing in the domestic market by offering frozen vegetable products like potato cutlets, vegetable samosas and vegetable spring rolls, to name a few. Dawn Foods also made their presence felt in the frozen food market with their parathas, frozen ready to eat flatbread. Cash and carry stores in bigger cities now offer more options to customers in the frozen food market as consumer demand for such products increases¹⁹.

B. Value Addition in Major Food Crops

3.3.7 Pakistan is a major producer of industrial crops such as wheat and rice. The value added products from these crops are dry vermicelli cereal, noodles, macaroni, poppadum's, pasta and spaghetti etc. The production of wheat was 25,286 thousand tons in 2013-14. Its share in value added products however remained low at 14.4% owing to the staple nature of wheat in the country. Rice is the second-most important cereal crop and its production was 6,798 thousand tones²⁰.

3.3.8 Growth and crops are abundant in Pakistan but suffer from post-harvest losses occurring after the harvest during transport, processing and packaging stages. The Harvest and post-harvest losses of wheat and other grains range between 15 - 18%.²¹

3.3.9 Good processing techniques, packaging, transportation and storage can play an important role in reducing spoilage and extending shelf life of value added items. Extrusion technology in recent times has become popular in many developed countries and is now emerging in Pakistan. It is believed that this technology has numerous merits including energy saving, higher production, variety of products, a wide range of ingredient usage and increased nutritive value. Currently, extrusion technology in Pakistan is being used in processing food products like breakfast cereals, direct expanded snacks, snack pellets, pasta, etc.²²

3.3.10 The industry needs more technically trained people in secondary processing in order to mitigate harvest & post-harvest losses. At present, only few universities/institutes are offering specialized courses on Post-Harvest Technology& Management and Extrusion technology.

C. Fruits, Vegetables and Intermediate Value Added Products

3.3.11 There are more than 25 processing plants for fruits, vegetables, and intermediate value-added products in the country. Most of the processing plants are citrus based, owing to its relative abundance. The second largest processing capacity in the industry is for mango. Major fruit processing plants are located in Karachi, Lahore and Peshawar. They produce jams, jellies, squashes, pickles and canned fruits. The production of fruit-preserve is currently estimated at 15,000 tons out of which; jams, jellies and marmalades are 2,000 tons,

pickles and chutneys 10.000 tons and syrups and 18 million bottles of squashes.²³

Major Players in Sector

3.3.12 Several global food giants and leading industrial enterprises are already making their presence felt in this sector. Some of the key players are Nestle Pakistan, Mitchell's Fruit Farms Ltd., Unilever Pakistan, and Engro Foods etc. An analysis of financial statements of these food companies shows an increase in their sales and net profit e.g. the sales of Nestle increased from Rs. 34.18 billion in 2008 to Rs. 86.22 billion in 2013, an increase of 152%. Similarly net sales of Mitchell's Fruit Farms also increased by 100.6% during CY 2008-13.²⁴

Current Situation and Future Needs

3.3.13 There are more than 90 citrus grading/packing plants in the country, which are all concentrated in Bhalwal/Sargodha, whereas in Toba Tek Singh the second largest citrus-producing district, there is only one citrus grading/packing plant. This situation is worse for other fruit crops. Due to short shelf life of raw materials, half of the fruit produced cannot be packaged, transported or stored and is eventually wasted due to non-availability of adequate storage infrastructure or processing facilities close to fields. There is a prevalent need for installing more fruit and vegetable value added processing industries in the country. The current capacity is under-utilized and can be enhanced 2-3 times.²⁵

3.3.14 There is a high demand of trained human resource in the industry across all levels. The shortage is more severe at the floor level, which holds significant proportion of the workforce employed in this sector. Further sector experts have highlighted (in-depth interviews of sector experts) that several in-house production facilities are being constructed that will create opportunities for skilled labor force in primary processing especially in harvesting, cleaning & storage of the product. The industry experts also highlighted future skills demand for secondary processing skills, especially canning skills.²⁶

3.4 Edible Oil and Fats

3.4.1 The 'edible oil and fats' sector covers vegetable oil, ghee and margarine. The domestic source of edible oil is cottonseed, sunflower, canola and rapeseed/mustard. Total availability of edible oil from all sources is provisionally estimated at 2.35 million tons during 2012-13 (July-March).²⁷ The table below provides the area and local production of oilseed crops in Pakistan:

¹¹ United States Department of Agriculture, Economic Research Service (2012)
¹² Report on Indian processed food industry (2008)
¹³ Ibid 12
¹⁴ Ibid 12
¹⁵ Census of Manufacturing Industries Pakistan
¹⁶ Ibid 16

¹⁹ Ibid 19
²⁰ Pakistan Bureau of Statistics, 2014
²¹ Economic Survey of Pakistan 2014
²² Pakistan Society of Food Scientists and Technologists
²³ Horticultural Research Institute, AARI, Faisalabad.
²⁴ Financial Statements of Nestle Pakistan, Mitchell's Fruit Farm, 2013
²⁵ USAID Agribusiness Quarterly Report, Issue: July – Sep 2012
²⁶ Discussions with experts from SMEDA and TDAP
²⁷ Pakistan Economic Survey 2012-2013

Crops	2011-2012			2012-2013 (P)		
	Area	Production		Area	Production	
Crops	(000 Acres)	Seed (000 Tonnes)	Oil (000 Tonnes)	(000 Acres)	Seed (000 Tonnes)	Oil (000 Tonnes)
Cottonseed	6,958	3,212	385	7,143	3,393	407
Rapeseed/Mustard	575	203	61	452	158	51
Sunflower	877	473	179	700	378	144
Canola	27	30	11	30	18	10
Total	8,437	3,918	636	8,325	3,947	612
Source: Pakistan Oilseed Development Board P: Provisional (July – March)						
TABLE 16: AREA AND PRODUCTION OF MAJOR OILSEED CROPS						

3.4.2 Edible oil is mainly supplied through three main sources; oilseeds produced domestically in Pakistan accounts to 23%, Pakistan imports of refined edible oil accounts to 68% and local oil production from imported oilseeds accounts to 9%.²⁸

3.4.3 Total oilseed crush in 2014/15 is anticipated at 5.7 Million Metric Tonnes (MMT), 5.5 % higher than in 2013/14. Almost 85 to 95 % of total oilseed production is crushed for oil with the balance used for food, feed, and seed purposes. Although the cotton crop is grown for its lint, cottonseed contributes 50 to 60 % to local edible oil production.²⁹

Current Situation of Sector

3.4.4 Vegetable ghee & cooking oil industry is one of the largest manufacturing sectors in the country. The industry has total 160 small and medium sized vegetable oil and ghee units. Out of the total units, about 87 firms are registered; also there are a large number of unregistered firms who are filling the gap between demand and supply. Out of 44 registered units in Punjab, 37 are operational.³⁰

TABLE 17: TOTAL NOS. OF VEGETABLE OIL AND GHEE UNITS		
Pakistan	Registeredunits	Unregistered units
	87	73

3.4.5 Pakistan is also the largest importer of palm oil after China & the European Union. Pakistan’s edible oil industry has 10 refining units, which imports crude palm oil.³¹ The refining units have fully automatic plants installed for refining. Technical or specialized personnel are not required to operate the plant. Even for packaging, skilled workers are not required as it is done automatically through specialized machinery. Only unskilled labor is required for loading purposes.³²

3.5 Beverages

3.5.1 Major products of the beverage processing industry include dehydrated products, fruit products including fruit juices/drinks, canned fruits and carbonated beverages, etc.³³ For our purposes, the beverage industry of Pakistan has been organized into two broad categories, (1) production of Juices,

Squashes and Syrups and (2) Aerated beverages.

Production of Juices, Squashes and Syrups

3.5.2 Pakistan has witnessed impressive growth of 16.34% in juices, syrups & squashes. The key players in this sector are Nestlé Pakistan Ltd, Mitchells Fruits and Benz, Popular Group of Industries, Pakistan Fruit Juice Company (Pvt.) Limited, Naurus (Pvt.) Ltd., Paradise fruit juice Ltd., Maaza and Shezan International. They are involved mainly in production of fruit juices, syrups, pulps and squashes in the country. Their production units in Punjab are mostly located in Lahore, Bahawalpur and Sargodha. Given the growth and potential in the fruit juice market, there is great opportunity for expansion and employment generation. Pakistan can grow more in this sector but post harvesting losses mainly because of; unavailability of modern processing techniques in the sector and the lack of modern fruit processing technology skills, are the biggest barriers hampering this growth.³⁴

Aerated Beverages

3.5.3 Pakistan has witnessed growth of 3.98 % in Beverages from 2009 to 2014.³⁵ The table below shows the total production of beverages in Pakistan.

TABLE 18: PRODUCTION OF BEVERAGES	
Year	(000) Liters
2009 – 10	1,554
2010 – 11	1,490
2011 – 12	1,812
2012 – 13	2,081
2012 - 13	1,308
2013 -14 P	1,618
P : Provisional	
Economic Survey of Pakistan 2013 – 14	

3.6 Bakery and Confectionery

3.6.1 According to Pakistan Biscuit & Confectionery Manufacturers Association, Pakistan Bakery and Confectionery Industry has grown at an average annual rate of 6.5% to 7.5%

during 2002-2010. The formal market is dominated by two leading players, Continental Biscuits Limited and English Biscuits Manufacturers. According to industry sources, together, the two companies make up almost four-fifths of the sales of the organized sector in this field. However, the majority of the overall demand for biscuits is still fulfilled by the informal sector; smaller players and bakeries whose sales figures remain largely unmeasured. After EBM and Continental Biscuit the market is occupied by Hilal confectionery, Candy land and Ismail Industries etc. which produces candies, chew toffee, wafers, powdered drinks, chewing gum, pan masala etc. In addition, Mitchell’s Fruits Farms Ltd. has 10 products in sugar confectionery³⁶.

3.6.2 The revenues of English Biscuits Manufacturers, which claims over 40% of the branded biscuits market, have clocked in at a compound annual growth rate (CAGR) of 26% from fiscal year FY2009 to FY2012.³⁷ Continental Biscuits Limited, another important player, has a CAGR of 23.7% during the four-year period. Talking about branded biscuits, the Economists note that an improved distribution network, quality control and the rising culture of ‘tiki packs’ are some of the main factors contributing to this growth³⁸.

3.6.3 Overall the industry faces shortage of skilled labor in formal sector for machine operators. Currently, the machine operators have inadequate ability to understand and use different settings of time, temperature on different machines for different biscuit products. Specifically, oven operating skills are in demand where technical knowledge leading to efficiency of operations is required (e.g. oven operators in Biscuit making). However, in the informal sector, cooking and frying, recipe making and baking skills are in demand³⁹.

Agri – Food Processing (Primary Process Foods)

3.6.4 Pakistan has a range of agro-climatic zones where diverse commercial crops are grown. This sector includes all food produced agriculturally which includes primary processing of fruits and vegetables fresh produce, flour, sugar, pulses and grains. The agriculture sector accounts for 21 % of GDP and 43.7 % of employment⁴⁰.

3.6.5 The table below depicts the global agricultural output and current standing of Pakistan⁴¹:

Countries	2014 (Billions in USD)
China	1,036
India	356
EU	331
USA	192
Nigeria	184
Brazil	123
Indonesia	122
Russia	86
Turkey	72
Pakistan	61
TABLE 19: LARGEST COUNTRIES BY AGRICULTURAL OUTPUT	

36 Data retrieved from <http://www.mitchells.com.pk>

37 Annual Report of English Biscuit Manufacturers

38 Annual Report of Continental Biscuits Limited

39 Discussions with Sector Experts, In depth Interview

40 Economic Survey of Pakistan, 2014

41 International Monetary Fund

42 Kharif crops are domesticated plants cultivated and harvested in the Punjab Province, during the rainy (monsoon) season, which lasts between June and September

Fresh Fruits and Vegetables

3.6.6 More than 22 varieties of vegetables are produced in our country. The kharif⁴² vegetables includes: lady finger, squash, brinjal, bitter gourd, bottle guard, pumpkin, lufa, long melon and cucumber etc. The rabi⁴³ vegetables include: radish, turnip, carrot, spinach, cauliflower, cabbage, sweet potato, peas and tomatoes etc. Potatoes are produced all year round. The table below depicts production of vegetables in Pakistan, particularly in Punjab in the year 2012⁴⁴.

Crops	Kharif	Rabi
Production (tonnes)– Pakistan	917,413	2,194,186 Potatoes – 3,392,493
Production (tonnes) – Punjab	577,235	1,970,655 Potatoes – 3,235,322
TABLE 20: PRODUCTION (TONNES)		

Flour

3.6.7 There has been tremendous increase in the milling capacity in Pakistan. In 1947, Pakistan had only 19 flour mills but now there are total 1,350 flour mills spread across the country. There are 915 registered flour mills working in Pakistan, with the daily milling capacity of 77,275 Metric Tonnes daily.⁴⁵

	Total No. of Flour Mills	Registered	Unregistered
Pakistan	1,350	915	435
Punjab	1,080	732	348
TABLE 21: NUMBER OF FLOUR MILLS			

Sugar Sector

3.6.8 The sugar industry in Pakistan is the second largest agro-based industry. Pakistan is an important cane producing country and is ranked fifth in the world cane acreage and 9th in sugar production. The share of sugar industry in value added of agriculture and GDP are 3.2% and 0.7%, respectively. The sugar sector constitutes 4.2% of manufacturing. It directly or indirectly employs over 1.5 million people, including management experts, technologists, engineers, and financial experts, skilled, semi-skilled and unskilled workers⁴⁶.

3.6.9 Punjab is the highest producer of sugar with 3.17 million metric tonnes recorded in the year 2012 – 2013.⁴⁷ There are 45 sugar mills located in Punjab and it directly or indirectly engages a total workforce of 790,000 people which shows the importance of for Human Resource Development in this sector.

3.6.10 The Food and Beverage Industry makes a heavy use of sugar. It is used in the confectionary industry in the making of candies, chocolates and lollipops. Cordial industry makes heavy use of sugar in brands like RoohAfza and Jam e Shirin; it is used in the making of juices, jams, biscuits and mithai (sweets) industry⁴⁸.

43 Rabi crops, in Punjab Province, refer to agricultural crops sown in winter and harvested in the spring. The rabi crops are grown between the months November to March.

44 Ibid 41

45 Pakistan Flour Mills Association46 Discussions with Sector Experts, In depth Interview

46 Pakistan Sugar Mills Association

47 Economic Survey of Pakistan, 2012 -13

48 Ibid 47

28 Economic Survey of Pakistan 2014

29 Oil seeds and Product Annuals 2014, Global Agricultural Information Network Report

30 Pakistan Vanaspati Manufacturer’s Association

31 Ibid 30

32 Ibid 24

33 Economic Survey of Pakistan, 2014

Pulses & Grains

3.6.11 Pulses are the most important source of vegetable protein in Pakistan. They are cultivated on 5% of the total cropped area. Their use ranges from baby food to delicacies of the rich and the poor. Because of the population growth, demand for pulses is increasing day by day. The total area under major pulse crops in Pakistan is about 1.5m hectares. Among these pulses, chickpea is the major winter food legume and moong (Mung Bean) is the major summer legume. Chickpea occupies 73% of the total pulses area with 76% contribution to the total production, whereas mung bean occupies 18% of total area devoted to pulses contributing 16% to the total pulses production. The black gram and lentil, each are cultivated on 5% of the total pulses area and each of them contributes 5% to the total pulses production⁴⁹.

3.6.12 The table below depicts the production of food grains in past 4 years. It shows an increase of 7.1% in 2013 - 14⁵⁰.

Years	(000) Tonnes
2010-11	34,302
2011-12	34,478
2012-13	34,468
2013-14	37,097

TABLE 22: PRODUCTION OF FOOD GRAINS

3.7 Employment in Processed Food Industry

3.7.1 The food processing industry employs 183,891 people in Punjab. A further bifurcation of number of employees with respect to the sub sectors of food processing industry is depicted in table below, and it can be seen that processed food has the highest workforce share.

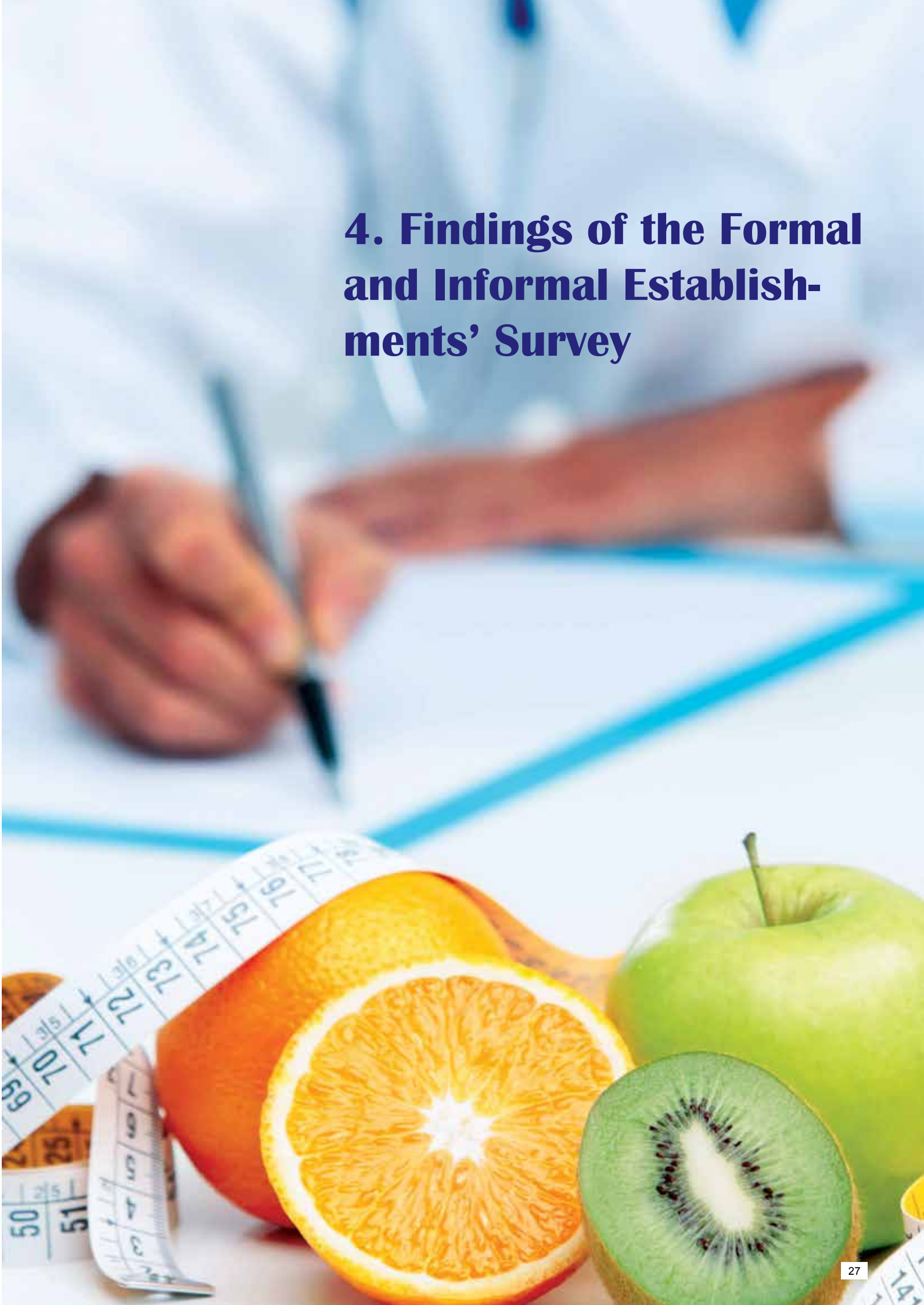
Sub – Sector in Food processing industry	2012	2013
Processed food	103,633	109,592
Edible Oil & Fats	10,539	11,145
Beverage	8,782	9,287
Bakery & Confectionery	50,938	53,867
Total	173,892	183,891

TABLE 23: TOTAL NUMBER OF EMPLOYMENT IN PUNJAB ⁵¹

3.7.2 The labor force is generally unskilled, with 70% of them having an educational level below the 10th standard as confirmed by majority of sector experts contacted for the survey. This sector actually requires highly skilled people given the intricate and varying natures of products and production methods in this sector⁵².

49 Pakistan Agricultural Research Council
50 Federal Bureau of Statistics
51 Based on the estimates and percentages provided by Federal Bureau of Statistics, Economic Survey of Pakistan (2010-2013) and SMEDA
52 Federal Bureau of Statistics 2012 -2013

4. Findings of the Formal and Informal Establishments’ Survey



4.1 Respondent’s Profile

4.1.1 This section provides a brief overview of profiles of the respondent companies (formal/informal) based on the results and analysis of the quantitative survey of food processing units. This section will also provide an insight on;

- Respondents’ organization size,
- Annual production and sales turnovers,
- Type of Ownerships,
- Type of products they are manufacturing,
- Level of Automation in production facility etc.

Organization Size and Respondents’ Distribution

4.1.2 For the purposes of analysis, respondent organizations were categorized into four categories namely,

- Micro
- Small
- Medium
- Large scale organizations

4.1.3 The number of employees was used to determine the size of the organizations as defined by the Small and Medium Enterprise Development Authority (SMEDA) – Ministry of Industries and Production. This classification along with the number of respondents in each category is presented in the table below:

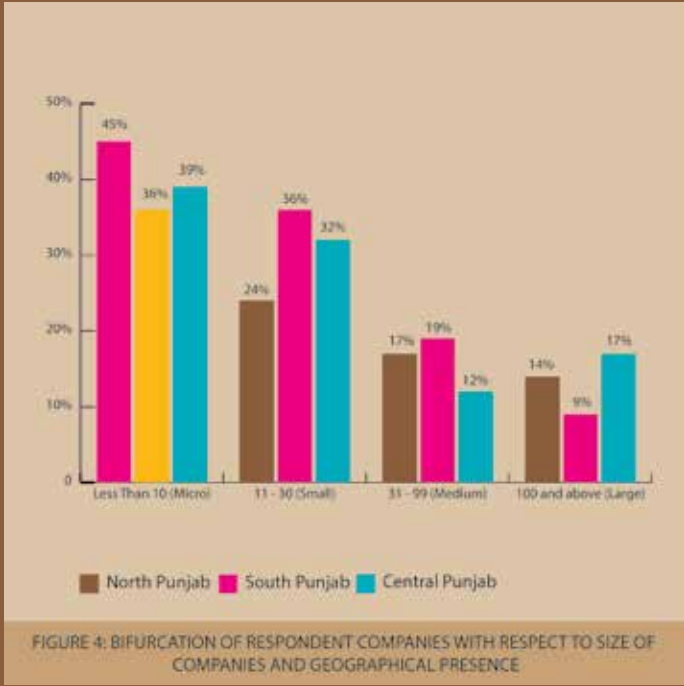
S. No	Classification	Number of Employees	Number of respondent companies	% distribution of companies
1.	Micro	Less than 10 employees	73	39%
2.	Small	11 – 30 employees	59	32%
3.	Medium	31 – 99 employees	26	14%
4.	Large	100 and above employees	27	15%

TABLE 24: ORGANIZATION SIZE CRITERIA

4.1.4 Additionally, bifurcation of respondent companies with respect to the nature of establishment (formal and informal) and geographical presence (north, south and central Punjab) is depicted in figure below.

Entity Registration

4.1.5 Figure 5 below shows the registration status of the organizations covered in the study. 58% of the organizations surveyed were registered businesses (formal organizations). A further bifurcation of registered and unregistered organizations with respect to their organizational size is portrayed in table 25, which states that majority of the informal organizations (91%) lies in the category of micro scale (providing employment opportunities, on an average, to less than ten persons per organization) . Moreover, 50% of the formal organizations are falling in ‘small scale’ category followed by 25% in Large Scale.



Organization Size	Number of Employees	Formal		Informal	
		No.	%	No.	%
Micro Scale	Less than 10	2	3%	71	91%
Small Scale	11 - 30	54	50%	5	6%
Medium Scale	31 - 99	24	22%	2	3%
Large Scale	100 and above	27	25%	0	0%

TABLE 25: BIFURCATION OF RESPONDENT COMPANIES WITH RESPECT TO NATURE AND SIZE OF COMPANIES

Industry Representation

4.1.6 The region wise industry/sub sector breakup of respondent organizations is depicted in the table below. It can be seen that processed food sector has highest representation in each region followed by Bakery and confectionery across both northern and central Punjab.

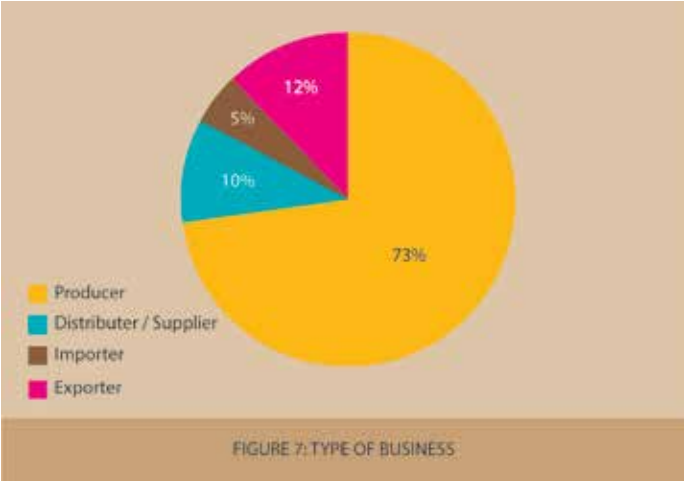
Industry	North Punjab		South Punjab		Central Punjab	
	No.	%	No.	%	No.	%
Value-added Pro-cessed Food	20	69%	32	68%	58	52%
Edible Oils	2	7%	3	6%	6	6%
Beverages Pro-duction	2	7%	2	4%	6	6%
Bakery and Con-fectiionery	5	17%	10	22%	39	36%
Total	29	100%	47	100%	109	100%

TABLE 26: REGION WISE INDUSTRY BREAKUP

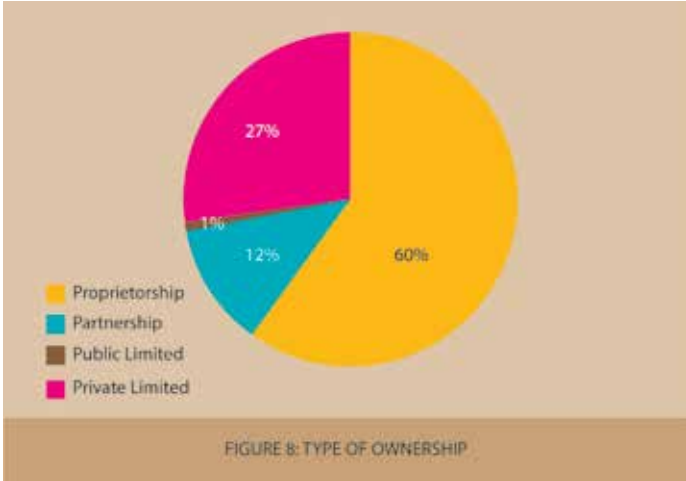
4.1.7 A further classification of participating organizations with respect to nature of the company (formal/informal) is illustrated in figure 6 below;



4.1.8 Figure 7 below depicts that survey covered 73% organizations which were producers followed by 12% exporters and 10% distributors/suppliers.



4.1.9 Majority of the companies in the survey were ‘proprietorship businesses’ (60%), followed by private limited companies (27%).



4.1.10 A further cross sectional analysis of ‘organization size’ with ‘type of ownership’ indicates that majority of Micro Scale companies’ owners are proprietors, whereas majority of large scale organizations are private limited companies. Further details are shown in table 27 below:

Organization Size	Proprietorship		Partnership		Public Limited		Private Limited	
	No.	%	No.	%	No.	%	No.	%
Less than 10 (Micro)	71	54%	0	0%	0	0%	2	5%
11 - 30 (Small)	36	28%	8	57%	1	100%	14	36%
31 - 99 (Medium)	13	10%	5	36%	0	0%	8	21%
100 and above (Large)	11	8%	1	7%	0	0%	15	38%
Total	131	100%	14	100%	1	100%	39	100%

TABLE 27: ORGANIZATION SIZE VS OWNER SHIP OF THE COMPANY

Type of Markets

4.1.11 The following tables show the local and international locations where our respondents are mainly supplying/exporting their products (raw materials, semi-finished goods or finished goods). Some of the responses were not specific. Respondents replied with either “Punjab” or “Nation- wide”. Survey results indicate that the majority of the respondent companies were supplying their products to customers based around Lahore (Central Punjab) which stands to reason considering Lahore represents a large market by virtue of it being a significant population concentration. The majority of processed food products are being exported to Afghanistan followed by Iran and Middle East.

Local Markets			
Areas	%	Areas	%
Lahore	20%	Punjab	2%
Multan	7%	Jehlum	2%
Gujranwala	6%	Attock	2%
Nation wide	5%	Narowal	1%
Sargodha	5%	Sahiwal	1%
DG Khan	4%	Lodhran	1%
Faisalabad	4%	Kasur	1%
Islamabad	4%	Rajanpur	1%
Urban Area	4%	North	1%
Bahawalpur	3%	Sheikhupura	1%
Sialkot	3%	Chiniot	1%
KPK	2%	Vehari	1%
Okara	2%	Karachi	1%
		No Responses	15%

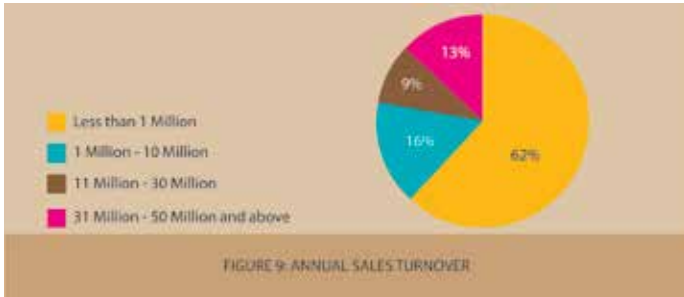
TABLE 28: LOCAL MARKET

International Markets			
Areas	%	Areas	%
Afghanistan	15%	UAE	12%
Iran	14%	UK	12%
Middle East	13%	No Response	34%

TABLE 29: INTERNATIONAL MARKET

Annual Sales Turnover

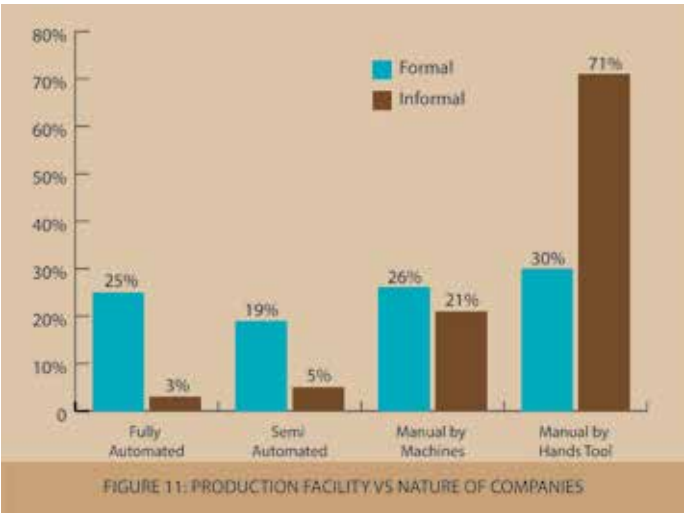
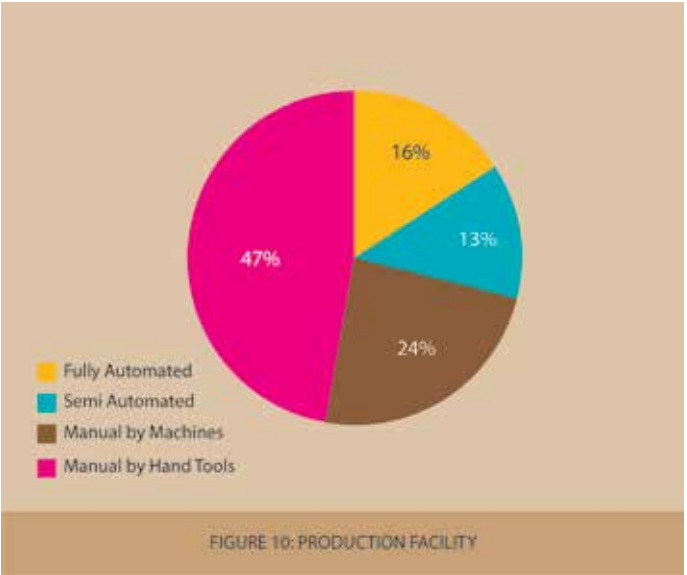
4.1.12 Figure below depicts annual sales turnover of participating organizations. Although 62% of the organizations participated in the study stated their annual sales turn over in the range of ‘less than 1 million’, this information may not be correct as people are generally reluctant to share their actual financial details.



Levels of Automation

4.1.13 Figure 10 below shows the type of production facilities (with respect to level of automation) installed in respondents’ organizations. It can be seen that majority of the operations in sector are still being carried out manually (manual-with hands/tools and Manual by Machine), which also illustrates that there is a need for skilled manpower and successively the demand for technical trainings in manual processes in the sector. This also depicts a potential in terms of employment opportunities for skilled labor in the sector.

4.1.14 A further detailed analysis (figure 11 below) of the levels of automation with respect to nature of companies illustrates that most organizations using manual operations belong to either informal or micro categorizations. These information/micro setups by virtue of their smaller size and lack of access to more capital and capital intensive manufacturing also represent, by similar virtue, substantial demand for technical trainings in manual processes. Furthermore, formal organizations that employ the majority of the workforce available to the sector are more inclined towards semi-automated and fully automated operations (when compared with informal organizations) and continuously moving towards further automation. These organizations represent an entirely different demand profile for technical skills as their drive towards automation skews their demand towards technically competent and skilled labor.



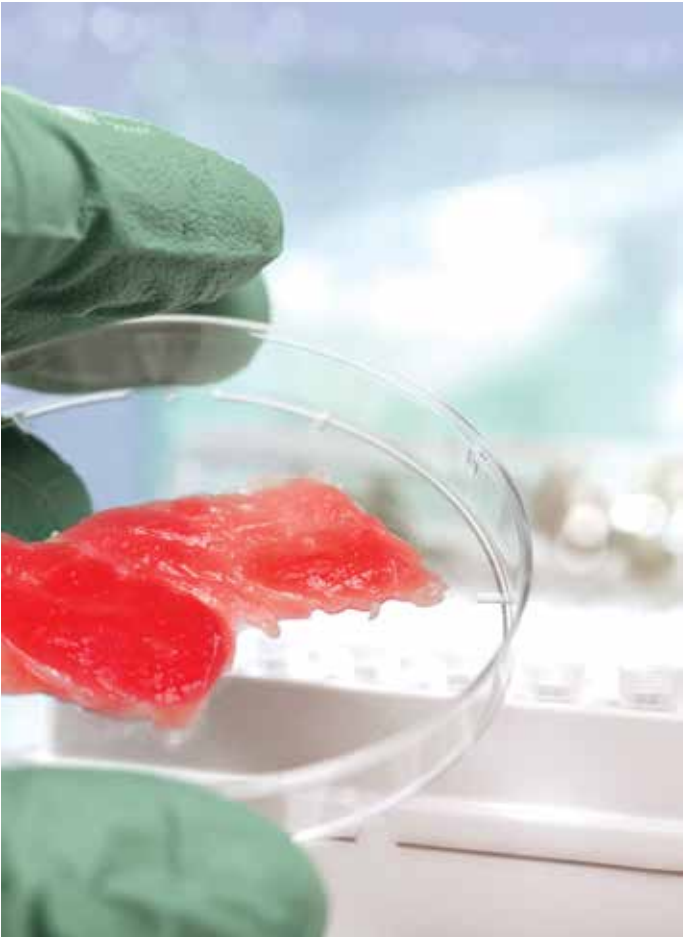
4.1.15 Further cross sectional analysis of level of automation with respect to organization size is described below. It can be seen that fully automated technology is mostly installed in large scale organizations whereas micro level companies are mostly using manual operations.

Level of Automation	Micro	Small	Medium	Large	Total no. of organizations
Fully Automated	3	6	5	15	29
Semi-Automated	4	4	10	6	24
Manual By Machines	14	19	7	4	44
Manual by hand tools	52	30	4	2	88
Total	73	59	26	27	185

TABLE 30: PRODUCTION FACILITY VS NATURE OF COMPANIES

Type of Products

4.1.16 The following table depicts the type of products which respondents companies are manufacturing in their production facilities. 70% (131 respondents) of the respondent companies are associated with manufacturing of Processed Foods (with 59% in manufacturing of value added and frozen food processing and 11% in edible oils and beverages products) and 30% are associated with manufacturing of Bakery and Confectionery Products (with 12% in General Bakery Products, 12% in ethnic and other confectionery products and 6% in Biscuits and other Dry Bakery Products;



Category	Sub-category	Products	
Processed Foods 131 Respondents 70%	Value Added & Frozen Food Processing 110 Respondents 59%	Frozen Vegetables	5%
		Frozen Snacks/ Frozen Meals (only wheat and vegetable based products)	5%
		Jams, Jellies, Marmalades	5%
		Chutneys, Pickles, Achaar	9%
		Sauces and Vinegar	4%
		Squashes, Concentrates, Fruit Juices & Fruit Juice Drinks	2%
		Seasonings & Spices	3%
		Dry Vermicelli, Noodles & Spaghetti, Pasta & Macaroni	4%
		Canned Fruits and Vegetables	5%
		Snack Foods (potato crisps, salted nuts, products from rice flakes & corn grits, lentil & gram snacks)	17%
		Total	59%
	Edible Oils and Beverages Products 21 Respondents 11 %	Vegetable Oil	3%
		Fruit Oil	1%
		Ghee	1%
		Margarine	1%
		Total	6%
		Aerated Drinks	1%
		Juices	3%
		Bottled Water	1%
		Total	5%
		Total -Processed Foods	70%
Bakery and Confectionery 54 Responses 30%	General Bakery Products/ Bakers 22 Respondents 12 %	Cakes/Pastries	2%
		Breads	5%
		Rusks	0%
		Doughnuts	1%
		Pies	1%
		Muffins	3%
		Total	12%
	Ethnic & Other Confectionery Products 23 Respondents 12 %	Ethnic Confections (Mithais and Nimkos)	5%
		Other Confectionery	2%
		Toffees	2%
		Candies	2%
		Bubble Gum	1%
		Jellies	0%
		Chocolates	0%
		Total	12%
	Biscuits & Other Dry Bakery Products 9 Respondents 6 %	Biscuits	4%
		Specialty Mixes & Concentrates	2%
		Total	6%
		Total-Bakery and Confectionery	30%

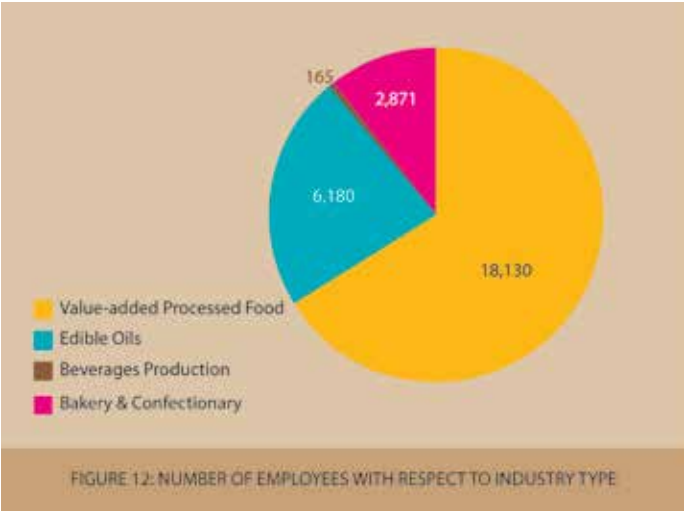
TABLE 31: SUB- SECTOR AND PRODUCTS

4.2 Work Force Characteristics

Number of Employees

4.2.1 The survey results indicate that the total work force of respondent establishments is **27,346**. Out of which **26,701 (97.6%)** work in formal sector and remaining **645 (2.4%)** work in the informal sector.

4.2.2 The further bifurcation of employees with respect to ‘company size’ and ‘industry type’ is depicted in figures below.



4.2.3 An interesting cross sectional analysis of results of Figure 12and table 26 above indicates that edible oil segment is providing promising employment opportunity, may be due to size and level of operations involved; as only 11 oil companies are currently employing 6,180 (22.5% of total work force) employees compared to processed food sector where 110 companies are employing 18,130 employees (66.3% of total work force).

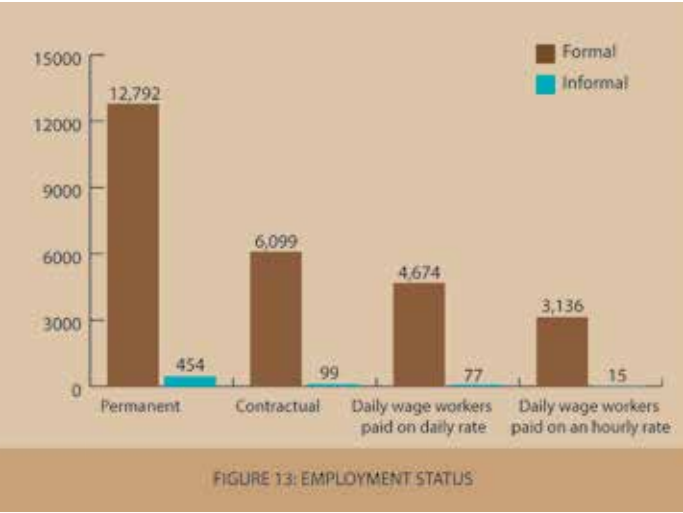
4.2.4 The cross section of average number of employees per unit and number of units under each company category (organization size wise) is shown in table below;

Organization Size	Size of Company	Overall Results	
		No. of Units Covered in Survey	Approx. Avg. No. of Employees per Unit
	Less than 10 (Micro)	73	7
	11 - 30 (Small)	59	21
	31 - 99 (Medium)	26	55
	100 and above (Large)	27	894

TABLE 32: AVERAGE NUMBER OF EMPLOYEES WITH RESPECT TO ORGANIZATION SIZE

4.2.5 Employment status with respect to nature of companies is illustrated in figure below. The results for both formal and informal companies indicate that majority of employees in both setups (formal/informal) are permanent employees⁵³ followed by contractual employees.⁵⁴

53 Permanent employees or the regular employees, work for an employer and are paid directly by that employer
54 contractual employee, is someone who works for a business on a project or on finite (usually less than 12 months) basis



Number of Employees VS Job Roles

4.2.6 Table 33 below shows that majority of the workforce (male and female) in food processing industry is working in the category of other skilled workers and elementary occupations while 34% are working as technicians and associate professionals, managers, craft and related trade workers and plant/machine operators. It can also be seen that majority of female employees are placed in jobs that require less physical activity. Roles in which women are working in food processing sector include; managerial roles, ‘elementary occupations’, ‘other skilled workers’ and ‘clerical support workers’ categories. Only 1% of all female employees covered in this survey are working in managerial roles however it is observed that in some positions, women outnumber their male counterparts. These female intensive positions include plant and machine operators, clerical support and in elementary occupations.

Job Titles	Total No of Employees		Male Employees		Female Employees	
	No.	%	No.	%	No.	%
Managers	1,247	5	1,230	5%	17	1%
Technicians and Associate Professionals	1,351	5	1,343	5	8	0
Craft & Related Trade Workers	1,410	5	1,254	5	156	7
Plant and Machine Operators	5,247	19	4,747	19	500	23
Clerical Support Workers	4,941	18	4,505	18	436	20
Other Skilled Workers	6,461	24	5,959	24	502	23
Elementary Occupations	6,689	24	6,130	24	559	26%
Overall	27,346	100	25,168	100	2,178	100

TABLE 33: NO OF EMPLOYEES VS JOB TITLES

Average Wage

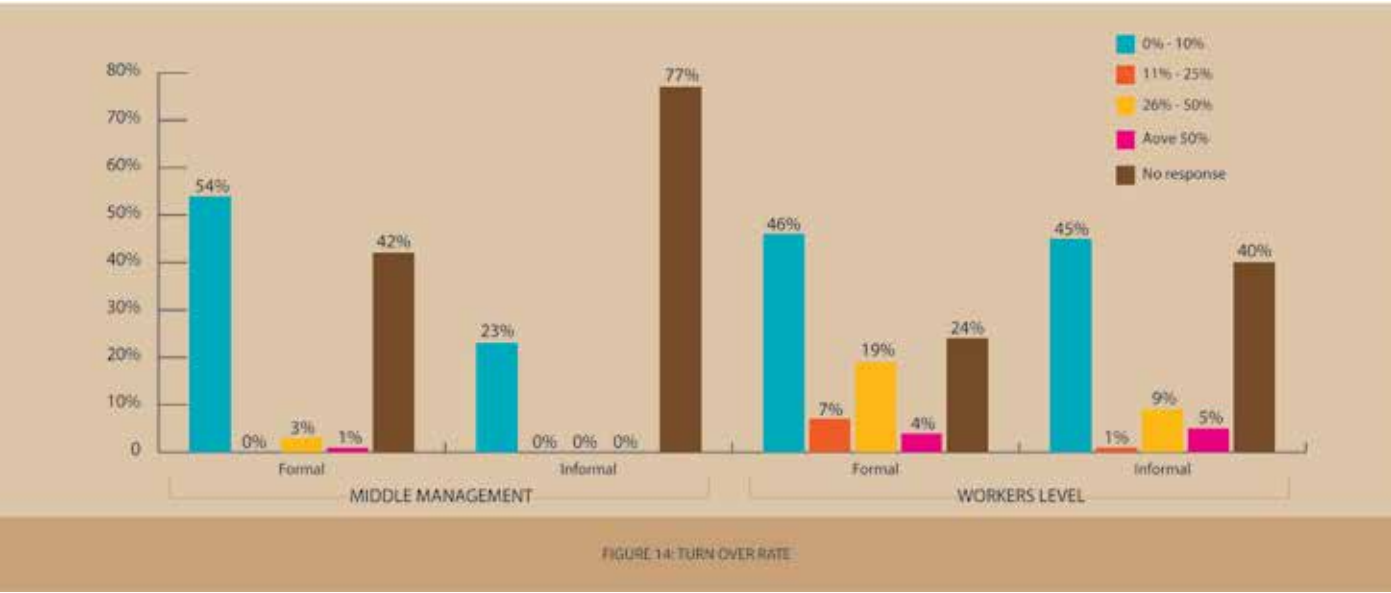
4.2.7 The table below shows that majority of the workforce earns an average monthly salary of Rs. 10-15 thousand (36% overall regardless of their employment status). Surprisingly 15% of the employees also reported to have an average monthly salary of 1-5 thousand rupees, which appears to be a contradiction with minimum wage laws in Pakistan.

Employment Status	Ranges of Monthly Average Wage ⁵⁵	Overall	
		No.	%
Permanent	1,000 - 5,000	8	4%
	5,001 - 10,000	15	8%
	10,001 - 15,000	39	21%
	Above 15,000	10	5%
Contractual	1,000 - 5,000	0	0%
	5,000 - 10,000	9	5%
	10,001 - 15,000	22	12%
	Above 15,000	5	3%
Daily wage workers paid on daily rate	1,000 - 5,000	10	5%
	5,000 - 10,000	11	6%
	10,001 - 15,000	4	2%
	Above 15,000	3	2%
Daily wage workers paid on an hourly rate	1,000 - 5,000	11	6%
	5,000 - 10,000	4	2%
	10,001 - 15,000	2	1%
	Above 15,000	0	0%
No Response		32	18%
Total		185	100%

TABLE 34: WORKERS SALARY RANGES

Turnover Rate

4.2.8 As stated by respondents, the overall turnover rate of employees is low, ranging between 0%-10% at worker level and middle management level respectively. Hence it may be ascertained that organizations either have good employee retention policy or employees do not prefer to switch because of the current economic scenario of Pakistan. Further details are mentioned in table below:



Middle Management: Middle management is the intermediate management of a hierarchical organization that is subordinate to the executive management and responsible for at least two lower levels of junior staff. Typical job titles include Food technologist, Food Preserver, Production Manager, Food Quality Assurance Manager/Supervisor, Bio-technologist etc.

Worker Level: refers to factory workers, working under middle management. Typical job titles include technicians, general labor, general office staff, bakers, confectioners, machine operators, food graders etc.

Education Profile

4.2.9 Following table depicts the educational profiles of the employees of respondent organizations. Results indicate that majority of managers are either Masters Level qualified or graduates. Interestingly, people with intermediate or less qualifications are also reported to be working at managerial level which may be because of their experience or they may be owners of the establishments. In the informal sector, majority of businesses are being managed by owners themselves.

⁵⁵ Daily wage workers (paid on daily/hourly rates) are also paid at the end of the month by the respondent companies

4.2.10 It has also emerged from the survey that large scale organizations and medium sized companies have a preference for hiring staff with formal educations, professional degrees, and diplomas. It is speculated that this is so, because these organizations bear proper management teams and possess some organizational structures to house these posts and qualifications. Furthermore, it appears that the smaller and micro respondents prefer experience over formal education in their hiring. This can be attributed to these units being mostly sole proprietorships (60%, as mentioned in Figure 8above) with managerial and operational authority concentrating in the owner and upon the manual nature of the work processes dominating this category of unit (out of 132 micro and small size companies, 115 using manual by machine and manual by hand tools processes) as depicted in 29above.

Qualification									
Job Level	MBA/ Post Graduates	Graduates	Diplo- ma Holder / DAE	Intermedi- ate	Middle	Primary	Less than Primary	Some Education/ Religious Education	Illiterate
Managers	44%	28%	11%	14%	15%	10%	10%	14%	12%
Technicians and Asso- ciate Professionals	15%	18%	22%	15%	13%	13%	13%	13%	13%
Professional Degree Holders	19%	17%	13%	0%	0%	0%	0%	0%	0%
Craft & Related Trade Workers	0%	4%	15%	15%	13%	13%	11%	14%	13%
Plant and Machine Operators	0%	4%	19%	15%	16%	16%	14%	15%	13%
Clerical Support Workers	8%	20%	10%	16%	10%	10%	11%	13%	15%
Other Skilled Workers	14%	9%	10%	13%	15%	15%	16%	16%	15%
Elementary Occupa- tions-Un-Skilled and Semi-Skilled	0%	0%	0%	12%	18%	23%	25%	15%	19%

TABLE 35: QUALIFICATION VS ROLES GRID (OUT OF 185 RESPONDENTS)

4.2.11 Similarly the table below depicts the educational profiles of the employees of respondent’s organizations relevant to food sector. It can be seen that majority of the organizations reported the presence of ‘DAE in food technology’ professionals in their entities at different levels. This has also been established through TSPs’ qualitative analysis where majority TSPs indicated that the job prospects for diploma holders in food processing are comparatively high, and food processing companies prefer to hire diploma holders (DAE in food technology) at different levels. Further, majority of companies reported that Bachelor’s and Master’s Degree holders (in food technology) are working at Managers and Technicians levels. More details are shown below:

Qualification				
Job Level	PHD /M.Sc. in Food Tech- nology	Bachelor in food	DAE Food Technology	Apprentice
Managers	49%	38%	25%	14%
Technicians and Associate Professionals	31%	34%	19%	17%
Professional Degree Holders	20%	28%	18%	19%
Craft & Related Trade Workers	0%	0%	18%	24%
Plant and Machine Oper- ators	0%	0%	20%	26%
Clerical Support Workers	0%	0%	0%	0%
Other Skilled Workers	0%	0%	0%	0%
Elementary Occupa- tions-Un-Skilled and Semi-Skilled	0%	0%	0%	0%

TABLE 36: QUALIFICATION (RELEVANT TO FOOD PROCESSING ONLY)

4.3 Skills Assessment

4.3.1 This section provides details on prompted responses⁵⁶ received on the ‘skills required’ (as reported by the survey respondents), both in formal and informal sector. The skills which respondents pointed out using the provided list (prompted) are classed as ‘general and non –sector specific skills’. Whereas the responses we retrieved under ‘others’ category are classed as ‘sec-
⁵⁶ Respondents were asked to respond to these questions using options available in questionnaire; which were shown to them during conduct of survey

tor specific skills’ (provision for ‘others’ response was provided in questionnaire to capture sector specific skills).

4.3.2 The various skills required in food processing sector are described in table below. It can be seen that the most required general and non-sector specific skills are managerial skills followed by record keeping, maintenance skills, health and safety skills and problem solving skills. Further various most required skills under the ‘Sector Specific Skills’ section (as reported by the survey respondents) is depicted in table 37 below.

4.3.3 When the respondents were asked about the skills for which Technical and vocational education (TVE) is required, most of the respondents for general skills pointed out managerial skills, information technology skills, plant/machine repairing skills, training skills and machine/tool operating skills and problem solving skills. Similarly for sector specific skills majority of respondents pointed out Food technology, bio-technology and quality assurance skills for which TVE is required.

4.3.4 Further, the skills which require on-the-job and off-the-job training in view of most of respondents (who replied to these questions) are also shown in the table. It can be seen that most preferred method of training in views of most of respondents is on-the-job training. The skills under ‘general and non-sector specific skills’ category for which majority of the respondents believe off-the-job is best suited are Managerial skills, plant /machine repairing and health and safety skills, project management and numeracy skills. Similarly off-the-job is best suited for food technologist, food quality assurance and food preserving skills under ‘sector specific skills’ category.

4.3.5 Finally when the respondents were asked about whether these skills (prompted and other responses) are easy available or hard to find, the results we retrieved are shown below. Majority of the respondents pointed out managerial skills, project management skills, plant/ machine operating, maintaining and repairing skills, numeracy and IT skills as Hard-to-fill under ‘general skills’ category. Whereas food technologist, food quality assurance, food planner, food preserver, product knowledge and bio-technology skills were pointed out as hard to fill under ‘sector specific skills’ category.

TABLE 37: SKILLS ASSESSMENT - FOOD PROCESSING SECTOR								
	List of possible skills	Skills required Prompted	Skills where TVE is required	OJT best suited	Off-the-Job trainings best suited	Future Skills Needs	Skills Availability %	
		%	%	%	%	%	Easily Available	Hard to find
General and Non Sector Specific Skills	Managerial Skills	6%	8%	5%	6%	5%	4%	7%
	Administrative Skills	5%	4%	4%	3%	5%	3%	6%
	Leadership Skills	3%	4%	4%	4%	4%	4%	3%
	Project Management Skills	4%	4%	4%	6%	4%	2%	4%
	Training Skills/ Coaching Skills	4%	5%	4%	5%	4%	3%	4%
	People Management Skills	4%	3%	4%	3%	4%	4%	4%
	Supervisory Skills	5%	4%	4%	4%	5%	8%	3%
	Problem Solving Skills	5%	5%	4%	4%	5%	3%	6%
	General Office Work Skills	4%	3%	4%	4%	4%	8%	2%
	Record Keeping/ Maintaining Skills	5%	5%	5%	4%	5%	8%	4%
General and Non Sector Specific Skills	Plant & Machine - Operating Skills	5%	4%	5%	4%	5%	1%	7%
	Plant & Machine - Repairing Skills	5%	6%	6%	6%	5%	2%	7%
	Plant & Machine - Maintenance Skills	5%	4%	5%	4%	5%	3%	7%
	Plant & Machine - Health & Safety Skills	5%	5%	5%	6%	5%	4%	6%
	Packing Skills	4%	4%	5%	4%	5%	6%	4%
	Basic Hand tools skills	5%	5%	6%	5%	4%	8%	3%
	Simple Machine/Tools Operating Skills	4%	5%	5%	5%	4%	6%	3%
	Technical Skills ⁵⁷	5%	5%	5%	4%	5%	2%	6%
	Communication	4%	4%	4%	4%	4%	8%	2%
	Numeracy	4%	4%	4%	6%	4%	2%	5%
	Information Technology/ICT	4%	6%	4%	4%	4%	2%	5%
	Team Working and Interpersonal Skills	5%	3%	4%	5%	5%	9%	2%

⁵⁷ Technical skills are the knowledge and capabilities to perform specialized tasks related to Food Processing

Sector Specific Skills	Cooking and Frying	6%	9%	7%	6%	5%	5%	6%
	Recipe Making	7%	5%	5%	6%	5%	7%	5%
	Baking	4%	6%	4%	5%	5%	6%	4%
	Food Technologist	8%	8%	10%	10%	9%	3%	13%
	Food Quality Assurance	8%	8%	9%	9%	8%	4%	11%
	Food Planner	7%	6%	8%	8%	8%	4%	9%
	Food Preservation	8%	5%	7%	8%	8%	5%	10%
	Procurement Skills	8%	5%	7%	7%	7%	11%	6%
	Product Knowledge ⁵⁸	7%	5%	6%	6%	5%	7%	7%
	Chocolate making	2%	3%	2%	2%	2%	3%	1%
	Confectionary / Confectioner	4%	7%	3%	4%	4%	7%	2%
	Pastry Cooking	3%	4%	3%	5%	3%	4%	2%
	Bio technology	6%	8%	7%	4%	7%	3%	8%
	Fruit Preserver	2%	4%	3%	3%	2%	2%	2%
	Oil Expeller Operating Skills	1%	2%	1%	2%	1%	1%	1%
	Bottling Skills ⁵⁹	1%	1%	1%	2%	1%	1%	1%
Sector Specific Skills	Batch Making skills/ Batch Operations	3%	3%	3%	4%	4%	3%	3%
	Transportation Skills ⁶⁰	5%	4%	5%	4%	5%	10%	1%
	Food Tasting Skills	5%	3%	6%	3%	5%	8%	4%
	Food Grading Skills	5%	4%	5%	2%	6%	6%	4%

Reasons and Measures Taken

4.3.6 According to majority of the respondents, the main reasons of skills shortages in those areas identified as ‘Hard to Find’ and measures taken by the industry to overcome difficulties in finding these skills are depicted below. Majority of the respondents believe that Lack of required qualification and lack of OJTs are the major reasons of having majority of ‘hard to fill vacancies’ in sector, as there is an acute shortage of people with desired skills and experience in the sector. However respondents believe that increased training activities both at workers and middle management levels can greatly overcome this shortage.

Reasons	%	Measures Taken	%
Lack of required qualification	32%	Increased training activity	32%
Lack of training opportunities (OJT, off-the-job training)	24%	Changing work practices/ reallocating work	22%
Lack of required skills (technical/ practical)	17%	Promoting exposure to practical and theoretical training	16%
Lack of required experience to perform the job	16%	Introduction to new technology/ Eliminate workforce	15%
Lack of soft skills (communication, numeracy, etc.)	11%	Increase recruitment activity/ Introduce new channels for recruitment	15%

TABLE 38: REASONS AND MEASURES TAKEN-HARD TO FIND SKILLS (OUT OF 185 RESPONSES)

⁵⁸ Product knowledge is an essential sales skill required in food processing industry which allows sales person to present benefits of the products to customers accurately and persuasively.
⁵⁹ Bottling skills require the knowledge and capabilities to; fill, pack, operate bottling machinery and make sure that the production lines are loaded
⁶⁰ Transportation skills require; lifting, transferring and positioning load, maintaining security and safety while loading /unloading consignments and efficient handling of transport

Future Skills Demand Scenario in Food Processing Sector

4.3.7 Based on the responses congregated through survey exercise, the table below depicts the future demand scenario of skills required in the next 5 years or skills for which demand is expected to increase under each job role in next five years. The actual demand figures for these skills are depicted in 'Demand Projection' section of chapter 7 below:

Job Level	Job Titles	TABLE 39: Skills Required in Future for specific role (listed in descending order)	
Managers	Productions Manager	- Managerial Skills - Administrative Skills - Leadership Skills - Supervisory Skills - Problem Solving Skills - Communication	- People Management Skills - Plant & Machine - Operating Skills - Plant & Machine - Repairing Skills - Plant & Machine - Maintenance Skills - Plant & Machine - Health & Safety Skills
	Operations Manager	- Administrative Skills - Leadership Skills - Supervisory Skills	- Problem Solving Skills - Communication - People Management Skills
	Quality Control Manager	- Food Quality Assurance - Plant & Machine - Operating Skills	- Product Knowledge - Plant & Machine - Health & Safety Skills
	Procurement Manager	- Problem Solving Skills - Administrative Skills	- Communication - People Management Skills
	Distribution Manager	- Problem Solving Skills - Communication	- People Management Skills - General Office Work Skills
	Warehouse Manager	- General Office Work Skills - Communication	- Problem Solving Skills - People Management Skills
Professional Degree Holders	Factory Supervisor	- Administrative Skills - Problem Solving Skills - Supervisory Skills - Communication	- Leadership Skills - Managerial Skills - People Management Skills - Plant & Machine - Health & Safety Skills
	Line Supervisor	- Leadership Skills - Supervisory Skills - Problem Solving Skills - Communication	- Plant & Machine - Operating Skills - Plant & Machine - Repairing Skills - Plant & Machine - Maintenance Skills - Plant & Machine - Health & Safety Skills
	Food Technologist	- Food Technologist - Plant & Machine - Health & Safety Skills - People Management Skills - Communication	- Recipe making - Food Quality Assurance - Problem Solving Skills - Plant & Machine - Repairing Skills
	Bio Technologist	Bio Technology	Food Quality Assurance

Craft & Related Trade Workers	Baker	- Baking Skills - Problem Solving Skills - Basic Hand tools skills	- Recipe Making - Simple Machine/Tools Operating Skills ⁶¹ - Technical Skills
	Chocolate Maker	- Chocolate making - Problem Solving Skills	- Food Quality Assurance - Simple Machine/Tools Operating Skills
	Confectioner	- Problem Solving Skills - General Office Work Skills - Packing Skills - Basic Hand tools skills	- Simple Machine/Tools Operating Skills - Technical Skills ⁶² - Communication
	Pastry Cook	- Problem Solving Skills - General Office Work Skills - Packing Skills	- Simple Machine/Tools Operating Skills - Technical Skills - Communication
	Fruit Preserver	Food Preserving	Packing Skills
	Oil Expeller	- Oil expeller operating skills - Basic Hand tools skills	- Simple Machine/Tools Operating Skills - Technical Skills
	Food Grader	Food Grading Skills	
	Food Taster	Food Tasting Skills	
Plant and Machine Operators	Fully Automated Plant Operator	- Plant & Machine - Operating Skills - Plant & Machine - Repairing Skills - Plant & Machine - Maintenance Skills	- Plant & Machine - Health & Safety Skills - Basic Hand tools skills - Simple Machine/Tools Operating Skills
	Oversized Heavy Duty Machine Operator	- Plant & Machine - Operating Skills - Plant & Machine - Repairing Skills	- Plant & Machine - Maintenance Skills - Plant & Machine - Health & Safety Skills
	Medium-sized Machine Operator	- Plant & Machine - Operating Skills - Plant & Machine - Repairing Skills	- Plant & Machine - Health & Safety Skills - Simple Machine/Tools Operating Skills
	Packing/ Bottling Machine Operator	Packing Skills	Plant & Machine - Health & Safety Skills
Clerical Support Workers + Office Staff	Production Clerk	- General Office Work Skills - Simple Machine/Tools Operating Skills	- Technical Skills - Communication
	General Office Clerk	General Office Work Skills	Communication
	Payroll Clerk	- General Office Work Skills - Communication	- Numeracy Skills - ICT skills
	Stock Clerk	- General Office Work Skills - Numeracy Skills	- ICT skills - Communication
Other Skilled Workers	Batch Maker	- Batch making/batch operation skills - Basic Hand tools skills	- Technical Skills - Simple Machine/Tools Operating Skills
	Lorry/ Heavy Truck/ Fork Lift Operator	Transportation skills⁶³	
	Simple Machine Operator	- Simple Machine/Tools Operating Skills - Basic Hand tools skills	- Technical Skills - Communication
Elementary Occupations-Semi Skilled, Unskilled	Helper	General Office Work Skills	Basic Hand tools skills
	Packer	Packing Skills	Basic Hand tools skill
	Cleaner	Cleaning/hygiene skills	
	Loader/ Un-loader	- Basic Hand tools skills - Simple Machine/Tools Operating Skills	- Technical Skills - Communication
	Laborer		Basic Hand tools skills
	Workers performing work manually	Basic Hand tools skills	Simple Machine/Tools Operating Skills
	Workers performing work with simple hand tools	Basic Hand tools skills	Simple Machine/Tools Operating Skills

61 Skills or knowledge required to operate and calibrate general or common machines/tools e.g. measuring machines, cutting/mixing machines, leveling machines etc.

62 Technical skills are the knowledge and capabilities to perform specialized tasks related to Food Processing

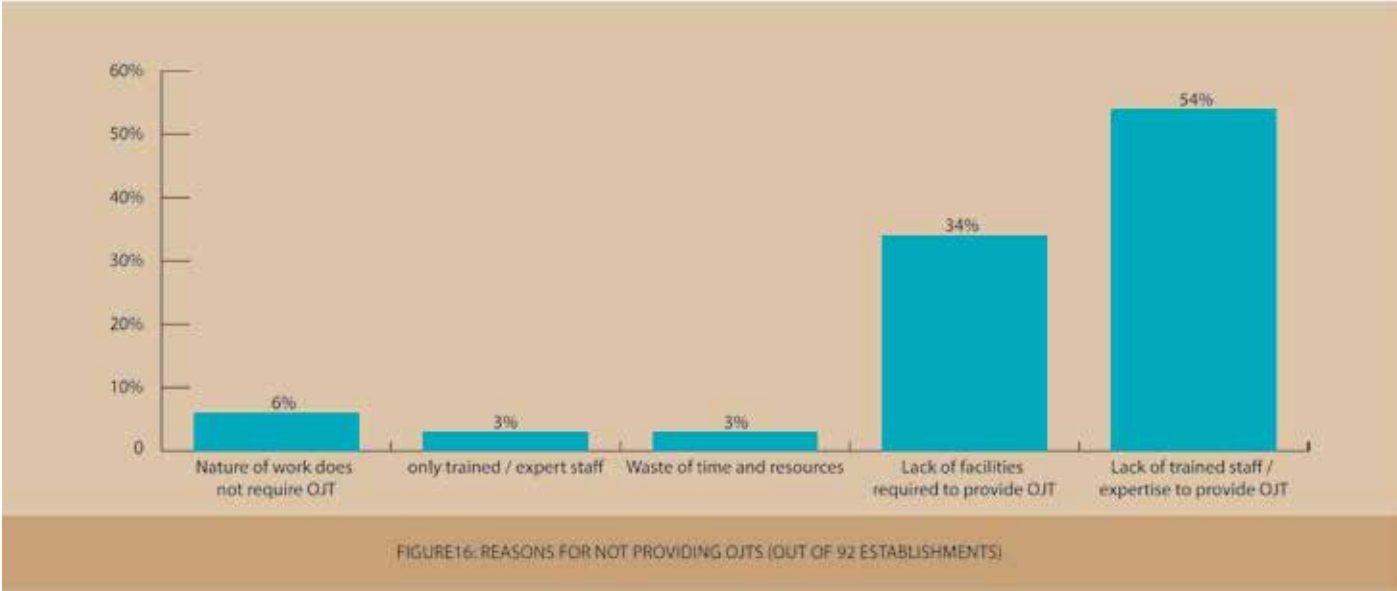
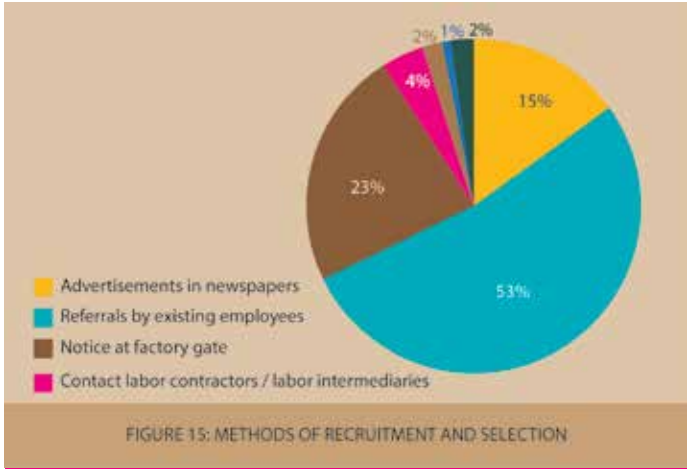
63 Transportation skills involve knowledge of principles and methods for moving goods by air, rail, sea, or road, including the relative costs and benefits.

4.4 Recruitment and Selection

4.4.1 Figure 15 below shows that the most preferred method of recruitment employed by majority of the respondent companies was ‘advertisement through newspapers’ followed by ‘notice at factory gate’ (23%). Another 15% of the respondents use referrals by existing employees for recruitment and selection.

4.4.2 The table below shows the overall picture of recruitment in processed food industry. Out of 3,678 employees hired in past two years 3,407 are still working which again shows that the turnover ratio is very low. Further, 2,049 employees (out of 3,678 hired) were hired on new positions in past two years and the total number of current vacancies is 539 out of which majority (519) are in the formal sector. As could be expected, majority of the workers were hired at the level of ‘other skilled workers’ and ‘elementary occupations’ in both formal and informal sectors, followed by plant and machine operators and technicians. Lowest numbers of people were hired at the manager’s levels. Further most of the hiring took place in formal sector rather than the informal sector.

4.4.3 The table below also shows that majority of the ‘hard to fill vacancies’ are at managers, plant/machine operators, technicians and craft workers which has also emerged from sector experts’ in depth interviews. Also majority of the respondents reported that they prefer to hire or train women at ‘elementary occupation’ and ‘other skilled workers’ levels or to jobs where less physical work is required, followed by managers and plant/machine operators.



4.5.2 Survey results indicate that a variety of methods are employed to provide OJTs to staff; with close observation training and working under direct supervision being the most commonly utilized methods. A job level wise analysis reveals that for managers, the most frequently used method is that of close observation (32%) followed (closely) by working under direct supervision (29%). Due to the technical nature of the jobs, working under direct supervision is the most frequently employed practice when providing OJTs to plant and machine operators (41%) and technicians and associate professionals (33%). The OJT method that has received the least limelight from the survey respondents is job rotation.

Type of Workers Hired	Total Number of Employees Hired			Hired on New Positions			Hired as Replacement			Still Working			No. of Current Vacancies			No. of Hard-To-Fill Vacancies			Women Hired		
	FORMAL	INFORMAL	OVERALL	FORMAL	INFORMAL	OVERALL	FORMAL	INFORMAL	OVERALL	FORMAL	INFORMAL	OVERALL	FORMAL	INFORMAL	OVERALL	FORMAL	INFORMAL	OVERALL	FORMAL	INFORMAL	OVERALL
Managers	195	24	219	88	16	104	107	8	115	150	11	161	80	4	84	45	0	45	15	0	15
Technicians and Associate Professionals	417	28	445	310	14	324	107	14	121	455	27	482	11	0	11	7	0	7	3	0	3
Craft & Related Trade Workers	351	37	388	170	24	194	181	13	194	330	22	352	2	6	8	5	0	5	0	0	0
Plant and Machine Operators	510	22	532	250	16	266	260	6	266	452	9	469	31	0	31	24	1	25	11	0	11
Clerical Support Workers	399	31	430	190	25	215	209	6	215	372	7	379	17	0	17	11	0	11	6	0	6
Other Skilled Workers	1040	76	1116	501	57	558	539	19	558	875	31	906	205	1	206	65	4	69	22	0	22
Elementary Occupations	442	106	548	335	53	388	107	53	160	575	83	658	173	9	182	44	16	60	21	4	25
Total	3,354	324	3,678	1,844	205	2,049	1,510	119	1,629	3,209	190	3,407	519	20	539	201	21	222	78	4	82

TABLE 40: OVERALL RECRUITMENT SCENARIO OF INDUSTRY

JOB LEVELS	Managers ⁶⁴	Technicians and Associate Professionals	Craft & Related Trade Workers	Plant and Machine Operators	Clerical Support Workers	Other Skilled Workers	Elementary Occupations
Close observation	32%	29%	29%	33%	26%	16%	28%
Each one teach one	16%	15%	20%	11%	19%	11%	13%
Theoretical training followed by practical exposure	13%	13%	12%	9%	10%	43%	8%
Working under direct supervision of an expert	29%	33%	32%	41%	36%	24%	36%
Job rotation	10%	10%	7%	6%	9%	6%	15%

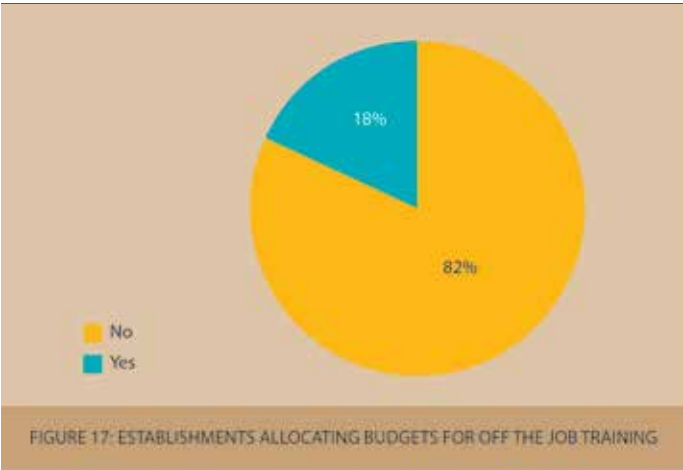
TABLE 41: METHODS EMPLOYED TO PROVIDE OJTS

4.5 On the Job Training

4.5.1 Out of total 185 respondents, on the job trainings (OJTs) were being provided by 50% of the participating organizations, whereas, the other half (92 establishments) stated that they were not providing OJTs to their staff. The most common reasons cited for this were lack of trained personnel and expertise to provide the trainings, which was affirmed by 54% (49 out of 92 establishments) of the respondents, followed by a lack of facilities required to provide OTJs (34%), and the nature of work that does not require trainings (7%).

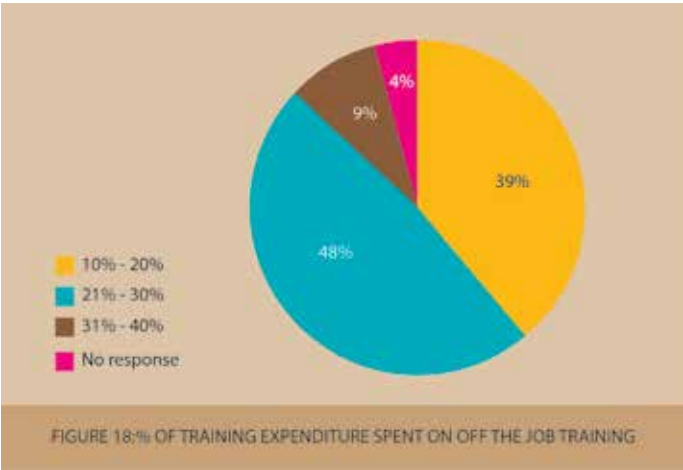
4.6 Off the Job Training

4.6.1 The survey results regarding external training programs reveals that majority of the establishments do not send their employees for off the job training or they do not consider off the job training as an investment (see Figure 17 below). It is worth noting that only 18% (33 companies) of the participating establishments allocate a budget for the provision of Off the Job Training, compared to 82% establishments who have either not responded to this question or they don’t allocate any budget for such external training programs.

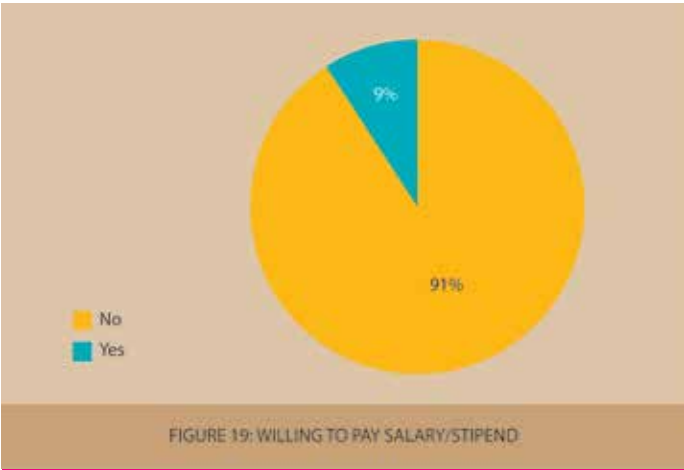


64 Based on responses gathered, managers which require OJTs mainly include; management trainees, QC managers (to learn new standards /testing methods which also vary within subsectors), technical managers (get OJTs on new plants/machinery/equipment), etc.

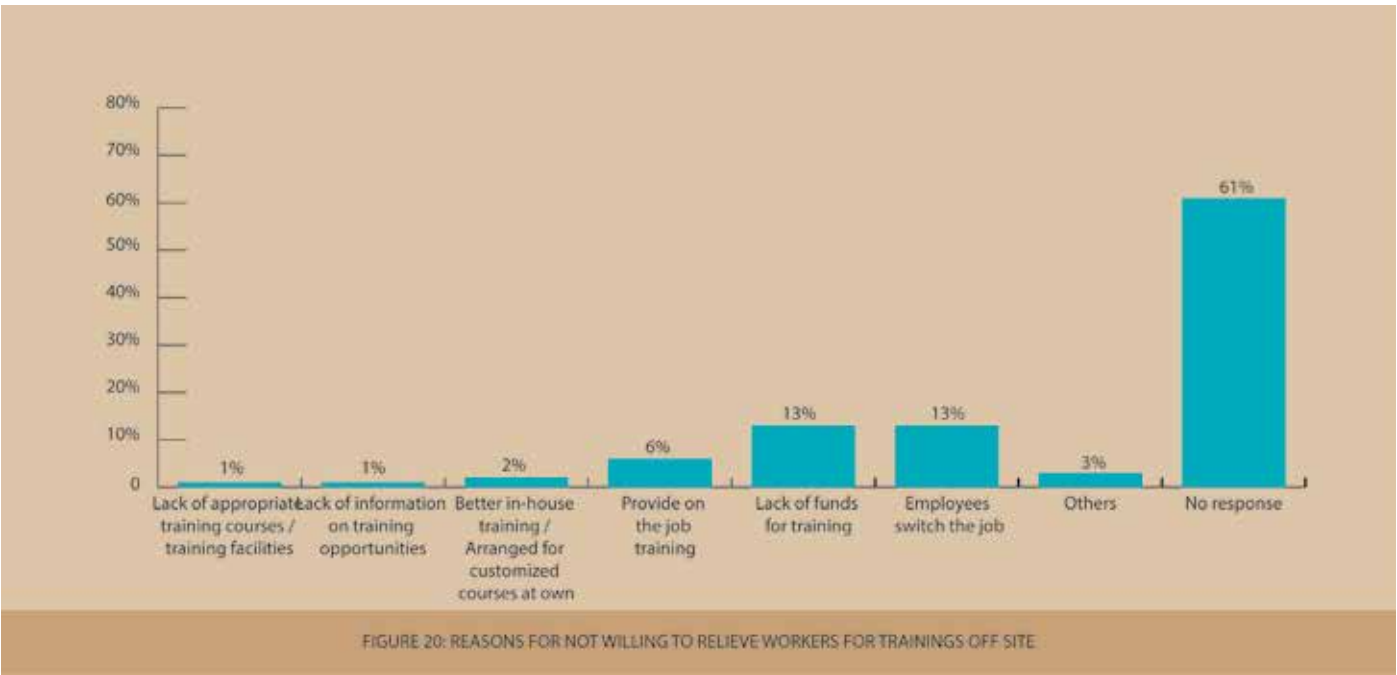
4.6.2 Out of aforementioned 18% establishments who are investing in off the job training, 48% (16 out of 33 establishments) of the establishments allocate 21-30% of their total expenditure for such trainings, 39% establishments allocate 10-20% of their expenses on such training, whereas, 9% of those establishments are allotting 31-40% of their total expenditure on off the job training (see below):



4.6.3 Further out of these 18%, only 9% (Figure 19) willing to pay any sort of stipend for such off site training.



4.6.4 When questioned about the reasons for not relieving workers for offsite training, majority of the respondents mentioned lack of funds for training as a major reason in addition to the fact that employee's switch jobs when they are sent for such external training.61% of the respondent companies did not share their views in this regard.



Training Courses

4.6.5 Survey results also indicate that a broad range of training courses- relating to food processing sector, have been provided by the respondent organizations to their employees. Percentage of companies providing these courses and the number (ranges) of these courses provided at different job levels are shown in table below. As per survey results, majority of companies, at manager level preferred to send their employees for training in food preservation related courses (17%), followed by food chemistry (14%) and physical properties of food materials (12%). Similarly, at technicians and associate professional level advance technology (17%) and food process engineering courses (17%), followed by computing technology in food processing (16%) are most popular courses. Craft and

related trade workers readily seek training in heat and mass transfer (16%). However, for plant and machine operators, courses similar to those for technicians are most popular e.g. advance technology (17%) and 'computing technology' (17%). Moreover, for other skilled workers, the most sought trainings are food processing and preservation (18%) and food micro biology (18%).

4.6.6 The aforementioned results may lead us to the conclusion, which has also been supported by the qualitative analysis (IDIs with TSPs and Sector Experts) that there is a potential demand for courses like; Food Preservation, Food Chemistry and Physical properties of Food, Heat and Mass Transfer, Product development, Advance technology and also for soft skills like basic accounting, IT and health and safety skills.

TRAINING COURSES	JOB LEVELS													
	Managers		Technicians and Associate Professionals		Craft & Related Trade Workers		Plant and Machine Operators		Clerical Support Workers		Other Skilled Workers		Elementary Occupations	
	%	No.s	%	No.s	%	No.s	%	No.s	%	No.s	%	No.s	%	No.s
Food chemistry	14%	1 to 5	9%	1 to 5	6%	5 to 10	8%	5 to 10	0%	-	8%	10 to 20	9%	10 to 20
Physical properties of Food Materials	12%	5 to 10	8%	1 to 5	8%	10 to 20	9%	10 to 20	2%	5 to 10	8%	10 to 20	6%	10 to 20
Post-harvest engineering	7%	1 to 5	7%	1 to 5	8%	10 to 20	8%	10 to 20	0%	-	9%	10 to 20	8%	10 to 20
Food Preservation	17%	5 to 10	15%	10 to 30	4%	10 to 20	7%	10 to 20	0%	-	9%	10 to 20	9%	10 to 20
Heat and Mass Transfer	6%	1 to 5	5%	10 to 20	16%	5 to 10	9%	10 to 20	2%	1 to 5	7%	5 to 10	6%	10 to 20
Post-harvest handling of fruits and vegetables	9%	1 to 5	9%	1 to 5	6%	1 to 5	8%	1 to 5	0%	-	8%	5 to 10	8%	5 to 10
Food regulations and legislations	8%	10 to 20	8%	10 to 20	7%	10 to 20	6%	10 to 20	7%	10 to 20	4%	5 to 10	9%	10 to 20
Food Engineering Design	7%	10 to 20	6%	1 to 5	8%	10 to 20	7%	1 to 5	0%	-	2%	5 to 10	7%	1 to 5
Food process engineering	9%	5 to 10	17%	10 to 20	9%	10 to 20	8%	10 to 20	0%	-	6%	1 to 5	4%	10 to 20
Material and energy balance	9%	10 to 20	7%	10 to 20	9%	5 to 10	8%	1 to 5	3%	1 to 5	7%	5 to 10	14%	5 to 10
Food quality control	6%	10 to 30	10%	1 to 5	7%	1 to 5	6%	10 to 20	4%	5 to 10	7%	1 to 5	12%	1 to 5
Food processing and preservation	9%	10 to 20	9%	10 to 20	9%	10 to 20	6%	10 to 20	0%	-	18%	10 to 20	5%	10 to 20
Food micro biology	5%	10 to 20	8%	5 to 10	8%	10 to 20	9%	1 to 5	0%	-	18%	10 to 20	9%	1 to 5
Food product and plant design	8%	10 to 20	15%	10 to 20	8%	10 to 20	8%	10 to 20	3%	10 to 20	7%	5 to 10	7%	10 to 20
Food packaging	7%	10 to 30	0%	10 to 20	9%	10 to 20	8%	5 to 10	2%	1 to 5	8%	5 to 10	9%	10 to 20
Agricultural processing engineering	6%	10 to 20	7%	10 to 20	7%	10 to 20	7%	10 to 20	0%	-	9%	10 to 20	9%	10 to 20
Product Development	5%	1 to 5	15%	10 to 20	9%	10 to 20	16%	10 to 20	0%	-	6%	5 to 10	17%	10 to 20
Operate Computing Technology In Food Processing Work Place	6%	10 to 20	16%	5 to 10	6%	1 to 5	17%	5 to 10	8%	10 to 15	7%	5 to 10	6%	5 to 10
Advance Technology	7%	10 to 20	17%	10 to 20	7%	10 to 20	17%	10 to 20	0%	-	8%	10 to 20	6%	5 to 10
Merchandising, Food Processing Retail	9%	10 to 20	6%	10 to 20	8%	10 to 20	5%	1 to 5	0%	-	9%	10 to 20	7%	10 to 20
Minor Machine Maintenance / Repair	6%	1 to 5	5%	10 to 20	6%	10 to 20	6%	10 to 20	1%	1 to 5	5%	10 to 20	7%	10 to 20
Quality Assurance/ Control	7%	1 to 5	9%	10 to 20	9%	10 to 20	7%	1 to 5	4%	10 to 20	7%	5 to 10	9%	5 to 10
Costing /Basic Costing	5%	10 to 20	8%	5 to 10	9%	10 to 20	9%	10 to 20	20%	10 to 15	2%	10 to 20	9%	5 to 10
Work Safety	7%	1 to 5	7%	10 to 20	7%	10 to 20	8%	10 to 20	21%	5 to 10	1%	5 to 10	8%	1 to 5

TABLE 42: TRAINING COURSES PROVIDED⁶⁵

65 Results based on quantitative survey findings

4.7 Training Service Providers

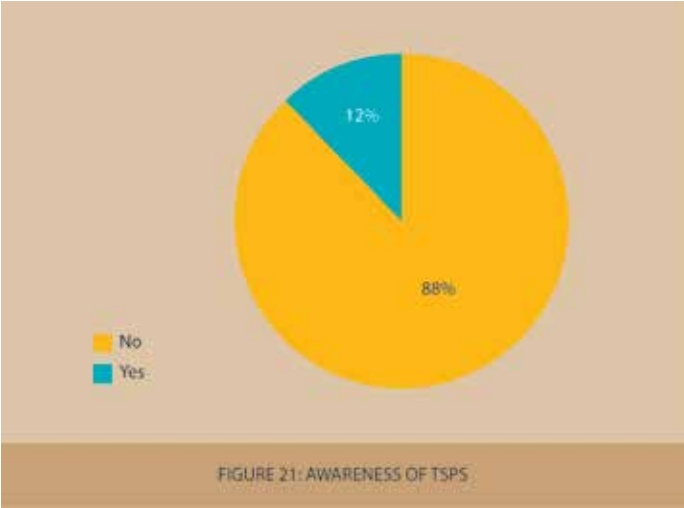
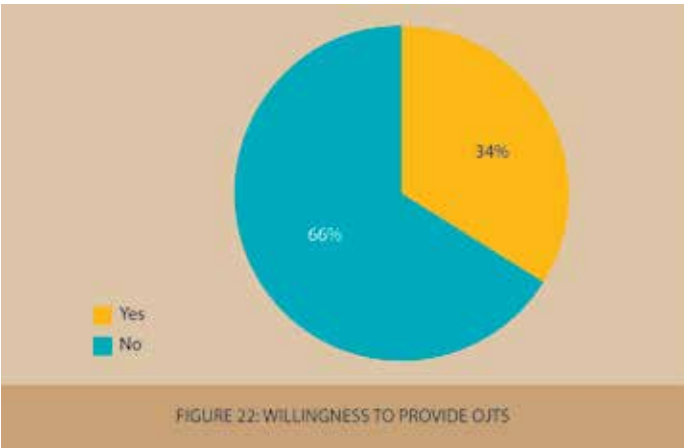
4.7.1 Figure below illustrates the awareness regarding the existence of TSPs amongst the respondents. Survey results indicate that only 12% of the companies have any knowledge about TSPs of Punjab associated with Food Processing Technology.

4.7.2 Out of a 185 respondents, only 12% had some knowledge of the University of Faisalabad, followed by Bahauddin Zakariya University of Multan and Star Farms, both of which were known to 8% of the respondents. Surprisingly, PMAS – Arid Agriculture University, Rawalpindi was the only TSP of which the survey respondents showed absolutely no knowledge. This lack of awareness amongst the respondents regarding the existence of TSPs is a matter of concern and poses a challenge for the industry. These results are also contradictory to the results of TSPs’ qualitative analysis, where majority of the universities/ TSPs pointed out that their graduates are well known to the industry and their job prospects are high especially for diploma holders. This contradiction in results may be due to reason that the TSPs are either unaware of this fact or they have not shared the correct information in order to safeguard their credentials and reputation.

TSPs	Knowledge of TSP(out of 185 responses)	Receive information on training courses	Employees Hired	Intention to Hire
The University of Faisalabad	12%	2%	3%	5%
University of Agriculture Faisalabad	6%	2%	4%	6%
Bahauddin Zakariya University Multan	8%	4%	2%	2%
The Islamia University of Bahawalpur	3%	1%	1%	1%
PMAS – Arid Agriculture University, Rawalpindi	1%	1%	1%	1%
Government College of Technology, Sahiwal	1%	1%	3%	3%
Government College of Technology, Faisalabad	3%	3%	2%	2%
Government College University, Faisalabad	4%	2%	1%	1%
Jinnah University for Women, Karachi	1%	1%	1%	1%
University of Karachi	1%	1%	1%	2%
Sindh Agriculture University, Tando Jam	2%	1%	1%	2%
University of Sargodha	3%	2%	3%	4%
University of Punjab	3%	3%	4%	6%
Star Farms	8%	1%	2%	1%
No Response	44%	75%	71%	63%

TABLE 43: TSPs OF FOOD PROCESSING INDUSTRY

4.7.3 From the TSPs listed in Table 43 above, Figure 22 below depicts that 34% respondents are willing to or routinely provide OJTs to graduates of food sector related TSPs. Further as depicted in table 44 below, majority of these OJTs were provided for technical skills like; post-harvest handling of fruits and vegetables, food chemistry, food preservation, physical properties of food material and food process engineering. The table also depicts the actual number of graduates to whom these OJTs were provided.

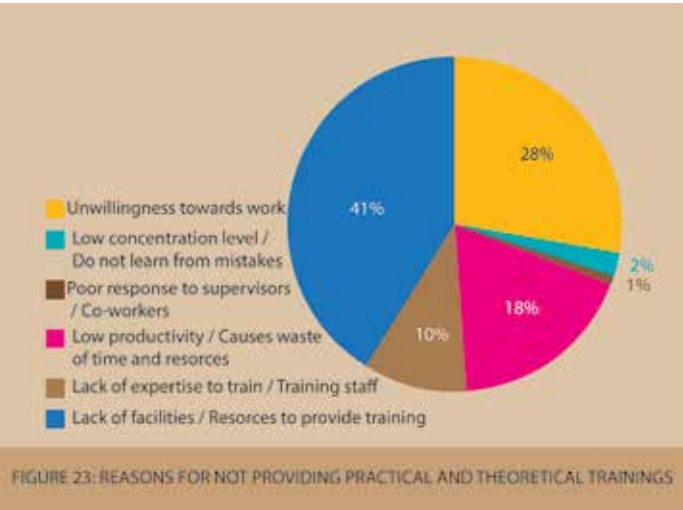


Skills/ Courses	%	No. of Trainees / year
Post-harvest handling of fruits and vegetables	8%	55 Per year
Food chemistry	6%	76 Per year
Food Preservation	5%	60 Per year
Physical properties of Food Materials	5%	44 Per year
Food Engineering Design	5%	89 Per year
Food process engineering	5%	90 Per year
Food regulations and legislations	5%	65 Per year
Heat and Mass Transfer	5%	40 Per year
Post-harvest engineering	5%	56 Per year
Costing /Basic Costing	4%	64 Per year
Food product and plant design	4%	65 Per year
Material and energy balance	4%	65 Per year
Minor Machine Maintenance /Repair	4%	53 Per year
Food packaging	4%	63 Per year
Food processing and preservation	4%	75 Per year
Merchandising, Food Processing Retail	4%	56 Per year
Advance Technology	3%	44 Per year
Quality Assurance/ Control	3%	43 Per year
Work Safety	3%	22 Per year
Agricultural processing engineering	3%	33 Per year
Food quality control	3%	60 Per year
Operate Computing Technology in Work Place	3%	53 Per year
Food micro biology	3%	55 Per year
Product Development	2%	43 Per year

TABLE 44: NO OF TRAINEES PER YEAR

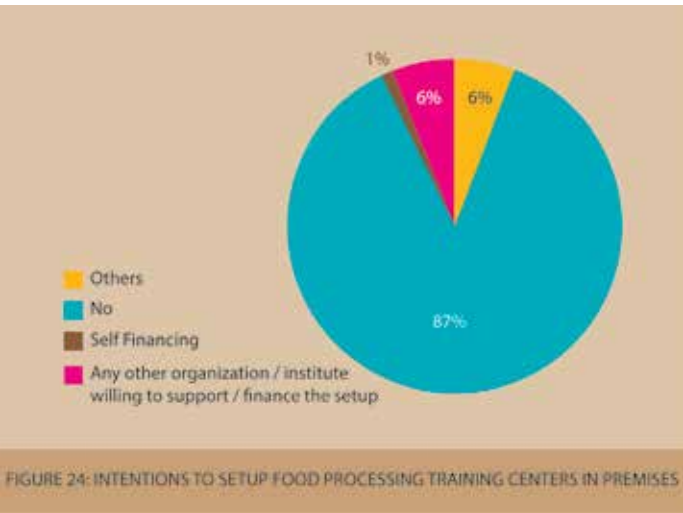
Reasons for not providing Practical and Theoretical Training

4.7.4 Figure 23 below outlines some of the reasons for not providing practical and theoretical training to students of food processing sector’s TSPs. As per survey results, ‘lack of facilities/resources to provide training’ was the top most reason with 41% of responses. Apart from this other major reasons include; unwillingness of students/trainees towards work (affirmed by 28% of the respondents) and low productivity of the trainees which ultimately leads to a wastage of time and resources (stated by 18% of the respondents).



Intentions to Set-Up In House Training Facility

4.7.5 Figure 24 shows that 87% of the respondents have no intention to set up in house training facilities, whereas a very small percentage (i.e. 6%) of the respondents seemed open to the idea of such training centers in their premises if financed or set up by any other⁶⁶ organization. Only 1% of the respondents were open to the idea of self-financing such in-house training centers.



⁶⁶ Under ‘Other Organizations’ category respondents mentioned International legitimate Financial Institutions, donor funding (if applicable), MNCs and large scale local organizations’ Support, etc.

4.8 Awareness of PSDF

4.8.1 Out of a 185 respondents, only 19 had heard about PSDF; majority of which belonged to the formal sector (14 respondents). The remaining 166 respondents had no idea regarding PSDF and its role as an organization in Punjab.

Heard of PSDF	Formal		In Formal		Total	
	No.	%	No.	%	No.	%
Yes	14	13%	5	6%	19	10%
No	93	87%	73	94%	166	90%

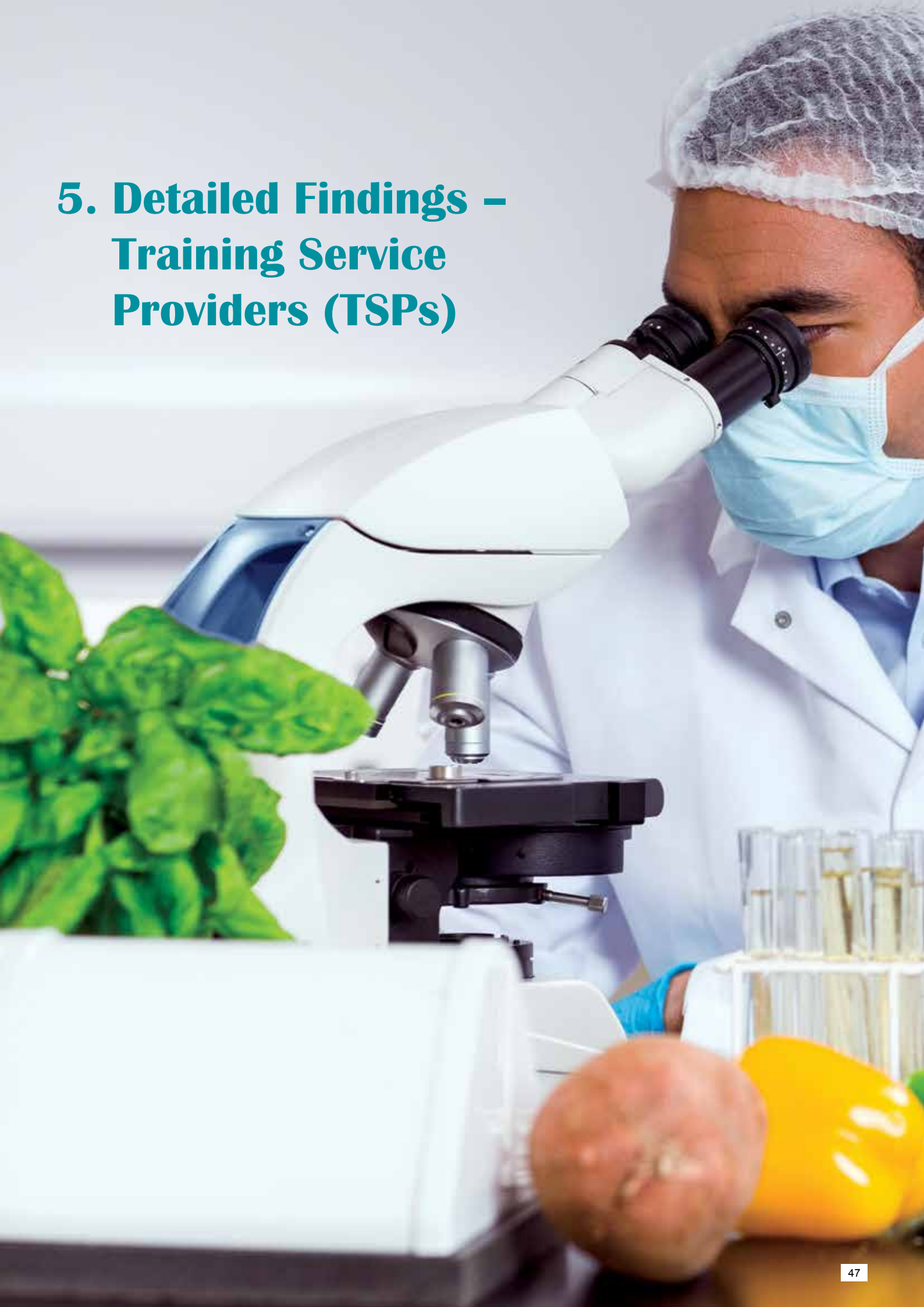
TABLE 45: AWARENESS ABOUT PSDF

4.8.2 Out of these 19 respondents who showed some awareness regarding the existence of PSDF, 18 of them knew that PSDF was provider of skills and vocational training opportunities, whereas only 1 respondent was of view that PSDF had a network that spread across 14 districts of Punjab.

Relevant Points	Formal		In Formal		Total	
	No.	%	No.	%	No.	%
Non – Profit Organization	0	0%	0	0%	0	0%
Collaboration between government of Punjab and Department of International Development (UK)	0	0%	0	0%	0	0%
Provide skills and vocational training opportunities	13	12%	5	6%	18	9%
Works across 14 districts of Punjab	0	0%	0	0%	0	0%
Others	1	1%	0	0%	1	1%
No	93	87%	73	94%	166	89%

TABLE 46: KNOWLEDGE ABOUT PSDF ROLE IN PUNJAB

5. Detailed Findings – Training Service Providers (TSPs)



5.1 Introduction

5.1.1 As part of the survey, consultants conducted in-depth interviews of existing TSPs (a list of these 12 TSPs is included in the annexure 3), who were actively involved in providing training services in Punjab. In-depth interviews aimed at capturing the current scenario of training supply to the food processing sector and identifying gaps (pertaining to the trainings’ supply and current requirement of the industry) and how PSDF may be able to play its role to overcome these gaps.

5.2 Summary of Findings

5.2.1 TSPs are providing courses at certification level, bachelor’s and master’s level. They are mainly focusing on ‘sector non-specific’ or ‘core and basic’ disciplines related to food technology and nutrition. However, little or no focus is laid on ‘sector specific’ programs.⁶⁷ The private sector, at present is providing certificate courses pertaining to the food sector (sector specific courses) but without focusing on the type of skills required by the industry. It has also been observed that TSPs need greater level of collaboration with the industry to cater to the current skill gaps in food processing sector.

5.2.2 Additionally, TSPs require an up-gradation in terms of teachers’ capacity, harmonization⁶⁸ of machinery and equipment and curriculum up gradation in line with industry requirement of the province. Furthermore, lack of active involvement in course design and selection is also observed at the strategic planning phase and a lot of dependency⁶⁹ (curriculum selection, review/design and up gradation etc.) on the governing bodies like Higher Education Commission (HEC) and Punjab Board of Technical Education (PBTE) in this regard is also reported.

5.3 Profile and Courses Offered

5.3.1 Training service providers (TSPs) selected for the survey represented a cross section of training providers that were providing skill development support to the sector. The brief profiles of our respondent TSPs along with their institutional and managerial capacities, detailed courses and profiles are presented in Annexure 11. It can be estimated that the total training capacity of ‘Food Processing Sector’ related TSPs in Punjab is 4,984⁷⁰ to cater the current demand of 210,142 workforces⁷¹ in the sector.

Career Prospects -Post Course Completion:

5.3.2 The table below depicts the overall scenario of ‘passing out graduates’ for various degree programs pertaining to the food processing sector:

Program	Sector/ Trade/Company	Starting Salary	Employability Ratio ⁷² (%)	Comments
Diploma of Associate Engineering	Companies such as Nestle, Engro, M.A. Foods, Mitchells, Gourmet.	Rs. 15,000 -20,000	100%	Due to high demand for skilled personal in the industry diploma graduates are able to find jobs easily.
BSC Food Science & Technology	Government Sector Research Institutes Industries(Food Security)	Rs. 23,000 - 25,000	70%	After degree completion students are able to find entry level jobs especially in the food security department
BS Hons. Food Sciences	Government Sector Research Centre Industries(Food Nutrition)	Rs. 23,000 - 25,000	80%	Food sciences graduates are well placed in industries especially in the food nutrition department.
M.Sc. Food Science & Technology	Government Sector Research Centre Industries(Food Inspection & Quality Assurance)	Rs. 50,000+	100%	Due to high demand for skilled personal M.Sc. degree holders are easily employed in industries, particularly in food inspection & quality assurance department
PhD (Food Science and Technology)	Research Centers	Information not Provided	-	Information not provided
Certifications(Skills for Framing and Farm Management, Food Processing and Pre-Post Harvest product enhancement, Food Baking and Cooking etc.)	Hotels, Industries, Entrepreneurship	Rs. 10,000- 15,000	70%	After certification students are able to find entry level jobs.

TABLE 47: POST SUCCESSFUL COMPLETION



5.3.3 It may be inferred from the above table that DAE & M.Sc. in food technology have scope in the industry with the highest employability ratio. TSPs need to invest resources in making these programs better and at par to the industry requirements. It may also be ascertained that focus is mainly on courses pertaining to food technology and food nutrition (sector non-specific skills), rather than industry specific skills. Hence it may be suggested that ‘sector specific’ certificate courses in government sector institutes may serve as a window of opportunity for prospective students to acquire skills within shorter time span that will eventually lead to greater influx of skilled workforce into the industry. PSDF therefore may fund institutes to acquire resources for providing these certification courses.

5.4 Course Selection Criteria

5.4.1 TSP representatives were asked about criteria that they employed for decisions regarding course selection. The following steps were highlighted in this regard;

- Selection committee,
- Industry Involvement in Selection,
- Written policies for Selection criteria,

Selection Committee:

5.4.2 Over all opinions shared showed lack of central committee for the selection of courses or trades within the government sector TSPs. In views of our respondents, this was identified as the key factor that leads to lack of harmonization in courses offerings across sector. At government level, this type of decision making is disintegrated across various independent bodies (teams) of qualified individuals (Senior Professors,

Dean, Chairman etc.) from the institute and they rely heavily on Governing bodies like Higher Education Commission (HEC) and Punjab Board of Technical Education (PBTE) for selection of trades.

5.4.3 In Private Sector institutes, trade and courses are mostly selected by team members or independent committees comprising of institution heads. Selection of new courses is mostly done by conducting independent in-house research. Courses are selected as per their own understanding of the industry requirements without including the industry representatives during finalization of trade and course selection, which leads to the lack of harmonization between TSPs and Industry.

Industry Involvement in Selection Process:

5.4.4 Based on our discussions, very few TSPs are involved in conducting surveys and gathering opinions from the industry experts prior to selection of trades. Majority stated that surveys are only conducted by their respective governing bodies such as HEC & PBTE. These governing bodies intermittently consult industry experts and also monitor courses that are being offered abroad to ensure standards are met and TSPs follow their guidelines accordingly. But the current efforts are not enough in order to meet the increasing demands of the sector with reference to the quality of curriculum and selection of new courses relevant to food sector.

5.4.5 TSPs also stated that they are willing to offer new courses related to food processing technology if the market demands.

⁷² Employability ratio has been calculated by dividing the total number of pass out graduates employed by the total number of pass out graduates from any institute in any particular year.

⁶⁷ Based on the responses gathered from respondent TSPs’ interviews
⁶⁸ Synchronization or alignment with the requirement of the industry
⁶⁹ Please see sections 5.4.4 and 5.5.6
⁷⁰ TSPs’ Organizational Profiles (depicting their current capacities) and courses levels these TSPs are offering are attached as annexure 11
⁷¹ Chapter 7, Table 54

Written Policies for Selection

5.4.6 University of Punjab and Sargodha involve members from agriculture board, the board of studies, agricultural sciences and the University Faculty Board (Academic Council) to help them in developing policies for selection of trades. TSPs governed by HEC, TEVTA and PBTE follow standards and policies set by these bodies for selection criteria (selection of courses). Private sector institutes have no written policy; however they refer to guidelines laid out by TEVTA and NAVTTC.

5.5 Development of Curriculum and Course Content

Steps in Curriculum Development

5.5.1 The TSPs reported that the key steps followed during development of curricula and course content were;

- Objectives of curriculum,
- Industry experts' involvement for Curriculum development,
- TSPs' involvement in curriculum development
- Frequency of reviewing the curricula design,
- Uniformity of course content and matching the requirements of the job market.

Objectives of Curriculum

5.5.2 Respondents are of the opinion that it is vital to identify objectives before development of curriculum and course content for any trade/program. Majority stated that main objective while designing curriculum is to ensure quality professionals are produced for the industry and curriculum is designed in a manner that covers requirements for the local as well as international market. The aim is to ensure students get to learn techniques and practices relevant to the trade and industry. TSPs are also of view that it is essential to conduct a comprehensive study of industry requirements and skills gaps identification before designing the curriculum for any particular trade, but this is not happening at the moment.

Industry Experts Involvement for Curriculum development

5.5.3 Most Government sector TSPs pointed out that they only follow guidelines set out by HEC and PBTE for designing curriculum and this is done by respective departmental heads. These Government bodies do consult industry experts before designing and developing course content and curriculum respectively but TSPs independently do not conduct any industry research or identify gaps before developing and finalizing curriculum.

5.5.4 But Private sector institutes do not collaborate with industry experts at the time of designing the curriculum; as a result curriculum is designed by only referring to guidelines set out by TEVTA and NAVTTC. Hence there is a gap between what is taught and what is currently required by the industry.

5.5.5 Therefore it can be suggested that PSDF may facilitate private sector TSPs by bridging the gap between the industry representatives and the institutes. It can be done by funding or sponsoring workshops and seminars. These workshops will provide platforms to industry representatives and university management where they can gather under one roof and share knowledge in more comprehensive way. This way the skills gaps of the sector can be effectively addressed.

TSPs Involvement in Curriculum Development

5.5.6 It has been observed from the survey that majority of the TSPs for curriculum development relies too heavily on the guidelines set out by HEC, PBTE and TEVTA. They generally do not conduct any survey regarding industry needs for curriculum development and up gradation. Independent committees within these TSPs (that are responsible for curriculum development) review guidelines set out by these governing bodies and design curriculum accordingly, without taking any initiative to develop curriculum based on industry requirement.

Uniformity across Institutes

5.5.7 Almost all respondents agree with the fact that there is uniformity in curriculum across the institutes in Punjab for similar courses offered. The prime reason attributed to uniformity was the fact that majority TSPs come under some common jurisdiction for example PBTE or HEC, hence there is uniformity in course content for similar trades being offered.

TSPs & Industry Correlation

5.5.8 Most TSPs pointed out that they not only focus on the technical aspect of the syllabus but also incorporate management, entrepreneurship and communication skills to prepare their students for practical industry exposure.

5.5.9 Majority of TSPs also pointed out that they are actively involved in facilitating their students to participate in various workshops and seminars (conducted by TSPs within/outside their premises), in order to get deeper insights on industry practices. In their views the curriculum taught is to great extent relevant to the industry practices and job market. However, this is in contradiction with our findings from sector expert views stated in chapter 6, where experts highlighted very low level of collaboration between TSPs and industry.

5.6 Affiliations/Partnerships

5.6.1 Majority of the TSPs (6 TSPs) have some local affiliations/partnerships with Government, Public bodies, associations or private organizations. Out of the total respondents surveyed, only two have partnerships/affiliations with foreign associations and industry representatives (COTHM College and Bahauddin Zakariya University). When inquired from the respondents if they were willing to acquire international affiliations, majority showed reluctance, as the process is cumbersome and institutes lack operational and financial capacity to qualify for the rigorous criteria.

5.6.2 The overall 'affiliation/partnership' profile of respondent institutes is attached as Annexure 6.

5.7 Accreditation

5.7.1 Survey findings indicated that majority of the TSPs have accreditation with local or foreign universities. Both TSPs surveyed from the private sector also laid great emphasis on being accredited to some foreign entity as this enables to brand institutions amongst potential students. Most TSPs from the government sector have accreditation with HEC & PBTE.

5.7.2 It emerged from the survey that College of tourism & hotel management (COTHM) is the only institute which has accreditation from foreign governing bodies and entities as mentioned in below table. Rests of the TSPs have acquired accreditation from local governing bodies.

5.7.3 The current 'accreditation profile' of respondent institutes is also attached as Annexure(Annexure 7).

5.8 Recruitment of Training Staff

Selection of Teaching Staff

5.8.1 Majority of the respondents pointed out that selection of trainer is done by the senior board members comprising of individuals from various disciplines for example University Of Punjab's selection board comprises 3-4 departmental heads, Vice Chancellor, Dean, 5-6 members of the public sector including; members from Ministry of Education, Ministry of Finance and Judiciary, bureaucrats, industry and area experts. University of Sargodha, Government College Technology Sahiwal, Islamia University of Bahawalpur, Arid Agriculture University Rawalpindi and Government College University Faisalabad also have selection boards in place to select trainers. TEVTA is mainly involved to select trainers for Government College of Technology, Faisalabad.

5.8.2 Private sector has no formal board for selection of training staff; hence recruitment is mainly done upon the need and nature of the position in question. Whenever need arises in these institutes, technical experts with relevant expertise for the position in question are summoned to interview and select trainers.

Selection Process

5.8.3 The selection process usually starts off by placing an advertisement in the newspaper, or receiving applicants through referrals, this is followed by a series of interviews, presentations and screening tests so that the committee can have a better understanding of the skill set of the candidate in question. Upon reviewing the candidate profile and assessing the candidate through interviews, the selection committee unanimously agrees on the trainer to be hired.

5.8.4 It has emerged from the survey findings that prior industry experience of a potential candidate for selection is not an underlying criterion for selection of trainers; however candidates who have industry experience are preferred over

those who don't have it. But at the same time particular emphasis is laid on hiring specialized trainers for technical subjects.

5.8.5 In addition to above few institutes like Star farms conducts in house research of local job market to review Job descriptions of training staff for similar positions and to ensure they hire the right candidate with right skills.

Training of Trainers

5.8.6 Government College University Faisalabad, NIFSAT agricultural Farms, Bahauddin Zakariya University, and Government College of Technology Sahiwal, employ a policy of pedagogy (teaching on how to teach). This strategy is used to train newly hired trainers so that they become more proficient in their work. Before they begin training, the teachers are given a comprehensive overview of the curriculum. This process gives a better understanding to the instructors as to what is required out of them and how to deliver the content to the students in a more structured manner.

5.8.7 TSPs also focus on the training and development of their instructors so that the skill sets of their instructors are developed with changing times and requirements of the industry. For example, University of Punjab is actively involved in conducting workshops and organizing training sessions, in-house and nationwide. Most respondents stated that they organize nationwide training and certifications for their faculty. It emerged that HEC is also involved in providing specialized trainings to trainers teaching technical subjects.

5.8.8 However, respondents mentioned low level of industry involvement in training their faculty. To address this issue, some universities summon graduates of certain institutes working in the industry, to give lectures or trainings to the teaching staff. Hence, it may be ascertained that TSPs to some extent are taking development initiatives to ensure trainers are at par with industry requirements.

5.8.9 Further it may also be ascertained from the survey, that there are no coherent policies in place for trainers' selection as a result quality of trainers may vary across institutes.

Pay Scale and Career Development

5.8.10 The general trend observed across all government sector institutes is that is that pay scales are determined on the basis of seniority and experience of the instructor, regardless of their qualification. However, university of Punjab has an open merit competition system in which internal instructors have to compete with external candidates if required for any vacant position. They also provide favorable promotion avenues for their faculty. Similarly, Star Farm institute has a proper promotional scheme for their instructors which are developed by their senior management.

5.8.11 It has emerged from the survey that career development paths of the trainers is an area which is greatly neglected in majority of the TSPs. As indicated most TSPs from the government sector follow the conventional method of promotion which is based on seniority. However, this is not in accordance with the best market practice. Unfavorable promotion avenues may also lead to good trainers leaving the sector or high-

ly de-motivated workforce.

5.9 Post Training Facilities/Placements for Graduates.

5.9.1 The survey results indicate that almost all institutes provide post training facilities to their students. University of Punjab, Government College of Technology Faisalabad and Government College of Technology Sahiwal have placement offices that are solely dedicated to bridge the gap between students and industries, by providing internships and job opportunities. The placement department also ensures active participation of their students and graduates in job fairs and job expos where students are exposed to a larger set of employment opportunities. Survey results also indicated that majority of the graduates from TSPs do not join any institute as trainers; however, some students have signed up as trainers with various organizations in the food processing sector and have also been involved in the trainings of new interns from Food Sector TSPs.

Skill Set of Trainees

5.9.2 When asked about the skill gaps of the TSPs' trainees and the industry, some respondents stated that there are certain gaps which may be dealt with better collaboration and communication with the industry. For example, students have a very strong knowledge on the processes and technology of food processing sector. But when it comes to mass production, increased level of automation and control systems required in highly sophisticated production units, the models and makes of machines vary from industry to industry (mostly due to high competition between competitor production units). This creates a gap with regards to 'industry harmonization' between existing TSPs and food processing industry. TSPs are trying to deal with this problem by arranging regular internships for their students.

5.10 Plans for Expansion

5.10.1 Majority of the TSPs are satisfied with their existing facilities and infrastructure, however most of them pointed out there is room for further improvement. Most respondents stated that changing dynamics of the food processing sector requires them to continuously upgrade their equipment and labs, especially for technical subjects.

5.10.2 University of Punjab, Government College of Technology Sahiwal, Government College University Faisalabad and University of Sargodha, are mostly funded by provincial/local government along with some in house funds generated through students' fee. Whereas the Islamia University of Bahawalpur, Government College of Technology Faisalabad and PMAS - Arid Agriculture University are solely funded by student fee and in house funds. Star Farms is funded by various donors and Metro MAS (Metro Assessment Service) Project.

5.10.3 The next 5 years' expansion plans for various institutes are depicted below:

- University of Punjab is planning to introduce more certificate & Diploma courses related to food technology, along

with adding more disciples to the agriculture department.

- Government College of Technology Sahiwal, University of Sargodha and PMAS Arid Agriculture University are planning to increase their seats due to high courses' demands in the market and at the same time planning to expand their labs and other practical facilities for further improvement.
- Star Farms is working to launch their institute in KPK and Sindh, along with adding more courses to their curriculum.

5.10.4 It has also been reported that most TSPs are relying on government funding to assist them with their expansion plans whereas some are planning expansions through their own funding and continued funding support from their donors (e.g. Star Farms).

5.11 Awareness of PSDF

5.11.1 Out of the twelve TSPs surveyed for the purpose of this study, only five TSPs had prior knowledge about PSDF, its role, mission and responsibilities. One TSP, Star Farm Institute, also pointed out that they are currently working with PSDF and are very impressed with their monitoring system. Out of these five respondents only three are aware of PSDFs funding structure.

5.11.2 Respondents were also asked to give recommendations and suggestions to PSDF as an organization. Majority of the respondents suggested the following;

- PSDF may also facilitate TSPs to enhance their trainer's skills by financing training programs so that skill gap between the industry and the TSPs may be identified and addressed accordingly.
- The organization can also provide financial assistance in carrying out research for curriculum development by collaborating with industry and foreign universities.
- Make efforts to market PSDF more, and reinforce awareness of their purpose and existence amongst TSPs so that more institutes are able to reach out to them for assistance and guidance.
- PSDF can play active role in helping TSPs to carry out their expansion plans in terms of capacity building and infrastructure development. Different financial schemes may be introduced to cater to the scope of expansion plan.

6. Detailed Findings – Sector Experts

6.1 Introduction

6.1.1 In-depth interviews and discussions with business experts across Punjab were conducted as part of the exercise covering review of 'skills training needs' within the food processing sector. This chapter summarizes insights and views expressed by these sector experts regarding;

- Skill needs,
- Skill gaps,
- Their feedback on relevance and quality of courses, and
- Effectiveness of Training Service Providers (TSPs)
- Global food processing sector scenario
- Current consumer demand in the international market
- Major challenges being faced by the sector etc.

Sector Experts Profile

6.1.2 SHMA identified 36 sector experts who are actively engaged in the processed food industry in Pakistan. These were shared with the client and confirmed prior to soliciting their inputs.

6.1.3 In the 'processed food' category we obtained viewpoints from **24** experts on frozen food including value added processed food and fruits, vegetables, edible oil and beverages. The remaining **12** experts were related to bakery and confectionery sub-segment including general bakery products, biscuits and other dry bakery and confectionery products. The sector experts were chosen on the basis of their academic qualifications, areas of expertise and years of experience in their respective sector. Majority of the respondents had Masters Degrees in food sector and work experience in the industry ranging between 10 to 15 years, while a few of the respondents had higher qualification such as PhDs in food sector related disciplines with more than 25 years of experience in the industry. Their main areas of expertise was related to; Food Technology, Extrusion Processing, Thermal Food Processing, fruit and vegetable sector, edible coating, sustainable production, food micro technology etc.

6.2 Food Processing Industry - Global Perspective

6.2.1 The respondents expressed the view that the global food industry has evolved rapidly over the past 5 years and with active involvement of internet, blogging and social media in our lives, more people are now aware of food and nutrition. The experts also highlighted the fact that in developed markets, like US and Europe, the consumption trend is slightly shifting from processed food to organic food. However in Pakistan the processed food sector has just started to flourish and it has a long way to go in terms of development.

6.2.2 While discussing about the trends and innovations of global processed food industry, the majority of the respondents believe that the global processed food industry depends more on automation and control systems in their production

facility in order to meet high consumer demand. Countries like USA and Germany are known to the world as innovators and vendors of automated machinery to this sector. Many developed countries around the globe have installed technology and machinery from these countries and have managed to achieve high levels of production efficiencies. The experts further emphasized the fact that USA and Germany have heavily invested in innovative machine designs and in reducing labor intervention throughout the processed food sector and it has helped them to a great extent in translating productivity gains into high profits for the food processing sector.

6.2.3 With regard to Asia, experts are of the opinion that China and Japan are the biggest markets that are very much developed and have greater potential for development followed by India and Oceania countries especially Malaysia. Apart from Japan which is very much into research and development, automation and in designing of innovative technology relevant to food sector, the rest of the region's main strength lies in replicating the European and American systems with utmost excellence. They are quite adept at implementing the western systems into their own factories and for this reason there is currently and will be in future - major exports of technology from countries like Germany and USA into these Asian countries, which is a major threat for entire region especially for Japan. The Pakistani processed food industry also relies heavily on USA and Germany in terms of technology import. As indicated by majority of the food sector experts, Food industry in Pakistan is shifting towards more automated systems and Pakistani Processed Food Sector will be a high potential market for technology export especially from China, Japan, USA and Germany.

6.2.4 When asked about the recent technological developments in the sector, 'technological advancements with respect to traceability' was highlighted by the experts. Recently, there have been developments in the sector because of which one can identify the actual components and their percentage in food product. Industries can now determine the actual percentage of the animal and its health as well. The traceability system allows checking for impurities in a product and even trace the feed of animals to see whether it contains harmful material or not, as they can enter into the human body from the food product if the animal has consumed these harmful substances in feed. Few other experts also talked in the same context, but with reference to hygiene factors and said that there are systems available which tracks the hygiene of the workers in factories. They also talked about increasing the shelf life of the product, which increases productivity and overall revenue for the company. There is a lot of awareness amongst global food technologists due to their recent trainings and advancement in technology. For example, automated hands free systems of packaging make the end product standardized by reducing human error and increasing the shelf life of the product.

6.2.5 Contrary to the aforementioned views of experts, there is another school of thought amongst the respondents which states that the global food processing industry is still not fully automated. According to them, currently, there are systems present which require human interventions; hence it may be safe to assume that the sector has shifted to great extent from 'semi- automated' operations to 'fully automated' globally but still not 'fully automated'.

6.2.6 As far as human resource requirement is concerned, almost all the experts strongly believe that the developed world does not generally face the problem of finding people related to human resources. They actually have institutes dedicated to training people in specific industries including food sector. Apart from the institutes they also have very advance 'on-job training' system and most of the staff gets proper training and internships before coming to the factories. Hence one of the main reasons of their success is attributed to the presence and availability of skilled staff. Further the sector experts during this discussion heavily emphasized on the 'needs of trainings' for the food processing workforce in Pakistan.

6.2.7 Moreover, the respondents also stressed upon the fact that the global industry has started working on acquiring specialized skill set. This cannot happen in Pakistan because of the rigid management structure of the industry. They believe that there is a dire need for specialized skill set spread over a larger number of workforce in Pakistan. The local industry also needs multi skilled people for small scale operations.

6.2.8 When asked about the issues with global food sector, almost all the respondents agree to the fact that it is very difficult to evaluate issues with global food industry. However, an issue has been raised recently that there is likely to be an "explosive growth" in the use of the technology in advanced countries. Also nanotechnology is likely to be employed to enhance flavor and even to make processed foods healthier by reducing the amount of fat and salt needed in production. Experts believe that there are risks associated with processed food, if prepared by nanotechnology, as the use of chemical sprays like insecticides and pesticides on fruits and vegetables may lead to producing harmful or contaminated process food products.

6.3 Food Processing Industry in Pakistan

6.3.1 In views of the respondents, Pakistan's Processed Food industry has come a long way and is beginning to gear up to compete in the international market especially in the Middle East where there is a huge demand for the Halal Processed and certified Products. Major industry players are focusing on maximizing cost advantages and taking advantage of access to markets that are hitherto not available. Experts are also of opinion that the sector is gradually shifting towards automation to increase efficiencies and to meet rising local and export demands.

6.3.2 The industry experts identified various challenges and opportunities this sector facing in terms of both technology and human resources. Some of the major challenges are depicted below:

- Shortage of skilled labor,
- Shortage of institutions providing sector specific trainings,
- Lack of research and development in the sector,
- Low wages, limitations of labor rights and labor laws violation,

- Inflation,
- Law and order situation,
- The current energy crisis,
- Weak Agriculture infrastructure, and
- Lack of technological advancements, process and quality initiatives in the sector.

6.3.3 In addition to the above, Pakistan has the highest sales tax rate as compared to other neighboring countries. The respondents feel that high sales tax hampers competitive pricing which is a challenge for the producers. .

6.3.4 Further in views of respondents, Implementation of international standards is also a challenge that is posing threats to exports. For example, exports of some Agro-Commodities like Plant Quarantine is suffering since local processed food industry is not completely meeting the requirements of International Food and Safety regulations. In addition to this, Pakistan still has to meet certain international standards in regards to quality control and food safety.

6.3.5 Moreover, almost all experts agree with the fact that the lack of skilled work force and technological advancements are the main reasons because of which Pakistan is lagging behind in competing internationally. Survey experts specifically highlight sugar confectionery sector as one that really needs food technologists to ensure safe and healthy products for children. Similarly in their opinion frozen food and edible oils are the sub-sectors where advancements in terms of automation and large number of skilled workforce are required.

6.3.6 Besides various challenges, several improvements are also spotted by the survey experts such as Improvements in; exports of fresh and value added fruits and vegetables and Halal value added food products, and developments in technological advancements especially in the fields of food preservation, post-harvest engineering, packaging and supply chain and storage.

6.3.7 One of the respondents suggested the use of 'refrigerated containers', during transport of fruit from farm to factory, as an opportunity to increase efficiency of our fresh fruit and vegetable sector. India is already using this technology through which the fruit is picked from the farm in raw shape and the transportation to factory is done using temperature controlled refrigerated containers. This way the fruits and vegetables reach the factory in same quality as of naturally ripe product.

Technological Advancements Expected in Near Future

6.3.8 Majority of the experts were of the view that the following technological advancements are expected in near future;

- IT technology is likely to play a vital role in food processing industry and may trigger demand for IT professionals in the Industry. Establishments of well-equipped labs for product testing may also increase. These developments

- would require the availability of micro biologists and food chemists.
- High level of technological advancement with respect to food preservation is also highlighted by the participants. They believe that almost all companies; nationals, multinationals, registered, unregistered, are looking for increased shelf life of their products by adding safe and healthy food preservatives. This factor would offer promising career opportunities to those with education in food preservation technology.

6.3.9 Despite the aforementioned views on future technological advancements, some participants are also of the opinion that there will be no advancements in near future. The prime reasons cited in support of this viewpoint were the associated cost implications and the current economic and political situation of the country, which is discouraging industrialists to incur this cost at the moment.

6.3.10 Further, respondents cautioned that Industrial and technological advancements may lead to flourishing businesses but these will require professional and skilled workforce. So one of the major challenges for industrialists in future will be “to attract and retain workforce” and for that industrialists will have to develop professional HR policies. Development of human resource through training is also highlighted as of prime importance in future by the experts.

6.4 Food Processing- Skills Required and Skills Gaps

6.4.1 Majority of the respondents agree with the fact that the employees with desired skill set level are not readily available in the market. The industry faces problems in finding people, who are specialized in technical fields like, food technologist, food planners, food quality control, microbiologist, biochemist, machine operations, electrical engineering, electronic engineering, and people who can work on boilers, seeding plants, crushing etc. It takes 2-3 years for a person to learn the processes properly and to deliver results. However this view is contrary to the views of TSPs, who believe that their graduates have the technical skill set, needed for food processing industry.

6.4.2 Almost all the respondents contacted for the study highlighted training, both at formal and informal level as the main cause of the skills-gaps at various levels. They are of opinion that due to a lack of training institutes/ courses almost all the players in the market depend on ‘on-the-job/in-house training’. Industry players mostly hire unskilled workers and train them. Experts also believe that both the industry and training institutes can play a vital role in bridging the gap, if they work in close relationship with each other.

6.4.3 Further the sector experts are of the opinion that demand for skilled work force in the processed food industry of Pakistan will rise in the next 5 years mainly due to industry awareness about the food processing sector, new product manufacturing, shift of industry towards automation and automated production plants.

6.4.4 Majority of the respondents do not feel that the industry is doing enough to fill the gap that may create in future due to this anticipated increase in demand. Only individual efforts are being conducted by some large scale companies as there are budget constraints too. For example, Tetra Pak conducts off-the-job trainings mainly for machine operations with a consulting firm. Also multinationals offer formal off the job and on the job trainings to their employees due to their experience and budgets, and their training programs are also up to the required industry standards. Experts also highlight that companies which do not have resources to train employees, prefer hiring experienced employees and face constant exploitation at the hands of experienced employees.

6.5 Hard to Fill Vacancies

6.5.1 Table below depicts the information retrieved from the sector experts’ interviews regarding vacancies for which; establishments are unable to find suitable candidates, medium to long term, at prevailing wages, and through the usual recruitment procedures (Hard to fill vacancies). Further the main reasons due to which experts believe these vacancies are hard to fill are also highlighted in table below:

Table 48: Hard to Fill Vacancies	
Hard to fill Vacancies	Reasons
1. Food Technologist	• Students are not trained about Food Standards and the Food Authority Act. Even if they are trained on few relevant things, they are completely out dated. • There is a need for developing manpower in specialized skills. The industry is not working in this regard at all.
2. Quality Assurance Specialists	• There is no perception regarding HACCP (Hazard Analysis and Critical Control Points), food safety and quality in the market • Lack of practical training at the institutes
3. Technical work & machine operator (holding at least a diploma)	• Turnover for such employees is high. • People are not trained for working on filling machines, washers, cappers, reverse osmosis and packing machines etc. In training institutes. Factories have to train them from scratch after hiring. • Companies can hire fresh employees and train them on their system but it will take about a year to make that person productive • Lack of practical training at the institutes /hands on exposure to a variety of material and tools
4. Sales team	• Sales employees switch frequently when they are offered more money. • Companies facing problems in finding employees who know the industry and is already trained.
5. Research & Development Specialist	• There is very less aptitude and attitude towards research along with business experience. • Lack of training facilities
6. Advanced IT professionals	• Relevant ICT skills shortage • Turnover for such people is high. • Lack of training facilities
8. Bio Technology specialist	• Lack of knowledge in Bio Technology • Lack of training facilities • Lack of theoretical and practical training at the institutes

Role of Labor Intermediaries

TABLE 48: HARD TO FILL VACANCIES

6.5.2 The study has found out that most companies in Pakistan don’t use intermediaries or labor contractors for hiring or filling hard to fill vacancies; this has also come out from the quantitative/demand survey of 185 establishments⁷³. They prefer recruiting people who are skilled or qualified directly through newspaper. Though labor contractors do provide people with required skills but sector experts are of the opinion that their supplied work force is not always up to the requirements may be due to lack of technical recruiters.

6.5.3 Experts also pointed out that majority of work force which comes from the labor intermediaries or contractors have serious issues in adjusting to company environment. Ex-

perts believe that finding a skilled individual with the required qualifications through mediums like newspapers, advertisement on factory gate etc. is not that difficult but to find people with right attitude is a challenging task as majority of the workforce (supplied by labor intermediaries) is only focused towards completing their day to day tasks without paying any heed to quality or taking any personal development initiatives.

⁷³ Figure 15, section 4.4.1 in chapter 4

6.6 On-the-Job Training(OJTs)

6.6.1 In view of experts, educational institutes only impart the conceptual knowledge regarding a particular subject matter while practical implementation is often neglected; therefore to deal with this situation ‘on the job training’ is vital for practical knowledge. This section of the chapter discusses those skills, for which on-the-job training is best suited, and the role that industry players have played, in providing on the job trainings to employees and recent graduates.

6.6.2 According to the majority of our respondents, following skills (in existing and newly hired employees) require on the job trainings;

TABLE 49:SKILLS REQUIRE ON THE JOB TRAINING	
• Mechanical Work and Machine operations at the plant	• Food technologist
• Health safety standards	• Food Chemist
• Food preservation	• Bio technology
• Food Grading	• Cooking and Frying
• Food Tasting	• Plant and Machine repairing and maintenance
• Basic Hand tools skill	• Hygiene Conditions at plant
• Food safety standards	
TABLE 49:SKILLS REQUIRE ON THE JOB TRAINING	

6.6.3 The experts believe that the above mentioned skills require on-the-job trainings because the factory environment is different from classroom environment; hence these skills require in-depth understanding of operations. Further, on-the-job training helps organizations to train their employees to specific requirements.

6.6.4 The respondents specifically highlight that ‘machine operating skills’ are most suitable for on-the-job trainings. Other skills can be learnt from training centers to some extent but machine operations can be best learnt on the machines and equipment, because machines like frying and cooking in the factory involve tackling quantity, temperature and timings which can only be practically taught in the factory. Further trainings for majority of the technical skills like Food Technology, Food Hygiene, Health and Safety and Food Safety, Mechanical Work and Machine Operation, etc. must be provided on the job.

6.6.5 When asked about the role industry players have in providing on-the-job trainings, experts are of the opinion that industry players are well aware of the importance of providing on-the-job trainings to their employees as the current influx of labor is not skilled to perform operations efficiently on advanced and more sophisticated industry equipment. Hence majority of the medium sized and large scale companies hire people and train them as per their requirements. It has been observed (in views of experts), that mostly, large organizations and multinationals train their people recurrently to keep up with the industry requirements. Hence their employees’ turnover is also less compared to the small factories. Though smaller factories also provide trainings to their employees, but they mostly prefer to hire someone who is already trained due to lack of technical and financial resources.

6.6.6 When asked whether the industry is willing to provide trainings to fresh graduates of TSPs especially on production aspects; in order to provide deeper understanding of the plant operations to them, Interviews’ results indicate that the industry especially major players are willing to provide such trainings. However medium and small scale companies have limitations like; lack of financial resources or adequate time and manpower to train fresh graduates. Some of the main skills highlighted by sector experts for which the companies are willing to provide trainings to fresh graduates are as follows:

- Food Chemistry & Physical properties of food.
- Computer operations at plant.
- Plant/Machine repair & Maintenance
- Food preservation
- Food Quality Assurance

6.6.7 Respondents also suggest that OJTs which food industries providing to graduates must be formal trainings and students should be given proper practical assignments and tasks instead of just assigning them general office works and administration tasks they should be allowed spending more time on production floor. Similarly during internships students are mostly trained on machine repair and machine process but experts believe that apart from these skills students should also be trained on production planning and control aspects.

6.7 Off-the-Job Training

6.7.1 It has emerged from the qualitative survey that very few companies provide off the job training to their employees as they do not notice any operational value for these trainings. Of the few companies in views of experts which provide or send their employees for off the job trainings, most of them send their employees for soft skills’ trainings.

6.7.2 Majority of the respondents highlighted following skills for which they think off the job training is best suited:

TABLE 50:SKILLS REQUIRED OFF THE JOB TRAINING	
• Time management	• Sales management
• Problem Solving	• Food Technologist
• Bio Technology	• Management Skills
• Food Preservation	• Leadership Skills
• Quality Assurance/Quality Control	• Health and Safety Standards
TABLE 50:SKILLS REQUIRED OFF THE JOB TRAINING	

6.7.3 Subsequent to providing aforementioned skills’ trainings, there are instances when new machinery is installed in the factory and in order to familiarize employees to its operations, off the job trainings are often provided or arranged by the manufacturers of the new machinery for employees. And sometimes our local industries even send their employees abroad for these off the job trainings.

6.7.4 Experts also indicate several large scale companies, which are providing off the job training facilities to their employees for example, Fauji Foundation has set up separate

campus to provide off the job trainings pertaining to their required skill set, multinationals have already an existing in-house formal set-up for such trainings. Besides this numerous training options are also available for other companies thinking of providing off the job trainings to their employees in form of agriculture and food sciences universities, institutes like Star Farms and Pakistan Institute of Management; which conducts trainings for soft skills, technical and supervisory skills in close liaison with the food industries.

6.7.5 As far as the quality of these off the job trainings is concerned, majority of the experts are of the opinion that for soft skills training material are adequately prepared and are up to the standards, whereas for technical trainings available training materials are not up to the standards or requirements of the sector.

6.7.6 Some recommendations and suggestions provided by the experts for improvement of the trainings administered are:

- Institutes administering training for employees must have strong collaboration with the industry and should conduct regular research so that skill gap may be easily addressed and more meaningful technical training for employees can be formulated.
- Industries should take initiatives at individual levels to provide technical knowledge to their employees.
- Impact assessments must also be done to determine the outcomes of a particular training program.

6.8 Technical and Vocational Education (TVE) in the Food Processing Sector

6.8.1 The table below represents the skills in views of the experts for which they believe technical and vocational trainings are required;

• Food chemistry	• Post-harvest engineering
• Physical properties of Food Materials	• Advance Technology
• Hazard Analysis and Critical Control Points (HACCP)	• Merchandising, Food Processing Retail
• Quality Assurance/ Control	• Minor Machine Maintenance / Repair
• High yield crop management	• Costing /Basic Accounting
• Food Technology	• Material and energy balance
• Canning	• Food quality control
• Food safety	• Food processing and preservation
• Food Preservation	• Food micro biology
• Basic Operational safety	• Food product and plant design
• Hygiene conditions at plant	• Food packaging
• Awareness of integrated practices	• Agricultural processing engineering
• Biochemistry	• Product Development
• Microbiology	• Resource management
• Application of quality management	• Stress Management
TABLE 51: SKILLS THAT REQUIRE TECHNICAL AND VOCATIONAL TRAININGS	

6.8.2 According to the majority of experts, there has been a slight change in the availability of training options/programs in the food processing sector. They believe that there is a huge demand of training required in the technical section of the industry which involves operating, maintaining and repairing machinery, food technology, food chemistry, food preservation, as well as know-how of the health and safety standards required in the production process. In addition to technological and mechanical understanding of machine operations, TVE is also required at the quality control level to ensure quality of products and procedures. Some experts also propose the development of more short and diploma level courses where improved practical trainings are provided in aforementioned areas along with relevant theoretical background, to gear the individual with the required skill set before entering the industry.

Training Service Providers in Punjab

6.8.3 Below is the list of various TSPs identified by our qualitative survey respondents in Punjab, which in their opinion providing programs/trainings on skills related to food processing industry.

1. University of Agriculture Faisalabad
2. The University of Faisalabad
3. University of Punjab
4. Government college of technology Faisalabad
5. Government college of technology Sahiwal
6. University of Engineering and Technology Lahore
7. University of Sargodha
8. Bahauddin Zakariya University Multan
9. The Islamia University of Bahawalpur
10. PMAS – Arid Agriculture University Rawalpindi

Correlation between TSPs and Industry

6.8.4 Majority of the survey experts affirm that they do not receive any information about the food processing training courses from universities or technical and vocational institutes. The experts are of the opinion that it is high time TSPs and industry representatives should start collaborating with each other so that the courses could be designed and delivered according to the industry requirements.

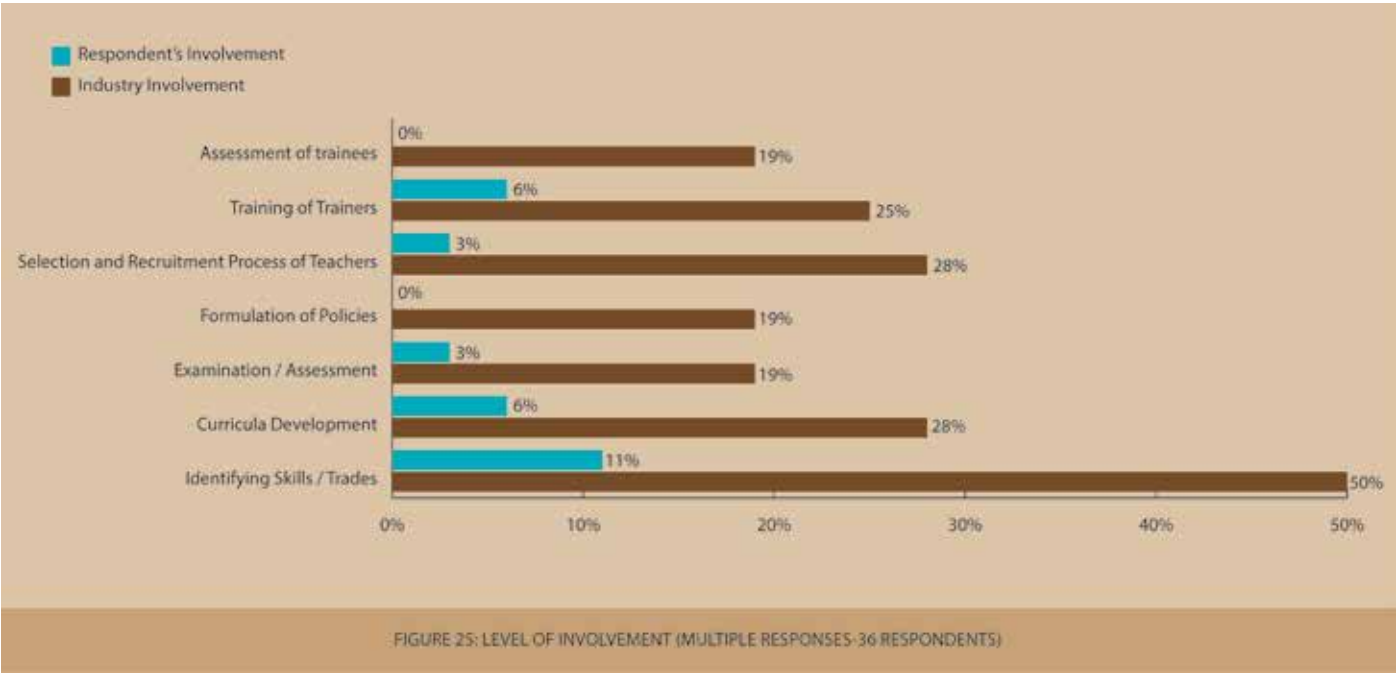
6.8.5 Further when survey experts are asked whether companies in food processing sector prefer to hire employees of these TSPs more than half of the experts affirm that the job prospects are high for those doing certifications or degree courses relevant to food processing sector. Experts rated University of Agriculture Faisalabad at top with regards to job prospects, followed by Bahauddin Zakariya University and Islamia University Bahawalpur.

6.8.6 When questioned about the relevancy of the curriculum with the requirements of the industry, the experts unan-

imously agree with the fact that although the material being taught is good theoretically, but it does not have any practical application for the students. Therefore, the institutes should design their curriculum in collaboration with industry in such a manner where major part of the training should be practical and applicative in nature. Moreover, experts also believe that the curriculum should be upgraded regularly in order to meet the current requirements of the industry.

Level of Involvement with TSPS

6.8.7 The graph below shows the views of experts with regards to the level of involvement of ‘survey experts’ and ‘industry’ (as a whole) with the TSPs. Most of the experts are of the opinion that industry representatives are to some extent involved with TSPs mostly in identifying skills/trades (18 out of 36 experts agreed) relevant to food processing, followed by selection and recruitment of teachers and curricula development. But they believe that more work is needed in strengthening the relationship between TSPs and industry.



6.9 Awareness of PSDF

6.9.1 Majority of the experts are unaware about PSDF and its role in Punjab. Only few are aware about PSDF (less than 10%) as they have some acquaintance or have worked with that organization. As the majority of the respondents were completely unaware of PSDF’s role and responsibilities, our consultants shared information regarding PSDF and its various initiatives for several industries including the food processing industry. This information was generally well received by the respondents and they reverted with the following opinions/suggestions on how PSDF can help the industry:

- PSDF can help the industry by strengthening the existing TSPs so they could develop more and updated (as per industry requirement) technical trainings. These institutes can then provide certifications for various required skills in the market.
- Collaboration between industry and TSPs is main issue; PSDF can help institutes to conduct seminars and programs where industry and TSPs can share knowledge and can effectively increase collaborations.
- PSDF can support TSPs to provide on field trainings to employees, as it is difficult for employees to take out time from their usual working hours.
- PSDF can also provide avenues to take the multinational and large size companies on board for conducting training activities; and through these avenues TSPs may send

their students to these companies’ in-house training facilities or factories. This should be a course of 1-1.5 years. Organizations like Lever Brothers, Knorr, Rafhan, K&N, and Nestle must be considered. Students can be sent to their facilities not just for lectures but on manufacturing floor for practical trainings.

- PSDF must take steps to inform organizations about their initiatives. They need more visibility and proper marketing plan to reach out to target audience/market.
- PSDF can involve or work closely with institutions like PC-SIR & PITAC which are actually capable of delivering what the industry requires.

6.10 Government Sector

6.10.1 According to majority of industry experts, Pakistani food processing industry is a sleeping giant⁷⁴ and government initiatives will definitely encourage the rapid growth in this sector. In views of the experts the Government may take the following key measures and policy interventions for continued growth and development of the sector and increase in exports;

- Income tax rebate may be allowed for new industries in fruits and vegetables besides institutional and credit sup-

74 In-depth interview with SGS and TDAP

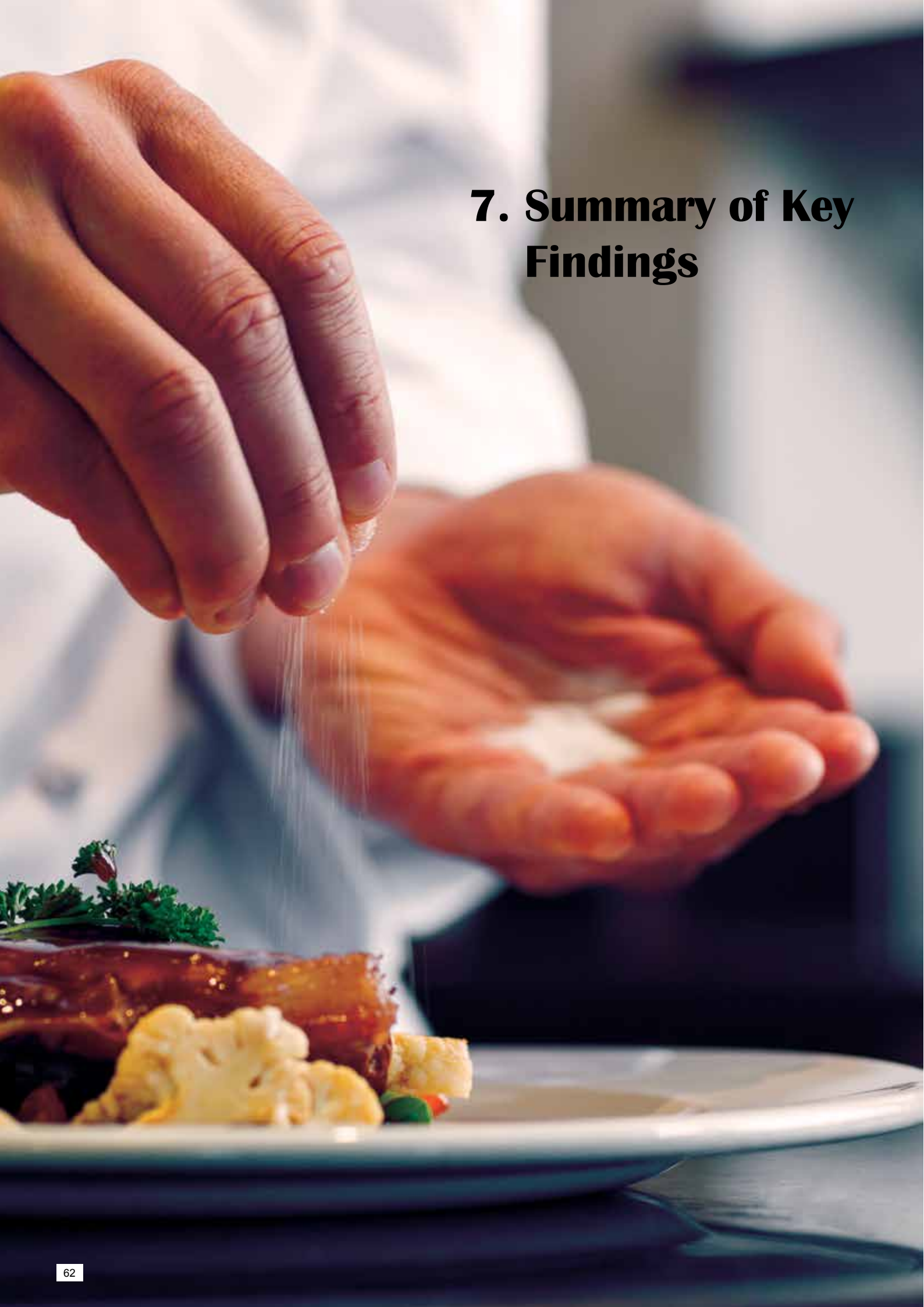
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- In a bid to boost the food sector, the Government may set-up mega “Food Parks” which would cover the entire food processing cycle, from the farm gate to the retail outlet.
- Approvals may be provided for setting up Technology Transfer Centers (TTCs).

6.10.2 The Survey experts also highlighted that there are associations like Punjab Food Authority, TDAP, etc. working actively for the growth and development of this sector. Hence, it will be of great importance for the sector that the government starts working on long term plans with these organizations instead of short term goals.

6.10.3 The respondents also indicated that the Government can assist in overcoming the current shortage of training and skills in one of the following ways;

- Public/ Private Partnership to support the technical education.
- Government can allocate investments through which TSPs may; send experienced trainers abroad to do Masters/PHDs, build new test labs and improve infrastructure facilities.
- The Government can make sector focused policies considering the current & future needs and to manage the shortage of skilled workforce.



7. Summary of Key Findings

7.1 Introduction

7.1.1 The food processing industry in Pakistan has shown great advancement during the last decade, becoming one of the major industries as new players continuously enter the market. Seasoned players have expanded their product/brand portfolio by introducing new product lines and making extensions in the existing ones. A large number of products that were being imported are now being produced locally.

7.1.2 As competitive pressures have increased, new technologies are replacing existing technologies and processes, the industry is compelled to upgrade and enhance the skill level of their manpower.

7.1.3 Further, with the expansion of food processing sectors, skills' requirements within each sub-sector have changed as well. There are needs for technical and vocational skills even in the traditional sector such as ethnic confectionery, sweets and other processed food (e.g. *mithai*, *nimco*, *achar*) as producers have adopted more modern techniques of production.

7.2 Key Findings of Study

7.2.1 The key findings highlighted below are based on the results obtained from the qualitative and quantitative surveys (187 establishments' Quantitative surveys, 36 in-depth interviews with the sector experts, 12 in-depth interviews with training service providers) along with the data collected through secondary research and these are summarized as follows:

Work-Force Characteristics

7.2.2 The workforce in food processing industry is dominated by unskilled male workers with low education level and mostly involved in performing mechanical tasks. The majority of the workforce is working in the category of 'other skilled workers and elementary occupations' while approximately 30-35% cumulatively working as 'technicians' and 'associate professionals of food', managers, craft and related trade workers and plant/machine operators⁷⁵. The overall turnover rate of the employees at middle management level (including technicians) and workers level is low (0%-10%).

Skills Analysis-Skills Required and Skills Gaps

7.2.3 Survey results indicate a scarce supply of skilled and precision⁷⁶ workers across all sub-sectors under study. As the level of technology is expected to increase, the demand for these workers is also expected to rise in future.⁷⁷

7.2.4 It has emerged that the minimum skill requirement includes some academic and vocational qualifications, personal skills, mechanical/technical skills and practical experience. Mostly the large sized organizations look for specialized skills, whereas informal sectors prefer multi-skilled workers.⁷⁸

⁷⁵ Extraction: ISCO- 2008

⁷⁶ Precision workers in food processing sector are those who perform technical/ machining operations with the degree of refinement with which an operation should be performed

⁷⁷ See 'Demand Projections' section below, Section 7.3.

⁷⁸ Findings of in-depth interviews with sector experts

7.2.5 A wide range of skills required by food processing operatives were identified during survey exercise. The key skills required along with identified skills-gaps, measures taken to fill these gaps, available training options for skill building, are summarized in the Table 56 and are attached at the end of this chapter. Key highlights are as follows:

- » The study indicated a need for skill building at all levels in production units across all segments under study. Skills requirements fall under two major groups; i.e.
 - a) Those performing routine tasks at elementary level, plant/machine operators and craft workers with specialized skills, and
 - b) Skills related to technical expertise in food processing and preservation, quality assurance, research and development, maintenance engineering and are also reported as hard-to-find.
- » It has been established that most preferred method of training in views of most of respondents is on-the-job training. A variety of methods are employed to provide
- » OJT to staff, such as close observation training and working under direct supervision being the most commonly utilized methods.
- » The formal training options related to food processing sub- sectors under study are generally advanced level programs being offered at universities in Punjab, leading to Bachelors and Master's Degree in Food Science and Food Technology. Some universities are offering Ph.D. in Food Science and Technology as well. Short Term Courses, though minimal, are also available with some universities in the following areas of technical training;

- Food Preservation skills
- Plant and machine operating and maintaining skills
- Food Quality assurance/ quality control skills
- Baking Skills
- Cooking and Frying techniques

7.2.6 Though there is a strong presence of technical and vocational training centers of more than 700 institutes⁷⁹ (both from public and private sector) across Punjab, the training options in the desired skills are minimal. Further, off- the- job/ offsite training options are limited to employees of large sized organizations working at senior levels.

Intentions to set-up In House Training Facility

7.2.7 Results indicate that majority of the food processing companies (regardless of their company size) have no intentions of setting up in house training facilities, however a very small percentage seemed open to the idea of such training centers in their premises, if financed or set up by any other organization.

⁷⁹ Data retrieved from: http://www.navttc.org/TVET_Pakistan.aspx

Awareness of PSDF

7.2.8 Majority of the industries and experts are completely unaware about PSDF and its role in Punjab. Only few are aware of PSDF as they have some acquaintance or have worked with the organization before.

7.3 Demand Projections (2015-2020) for Trainings in the Food Processing Sector

7.3.1 In order to determine estimations of demand for training for the food processing sector it was first necessary to estimate the total demand for training as of 2015. As a first step towards estimating demand, the results of the survey (qualitative and quantitative survey findings) were referenced and a list drawn of the top most requested training courses. These courses were then categorized under; Core and Non Sector-Specific Skills and Sector Specific Skills. The list of top most requested training courses is given below for reference:

CORE AND NON SECTOR-SPECIFIC SKILLS

- Managerial and Administrative Skills
- Communication Skills
- Problem Solving Skills
- Numeracy Skills
- Food Technologist/ Bio technologist
- Food Preservation expert
- Food Quality Assurance/Quality Control
- Plant and Machine Operating and repairing Skills

SECTOR SPECIFIC SKILLS⁸⁰

Value added and frozen food processing

- Cooking and Frying techniques
- Food Preservation techniques
- Food Tasting and Food Grading Skills
- Visual Examination for Quality Product/ Sorting /Grading

Edible Oils and Fats

- Technical knowledge of the products
- Oil expeller operating skills

Beverage Production

- Bottling Skills

- Transportation skills

Bakery and Confectionery

- Baking Skills
- Pastry Cooking Skills
- Chocolate Making Skills
- Biscuits Dough and Batter making Skills

7.3.2 The food processing sector in Punjab (except primary processed food) employs an estimated 210,142 people over 1928 units (2014-2015 data). The distribution of units by sub-sector and their employment figures are presented in table below:

Sub-sector	No. of units	Estimated Employment
Value added and frozen food	1,121	125,236
Edible Oils and Fats	120	12,736
Beverage Production	97	10,613
Bakery and Confectionery	590	61,557
Total	1,928	210,142

TABLE 52: EMPLOYMENT IN FOOD PROCESSING SECTOR⁸¹

7.3.3 The next step in estimating demand was to project the growth of the food processing sector. As per the Economic Survey of Pakistan 2010-2013 and results from Bureau of Statistics (also mentioned in chapter 3), the food processing sector as a whole is currently growing @CAGR of 5.75%p.a. during the last four years' period. We have assumed that generally this growth rate will result in a corresponding increment in labor deployment over coming years. However, based on the qualitative findings mentioned in chapter 6 and secondary research conducted for this study, the growth rate is expected to be stable for the next three to four years, as during this time the industry will be implementing or installing new technology and automated machines during this period. From 2019 onwards, the growth rate in employment will start decreasing due to increasing automation in the sector.⁸²

7.3.4 Based on our primary and secondary research we have assumed the following growth rates by size for each sub-sector (the basis for assuming these growth rates is also mentioned):

- **Value added and frozen food** - 7% (as per Economic Survey of Pakistan 2010-2013 and results from Bureau of Statistics, this subsector is currently growing at CAGR of 6.5-7.5%)
- **Edible Oils and Fats** - 4%(Based on the estimations provided by Pakistan Oil Seed Development Board)
- **Beverage Production** - 4%(Section 3.5.3, Chapter 3)

⁸¹ Ibid 52

⁸² Economic Survey of Pakistan 2010-2013, results from Bureau of Statistics and views of industry experts gathered through qualitative survey

- **Bakery and Confectionery** - 6%(Section 3.6.1, Bakery and Confectionery, Chapter 3)

7.3.5 Based on the above average growth rates for each sub sector, expected increasing level of automation in the sector and average CAGR of the entire food processing sector, employment projections were calculated using 2015 employment figures for each subsector. This exercise is mentioned in the demand grid 'Table 55' below. Basically the above mentioned growth rates were applied to 2015 employment figures (Table 52 above) for each sub sector to attain 2016 (next year's) estimated employment figures and so on(till 2018). The growth rates for 2019 will be slightly different (due to increasing level of automation in the sector, as elucidated above) and are assumed as follows:

- **Value added and frozen food** – 6.5%
- **Edible Oils and Fats** – 3.5%
- **Beverage Production** – 3.5%
- **Bakery and Confectionery** – 4.5%

7.3.6 The pattern of employment within each sub-sector as determined from the quantitative survey is as under:

Employment Cadre	Percent of total workforce
Management	4%
Supervisory	6%
Skilled Labor	48%
Unskilled Labor	42%

TABLE 53: PATTERN OF EMPLOYMENT

7.3.7 Using the above estimations (estimations from table 52 and table 53 above) it is possible to profile employment by size across the four management cadres as follows;

	Value added and frozen food	Edible Oils and Fats	Beverage Production	Bakery and Confectionery
Management	5,009	509	425	2,462
Supervisory	7,514	764	637	3,693
Skilled Labor	60,113	6,113	5,094	29,547
Unskilled Labor	52,599	5,349	4,457	25,854

TABLE 54: EMPLOYMENT BY MANAGEMENT CADRE

7.3.8 With labor distributions, growth rates in employment and with trainings'/skills requirements emerging from the survey⁸³, it is possible to project the training needs of the food processing sub-sectors till 2019, and these are presented in table below.

⁸⁰ Based on qualitative and quantitative survey findings and results of Annexure 15- Skills requirements and training needs, above)

⁸³ Chapter 4, Tables; 39, 42 and 44

Category	Courses	2015 ⁸⁴				2016				2017				2018				2019			
		VAF	EO	BP	B&C	VAF	EO	BP	B&C	VAF	EO	BP	B&C	VAF	EO	BP	B&C	VAF	EO	BP	B&C
Core and Non Sector-Specific Skills	Managerial and Administrative Skills	5,009	509	318	2,462	5,360	662	331	2,585	5,735	689	344	2,715	6,137	716	358	2,850	6536	741	371	2979
	Communication Skills	3,757				4,020	-	-	-	4,301	-	-	-	4,603	-	-	-	4902	-	-	-
	Problem Solving Skills			318		-	-	331	-	-	-	344	-	-	-	358	-	-	-	371	-
	Numeracy Skills	3,757	637		1,847	4,020	530	-	1,939	4,301	551	-	2,036	4,603	573	-	2,138	4902	593	-	2234
	Food Technologist/ Biotechnologist	10,019			7,387	10,720	-	-	7,756	11,471	-	-	8,144	12,274	-	-	8,551	13,071	-	-	8,936
	Food Preservation expert	7,514			3,693	8,040	-	-	3,878	8,603	-	-	4,072	9,205	-	-	4,276	9,804	-	-	4,684
	Food Quality Assurance/Quality Control	7,514	2,292	849	3,693	8,040	2,384	883	3,878	8,603	2,480	918	4,072	9,205	2,579	955	4,276	9,804	2,699	988	4,468
	Plant and Machine Operating and repairing Skills	12,524	2,675	1,698	6,156	13,400	2,782	1,766	6,463	14,338	2,893	1,837	6,787	15,342	3,008	1,910	7,126	16,339	3,114	1,977	7,477
	Cooking and Frying techniques	28,804	-	-	-	30,821	-	-	-	32,978	-	-	-	35,286	-	-	-	37,580	-	-	-
	Food Preservation techniques	17,533	-	-	-	18,760	-	-	-	20,074	-	-	-	21,478	-	-	-	22,875	-	-	-
Sector Specific Skills	Food Tasting and Food Grading Skills	13,776	-	-	-	14,740	-	-	-	15,772	-	-	-	16,876	-	-	-	17,973	-	-	-
	Visual Examination for Quality Product/ Sorting /Grading	15,028	-	-	-	16,080	-	-	-	17,206	-	-	-	18,410	-	-	-	19,607	-	-	-
	Technical knowledge of the products	-	3,821	-	-	-	3,974	-	-	-	4,133	-	-	-	4,298	-	-	4,448	-	-	-
	Oil expeller operating skills	-	2,802	-	-	-	2,914	-	-	-	3,031	-	-	-	3,152	-	-	3,262	-	-	-
Beverage Production	Bottling Skills	-	-	4,776	-	-	-	4,967	-	-	-	5,166	-	-	-	5,372	-	-	5,560	-	-
	Transportation skills	-	-	2,653	-	-	-	2,759	-	-	-	2,870	-	-	-	2,984	-	-	3,089	-	-

Sector Specific Skills	Baking Skills	-	-	-	11,080	-	-	-	11,634	-	-	-	12,216	-	-	-	12,827	-	-	-	13,404
	Pastry Cooking Skills	-	-	-	8,618	-	-	-	9,049	-	-	-	9,501	-	-	-	9,976	-	-	-	10,425
	Chocolate Making Skills	-	-	-	7,387	-	-	-	7,756	-	-	-	8,144	-	-	-	8,551	-	-	-	8,936
	Biscuits Dough and Batter making Skills	-	-	-	9,234	-	-	-	9,695	-	-	-	10,180	-	-	-	10,689	-	-	-	11,170
	Total	210,142				222,920				236,504				250,944				265,042			
Bakery and Confectionery	Rate of increase in workforce (%)					5.73				5.74				5.75				5.32			

TABLE 55: DEMAND PROJECTIONS FOR TRAINING IN FOOD PROCESSING SECTOR

⁸⁴ Proposed number of trainings depicted in table are calculated by proportionately distributing (based on the percentages gathered from the quantitative survey and opinions from the sector experts) expected number of employees/trainees(in food processing sector) among top most required training courses

Category		Courses	2015			2019		
			Skills Demand (SD)	No. of Seats Available (SA)	Gap expected in Demand and Supply (SA-SD)	Skills Demand (SD)	No. of Seats Available (SA)	Gap expected in Demand and Supply (SA-SD)
CORE AND NON SECTOR-SPECIFIC SKILLS		Managerial and Administrative Skills	8,427	118	(8,309)	10,626	147	(10,479)
		Communication Skills	3,757	45	(3,712)	4,902	56	(4,846)
		Problem Solving Skills	318	15	(303)	371	19	(352)
		Numeracy Skills	6,113	188	(5,925)	7,729	235	(7,494)
		Food Technologist/ Bio technologist	17,406	612	(16,794)	22,007	765	(21,242)
		Food Preservation expert	11,208	450	(10,758)	14,272	562	(13,709)
		Food Quality Assurance/ Quality Control	14,349	486	(13,863)	17,929	607	(17,322)
		Plant and Machine Operating and repairing Skills	23,052	724	(22,328)	28,877	905	(27,971)
SECTOR SPECIFIC SKILLS	Value added and frozen food processing	Cooking and Frying techniques	28,804	432	(28,373)	37,580	540	(37,040)
		Food Preservation techniques	17,533	324	(17,209)	22,875	405	(22,470)
		Food Tasting and Food Grading Skills	13,776	262	(13,514)	17,973	327	(17,646)
		Visual Examination for Quality Product/ Sorting / Grading	15,028	216	(14,812)	19,607	270	(19,337)
	Edible Oils and Fats	Technical knowledge of the products	3,821	137	(3,683)	4,448	172	(4,276)
		Oil expeller operating skills	2,802	30	(2,772)	3,262	38	(3,224)
	Beverage Production	Bottling Skills	4,776	172	(4,604)	5,560	215	(5,345)
		Transportation skills	2,653	50	(2,603)	3,089	63	(3,026)
	Bakery and Confectionery	Baking Skills	11,080	288	(10,792)	13,404	360	(13,044)
		Pastry Cooking Skills	8,618	144	(8,474)	10,425	180	(10,245)
		Chocolate Making Skills	7,387	252	(7,135)	8,936	315	(8,621)
		Biscuits Dough and Batter making Skills	9,234	40	(9,193)	11,170	50	(11,120)

TABLE 56: DEMAND AND SUPPLY SCENARIO-2019



7.3.9 It can be seen that during 2019-2020 the demand for trainings in the Food Processing Sector would be about 265,042 (the same for 2015 is 210,142, 2016 is 222,920, 2017 is 236,504 and for 2018 is 250, 944). The cumulative demand for trainings in the next 5 years (2015-2019) is estimated to be 1,185,552. Further it can be derived that majority of the trainings would be required for sector specific skills followed by sector non-specific skills in coming years. Based on the grid above the key skills which require maximum number of trainings in years to come are mentioned below;

- Food technology/bio technology,
- Food Preservation,
- Food Quality Control,
- Plant and machine operating and repairing skills,
- Cooking and frying techniques,
- Bottling skills,
- Technical knowledge of the product,
- Baking skills etc.

Demand and Supply Scenario for Food Processing Key Skills’ Trainings during 2019

7.3.10 The total number of seats available within TSPs catering to this sector (including all sub-sectors) for the period 2014-2015 is mentioned in below table. We have assumed the same average CAGR growth rate of 5.75% as assumed above for demand projection⁸⁵, to project the supply figures during period 2019-2020. Based upon our projections (demand projections; Table 55 above) the gap between the total number of seats available and the estimated potential TVET trainees within the sector is given as under:

⁸⁵ Demand Projection Section, Section 7.3.3

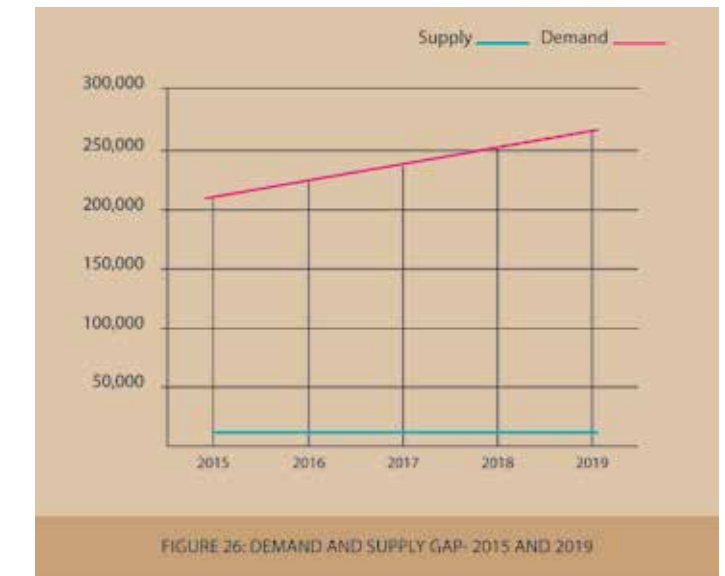
TABLE 57: SKILLS SCENARIO IN FOOD PROCESSING SECTOR					
Skill classification	Skills required	Skill gaps	Hard to fill vacancies	Formal Training Options – Training Institutes /Universities	Measures taken to Fill the Skill Gap
Basic /Soft Skills	• Literacy and numeracy skills • Communication skills • ICT Skills • Problem Solving Skills • Working with others	Generally the level of skills is much lower than what is required under each job group. The main reason being low and poor quality of education at each level.		Formal training on enhancing core and basic skills are not available. However English language skills, English for employment and ICT form part of curriculum at university level programs and DAE at technical training institutes/college.	None – only learn while on job
	• Flexibility , adaptability, maturity, attitude towards work • Willingness to learn and work hard, ability to perform and manage multiple tasks , honesty, loyal	Positive personal traits employers look for are getting extinct.	Hardworking, trustworthy and loyal employers are HARD –TO-FIND across all levels	None	None
	• Personal hygiene • Manual dexterity • Physical fitness	Lacking amongst general laborers, workers performing tasks elementary in nature and plant /machine operators			

Non sector specific skills				
• Research and Development Skill • Food Technologist/Bio technologist • Food Processor/ Preservation Expert • Food Quality Assurance /Quality Control	Lack required knowledge backed by practical exposure as per industry requirement.	Research and Development Expert Food Technologist Food Processor/ Preservation Expert Food Quality Assurance /Quality Control Professionals Advance level programs offered at university level, available to urban males from relatively well-off background. The sector is abandoned by youth due to lack of awareness for a career path into food processing industry	PhD, M.Sc., B.Sc. and DAE programs available at university levels only	More focus is being placed on “upside” adjustment, where employment and training programs are targeted to upgrade the skills of current employees.
• Sale And Marketing Skills • Procurement Skills • People Management Skills • Training Skills/Coaching Skills	Lack practical experience, expertise in customer service, understanding and solving customer problems and handling difficult customers; poor negotiation skills, keeping track of customers/suppliers, team managing skills,	Sales Professions specific to food sector – expertise gained developed over time hence scarce and high in demand	Off- the- job training options generally of short duration are limited to employees of large sized organizations working at senior levels.	None –only learn while on job
• Technical Skills • Plant and machine operating skills • Tools And Equipment Handling • Plant/Machinery/Tools and Equipment Maintenance, Repair and Sanitization	Lack overall operational /technical skills required to operate, maintain, repair, clean, sanitize. Training of staff.		Off- the- job training options on new plant /machine are limited to senior staff –production manager, plant engineer etc. On-site training options are limited and available for operator where suppliers of newly acquired plant & machinery provide training at production site-	Learn while on the job by working under direct supervision of expert as helper /assistant
• Good Manufacturing Practice • Good Hygiene Practice • Health and Safety at Work Place • First Aid in food Processing	Lack of awareness amongst both the employers and employees on the need and importance of practicing hygiene and safety at workplace efficiently and effectively. Realize the need only when accidents /unforeseen events takes place		None	None –
Elementary Skills – cleaning, sorting, storing, washing of raw material and other ingredients	Ability to perform the task efficiently and effectively without causing wastage.		None	Learn the skill while on the job in a short time. Training is a continuous process and employees hire raw hands and train according to their need. Trained / staff are generally not available. Both, employee turnover and availability are high at this level.

Sector specific skills		Learn while on the job by working under direct supervision of expert as helper /assistant	
• Agri based Products (sugar, grains and pulses, fruit and vegetable), • Edible oil and Fats • Beverage • Bakery and Confectionary • Value added products and frozen food, Processed Food	Technical expertise required at production unit is lacking. The key skills (craft related) required to achieve the desired results are often not shared with assistants and helpers. The expertise is generally gained over time by performing routine task again and again and obtaining tips generally from USTAADS/KARIGARS or by closing	Below mentioned courses form part of curriculum at University level program and DAE at technical training institutes/college. Bakery Products and Technology Baking science and Technology Beverage Technology Cereal Technology Confectionery and Snacks foods Edible Oils and Fats-Industrial Processing and Technology Fruit and Vegetable Processing milling of cereals Sugar technology Options for TVET are minimal.	Basic/Craft related skills (informal/home based productions/smaller sized units) are learnt while working under direct supervision of USTAADS/KARIGARS as helper /assistant.

7.3.11 Survey results reveal that almost all the TSPs covered are offering bachelors and Masters/PHD programs (apart from the Star Farms) and these programs covers most of the skills/ courses mentioned in above table. None of the TSPs (apart from the Star Farms) offering specific TVET related course for skills mentioned in above table. Therefore short term training programs must be introduced by the TSPs associated with the Food Processing Sector for narrowing the skills supply gap (depicted in figure 26 below).

7.3.12 The demand and supply gap for the years 2015 and 2019 can be better portrayed through figure below. It can be estimated that the total skills/trainings gap (difference between skill supply or number of seats available and skill demand) during 2019-2020 would be about 258,809 (the same for 2015 is 205,158).



7.3.13 The growth in the gap between 2015 and 2019 (as depicted in chart above) represents substantial potential for trainings and capacity building in this sector. However, there is a risk in the limited number of seats available in TSPs. We have assumed this figure to remain constant over 5 years for the purposes of projection. In practical terms we anticipate that this figure, barring substantial investments in teaching capacity infrastructure and establishment of new institutes, will actually decrease further raising the gap between demand and supply of TVET training to this sector.

7.4 Conclusions

7.4.1 Though the food processing industry is progressing, it is confronted with significant problems in the areas of skills development, training delivery systems, weak institutional linkages and poor labor market intelligence. The key issues identified through the survey exercise (derived from both qualitative and quantitative surveys) are summarized as follows:

Skills Development

7.4.2 Though the capacity of the food processing sector to generate employment is extensive, the workforce available to this sector is unskilled with the majority having no or low level of education or training. Therefore the demand gap for skills is currently large. The skilled workers currently available

are those that mainly learn their craft through acquired work experience.

7.4.3 The large sized organizations have adopted a policy of investing in the skills of their employees through formal (off-the-job) and on-the-job training. More focus is being placed on “upside” adjustment, where employment and training programs are targeted to upgrade the skills of current employees. This is however much more limited in scope and quantity.

7.4.4 In flatter structures, employers want fewer process workers to do more, and to develop a wider range of personal and technical skills.⁸⁶

Training Delivery System

7.4.5 Though there is a strong presence of Technical and Vocational Training Centers for several manufacturing sectors including Food Processing, with more than 700 institutes (both from public and private sector) across Punjab⁸⁷, the training options in Food Processing sector for desired skills are still minimal.

7.4.6 The current TVET certificate stream relevant to food processing sector is too narrow in its scope and does not cover the large variety of skills training that takes place in the sector. Two way cross-over between the academic and the applied streams is also lacking in the system. The absence of a well-articulated qualification system relevant to food processing sector is also a major structural shortcoming.⁸⁸

7.4.7 Though our research is unable to ascertain what exact proportion of training service providers get into contact with the employers, it is highlighted during qualitative interviews that many companies undertake trainings on their own without any contact with trainers due to no/limited training opportunities.⁸⁹

7.4.8 Lack of active involvement in course design and selection is also observed at the strategic planning phase within TSPs. Further a lot of dependency (course selection, curriculum design and course up gradation etc.) on the governing bodies like Higher Education Commission (HEC) and Punjab Board of Technical Education (PBTE) in this regard is also reported.

Weak Institutional Linkages with the Industry

7.4.9 The role of the industry within TVET is negligible in views of key stakeholders. In views of sector experts the suggestions of important stakeholders, such as the business sector experts, are not adequately taken into account. The TVET sector does not benefit from good collaboration and input from the business sector in;

- Identifying trades /skills that matches with industry need
- Shaping the content of the curriculum

⁸⁶ Data retrieved from: 'Institute for employment studies' website

⁸⁷ Data retrieved from: http://www.navttc.org/TVET_Pakistan.aspx

⁸⁸ Data retrieved from: Qualitative interviews with sector experts

⁸⁹ Qualitative findings from sector experts: Chapter 6, Sections; 6.6.5 and 6.6.6

- Updating of the tools/equipment /teaching materials etc.
- Selection, recruitment , assessment and training of trainers
- Assessment of students
- Certification of study programs

7.4.10 The findings of survey results also reveal that there are perennial complaints from employers on availability of required skills in the sector. They believe that not only there is a shortage of availability of required skills in the market; the ones that are available are not up to the desired level required by the industry.

Labor Market Intelligence

7.4.11 The sector needs better labor market intelligence to provide insights on current trends, issues and challenges available to the sector in terms of both, demand and supply of skills.

Specialized Technical and Vocational Training Institutes

7.4.12 Survey results also indicate that there are no specialized technical and vocational training centers offering registered programs specific to trades related to food processing sector under study that could produce the skilled workers for some jobs that are in demand or hard-to-fill jobs. The technical and vocational training centers in the regions under study are neither offering trade-related programs (Food Processing sector under study) nor are equipped to do so (training facilities, equipment, trainers). They require up- gradation in terms of teachers' capacity, harmonization of machinery and equipment and curriculum up gradation in line with industry requirement of the province.

Other Gaps

7.4.13 Other gaps identified through survey exercise (both qualitative and quantitative) are;

- » There are very few specific programs in the region for TVET Qualifications relevant to food sector (also majority sample institutes were not offering any food sector specific TVET programs) that could produce the skilled workers for some in demand/hard-to-fill jobs
- » Most training institutes are unable to reach employees in the informal sector.
- » The available training options are limited to urban males from relatively better economic background.
- » General labor/unskilled workers (in elementary job roles) neither have resources nor time to enroll in training courses of any kind
- » The current curriculum is neither responsive to industry needs nor focuses on the personality development of the students.⁹⁰

⁹⁰ Chapter 6: Sector Experts Interviews' findings , section 6.8.6

7.5 Recommendations

7.5.1 The recommendations highlighted below are aimed at filling the skills' gaps through enhancing the skills of existing workforce and aligning it with skills needs of potential employers. These are as follows;

- PSDF may appoint an expert panel group represented by processed food industry, training providers, the government officials and other stakeholders to seek consultation / cooperation in;
 - Assessing the “Demand” side of the market to provide a clearer picture of sector specific occupational needs and skills requirements
 - Development of the curricula, training material for the training providers, selection or recruitment of trainers, training of trainers etc.
- PSDF should provide guidance and support to the their funded training service providers in;
 - Devising a training delivery system that is more responsive to the industry needs
 - Providing and supporting access to specialized expertise, resources and equipment to facilitate development in specialized skills
 - Offering part-time and evening-shift programs, using their existing premises after normal institutes timings
 - Offering students internships and co-op education (work-and-study) opportunities.
- PSDF can increase the role of industry by involving them in increasing the role of entrepreneurs through;
 - Working on increasing industry investment on skills development to produce quality workforce
 - Encouraging industries in providing financial support to institutes offering TVET relevant to their industry
 - Expanding the scope of On-the-Job Training by;
 - » Offering placement incentives to encourage employers to provide on the job trainings (specially to students of TSPs)
 - » Provide funding for employers to create summer job opportunities for students
- PSDF may identify and focus on training service providers that have strong presence across Punjab and/or possess ability to respond to the industry needs by introducing diversified range of programs to alleviate current skill shortages through;
 - **Out-Reach Programs** - for the youth and neglected populace by offering short-term skill development projects – preferably in the clusters or regions where training facilities are not at all available.
 - **Developing Technology Specific or Sub-Sector Specific Courses** – These would potentially include need driven courses/ course material for technology specific or sub-sector specific skills requirements that cannot otherwise be learnt in generic classroom based environments
 - **Customized / Specialized Courses** - Develop and offer need-based courses

TABLE 57: SKILLS SCENARIO IN FOOD PROCESSING SECTOR

TABLE 57: SKILLS SCENARIO IN FOOD PROCESSING SECTOR					
Skill classification	Skills required	Skill gaps	Hard to fill vacancies	Formal Training Options –Training Institutes /Universities	Measures taken to Fill the Skill Gap
Basic /Soft Skills	• Literacy and numeracy skills • Communication skills • ICT Skills • Problem Solving Skills • Working with others	Generally the level of skills is much lower than what is required under each job group. The main reason being low and poor quality of education at each level.		Formal training on enhancing core and basic skills are not available. However English language skills, English for employment and ICT form part of curriculum at university level programs and DAE at technical training institutes/college.	None –only learn while on job
	• Flexibility , adaptability, maturity, attitude towards work • Willingness to learn and work hard, ability to perform and manage multiple tasks , honesty, loyal	Positive personal traits employers look for are getting extinct.	Hardworking, trustworthy and loyal employers are HARD –TO-FIND across all levels	None	None
	• Personal hygiene • Manual dexterity • Physical fitness	Lacking amongst general laborers, workers performing tasks elementary in nature and plant /machine operators			

Non sector specific skills					
• Research and Development Skill • Food Technologist/Bio technologist • Food Processor/ Preservation Expert • Food Quality Assurance /Quality Control	Lack required knowledge backed by practical exposure as per industry requirement.	Research and Development Expert Food Technologist Bio Technologist Food Processor/ Preservation Expert Food Quality Assurance /Quality Control Professionals Advance level programs offered at university level, available to urban males from relatively well-off background. The sector is abandoned by youth due to lack of awareness for a career path into food processing industry	PhD, M.Sc. , B.Sc. and DAE programs available at university levels only	More focus is being placed on “upside” adjustment, where employment and training programs are targeted to upgrade the skills of current employees.	
• Sale And Marketing Skills • Procurement Skills • People Management Skills • Training Skills/Coaching Skills	Lack practical experience, expertise in customer service, understanding and solving customer problems and handling difficult customers; poor negotiation skills , keeping track of customers/suppliers , team managing skills,	Sales Professions specific to food sector – expertise gained developed over time hence scarce and high in demand	Off- the- job training options generally of short duration are limited to employees of large sized organizations working at senior levels.	None –only learn while on job	
• Technical Skills • Plant and machine operating skills • Tools And Equipment Handling • Plant/Machinery/Tools and Equipment Maintenance, Repair and Sanitization	Lack overall operational /technical skills required to operate, maintain, repair, clean, sanitize. Training of staff.		Off- the- job training options on new plant /machine are limited to senior staff – production manager, plant engineer etc. On-site training options are limited and available for operator where suppliers of newly acquired plant & machinery provide training at production site-	Learn while on the job by working under direct supervision of expert as helper /assistant	
• Good Manufacturing Practice • Good Hygiene Practice • Health and Safety at Work Place • First Aid in food Processing	Lack of awareness amongst both the employers and employees on the need and importance of practicing hygiene and safety at workplace efficiently and effectively. Realize the need only when accidents /unforeseen events takes place		None	None –	
Elementary Skills – cleaning, sorting, storing, washing of raw material and other ingredients	Ability to perform the task efficiently and effectively without causing wastage.		None	Learn the skill while on the job in a short time. Training is a continuous process and employees hire raw hands and train according to their need. Trained / staff are generally not available. Both, employee turnover and availability are high at this level.	

Sector specific skills	Technical expertise required at production unit is lacking.	Below mentioned courses form part of curriculum at University level program and DAE at technical training institutes/college.	Learn while on the job by working under direct supervision of expert as helper /assistant
• Agri based Products (sugar, grains and pulses, fruit and vegetable), • Edible oil and Fats • Beverage • Bakery and Confectionary • Value added products and frozen food, Processed Food	The key skills (craft related) required to achieve the desired results are often not shared with assistants and helpers. The expertise is generally gained over time by performing routine task again and again and obtaining tips generally from USTAADS/KARIGARS or by closing	» Bakery Products and Technology » Baking science and Technology » Beverage Technology » Cereal Technology » Confectionery and Snacks foods » Edible Oils and Fats-Industrial Processing and Technology » Fruit and Vegetable Processing » milling of cereals » Sugar technology Options for TVET are minimal.	Basic/Craft related skills (informal/home based productions/smaller sized units) are learnt while working under direct supervision of USTAADS/KARIGARS as helper /assistant.

ANNEXURES

List of Formal Establishments

S.N o	Nature of the Company	Comapny Name	Industry	City	Region	Contact No	Email Address
1	Formal	Dawn Frozen Foods Company Ltd	Processed Food	Lahore	Central Punjab	042-111-111-989	lahore@dawnbreadcom
2	Formal	Triple M Foods	Processed Food	Lahore	Central Punjab		
3	Formal	Tipoo Foods Industries	Processed Food	Lahore	Central Punjab	042-35297001-8	hoest@hoestcompk
4	Formal	Sunrise Bakery	Bakery and Confectionery	Lahore	Central Punjab	042-35761242	riaz_hussain@yahoocom
5	Formal	Meer bakery	Bakery and Confectionery	Gujranwala	Central Punjab		meerbakery@brainnet
6	Formal	Baba Bakers	Bakery and Confectionery	Gujranwala	Central Punjab	553841514	info@babapk
7	Formal	Beil and Tell Industries	Processed Food	Multan	South Punjab	061-4570614	
8	Formal	Nirala Sweets	Bakery and Confectionery	Multan	South Punjab	061-4571182	
9	Formal	Al Hilal (pvt) Ltd	Processed Food	Multan	South Punjab	061-4774054	
10	Formal	Shangrila Foods	Processed Food	Multan	South Punjab	061-4570444	061-4570444
11	Formal	Haliz Sohan Halwa	Bakery and Confectionery	Multan	South Punjab	061-4515034	
12	Formal	Food Festival (Pvt) Ltd	Processed Food	Multan	South Punjab	061-4554533	061-4554533
13	Formal	Multani Sohan halwa	Bakery and Confectionery	Multan	South Punjab		
14	Formal	Al Khair Foods	Processed Food	Multan	South Punjab	0300-6328885	
15	Formal	GIBS (Pvt) Ltd	Processed Food	Multan	South Punjab	0301-7568558	
16	Formal	Al Habib Sweets	Bakery and Confectionery	Multan	South Punjab	0300-6364005	
17	Formal	Sheikh Bilal Factory	Processed Food	Multan	South Punjab		
18	Formal	Shakarganj Food Products Ltd	Processed Food	Lahore	Central Punjab	35781801-4	
19	Formal	Rafiq Oil Mills	Edible Oils	Lahore	Central Punjab	35812119, 35801776	
20	Formal	Habib Oil Mills	Edible Oils	Lahore	Central Punjab	0300-8682964	malikshafique64@yahoocom
21	Formal	HBM Askari Oil Mills	Edible Oils	Lahore	Central Punjab	042-35087660-1 0300-4505692	
22	Formal	Hamdani Brothers	Edible Oils	Lahore	Central Punjab		
23	Formal	Achank Foods	Processed Food	Lahore	Central Punjab	0323-4783434	
24	Formal	A Rahim Foods Pvt Ltd	Processed Food	Lahore	Central Punjab		
25	Formal	Sunrise Baiting Co	Processed Food	Lahore	Central Punjab	042-35761243	
26	Formal	Taj mahal Foods	Processed Food	Sargodha	Central Punjab	048-3212221,3226536	
27	Formal	Bajwa Sweets	Bakery and Confectionery	Sargodha	Central Punjab	048-725607	
28	Formal	Shaheen Industries	Processed Food	Sargodha	Central Punjab		
29	Formal	Kashmir Factory	Processed Food	Sargodha	Central Punjab		
30	Formal	Zabie Manufacturers	Processed Food	Sargodha	Central Punjab	0346-8711075	
31	Formal	Shangrila Sweets & Bakers	Bakery and Confectionery	Sargodha	Central Punjab	048-3214168	
32	Formal	Ambala Sweets	Bakery and Confectionery	Sargodha	Central Punjab	048-3714605	
33	Formal	Trade Mark Taj Mahal Sweets	Bakery and Confectionery	Sargodha	Central Punjab	048-3212221,048-3226536	
34	Formal	Great Sweets & Bakers	Bakery and Confectionery	Sargodha	Central Punjab		
35	Formal	Mehran Industries	Processed Food	Sargodha	Central Punjab		
36	Formal	Munpasand Sweets & Bakers	Bakery and Confectionery	Sargodha	Central Punjab		
37	Formal	Anin Dhoodha Factory	Processed Food	Sargodha	Central Punjab	0483-715794	
38	Formal	Tea time Food /Nabeel Foods	Processed Food	Lahore	Central Punjab	042-37504019	
39	Formal	Russian Inn	Processed Food	Lahore	Central Punjab		
40	Formal	SUFI OIL EXTRACTION PVT LTD.	Edible Oils	Lahore	Central Punjab	042-37332201	
41	Formal	Niaz Oil (Pvt) Ltd	Edible Oils	Lahore	Central Punjab	0423-36141501	shahid@nialzcom
42	Formal	Qasim Bakers	Bakery and Confectionery	Lahore	Central Punjab		
43	Formal	Fazal Sweets and Bakers	Bakery and Confectionery	Lahore	Central Punjab	0423-7656075	
44	Formal	Haliz Sweets	Bakery and Confectionery	Lahore	Central Punjab	0423-7820438	

S.N o	Nature of the Company	Comapny Name	Industry	City	Region	Contact No	Email Address
45	Formal	Rafique Sweets	Bakery and Confectionery	Lahore	Central Punjab	0423-7664113, 7654113	
46	Formal	Khalifa Sweets	Bakery and Confectionery	Lahore	Central Punjab	0423-765352	
47	Formal	Morgan Bakers	Bakery and Confectionery	Lahore	Central Punjab	0423-5145779-80	info@morganbreadcom
48	Formal	Kashmir Bakers	Bakery and Confectionery	Lahore	Central Punjab	0423-7570141	
49	Formal	Mari Gold Bakers	Bakery and Confectionery	Lahore	Central Punjab	0423-5120341-42	
50	Formal	Al Siddique Bakery & Sweets	Bakery and Confectionery	Sheikhupura	Central Punjab		al-siddique@yahoocom
51	Formal	Aquatics International	Processed Food	Lahore	Central Punjab		
52	Formal	Chitral Oil & Ghee Industries Pvt Ltd	Edible Oils	Lahore	Central Punjab	042-379541637	
53	Formal	Ethical Foods	Processed Food	Lahore	Central Punjab	042-35145778	042-351235-78
54	Formal	Saddam Foods	Processed Food	Lahore	Central Punjab		
55	Formal	Sunrise Mayonnaise	Processed Food	Sheikhupura	Central Punjab		
56	Formal	Good Luck Bakery	Bakery and Confectionery	Lahore	Central Punjab		
57	Formal	Chaudhary Bakers	Bakery and Confectionery	Faisalabad	Central Punjab		
58	Formal	Hamza Foods Private Limited	Processed Food	Lahore	Central Punjab	92-42-111100786	Lahore@dawnbreadcom
59	Formal	ASHRAFIA FOODS & PROCESSING INDUSTRIES	Processed Food	Gujranwala	Central Punjab		
60	Formal	Al-Noor Mart	Bakery and Confectionery	Gujranwala	Central Punjab	92-321-7762050	
61	Formal	Real Foods	Processed Food	Lahore	Central Punjab	0423-35860331	info@real fooditdcom
62	Formal	Baba Sweets	Bakery and Confectionery	Lahore	Central Punjab	042-35758891-2	info@bababpk
63	Formal	Mano-Salwa	Processed Food	Lahore	Central Punjab		
64	Formal	Darbanwala Industries	Processed Food	Lahore	Central Punjab	042-3512888	
65	Formal	Time Food Industries	Processed Food	Lahore	Central Punjab	042-36672343	
66	Formal	Six B Foods Industries	Processed Food	Lahore	Central Punjab	35299456, 35299457	
67	Formal	Shandy's Cake	Bakery and Confectionery	Lahore	Central Punjab		
68	Formal	NIRALA SWEETS AND BAKERS	Bakery and Confectionery	Sialkot	North Punjab		
69	Formal	Master Foods	Processed Food	Sialkot	North Punjab		
70	Formal	Shani Ghee Pvt Ltd	Edible Oils	Sialkot	North Punjab	052-396440-3	
71	Formal	Zaytoon Pakistan Pvt Ltd	Processed Food	RWP/ISB	North Punjab		
72	Formal	Hafees Iqbal HQ Oils	Edible Oils	RWP/ISB	North Punjab		
73	Formal	Punjab Oil Mills	Edible Oils	RWP/ISB	North Punjab	044333826-28	4433529
74	Formal	Shakeel Distributors	Processed Food	RWP/ISB	North Punjab	051-4859040	shaloper@gmailcom
75	Formal	Al Iman Floor Mills	Processed Food	RWP/ISB	North Punjab	051-4100186	stam9008@yahoocom
76	Formal	Triways Food Industries	Processed Food	RWP/ISB	North Punjab	4438700	
77	Formal	BB Industries	Processed Food	RWP/ISB	North Punjab	2653266	
78	Formal	Siddiq Foods	Processed Food	RWP/ISB	North Punjab	2655599	
79	Formal	Moti Food Industry pvt Ltd	Processed Food	RWP/ISB	North Punjab	2607370	mirzamuhammadsaleem@hotmailcom
80	Formal	Gourmet	Bakery and Confectionery	RWP/ISB	North Punjab	051-2650949	gourmet@yahoocompk
81	Formal	Pakistan Mineral Water	Beverages Production	RWP/ISB	North Punjab	111-6000-000	
82	Formal	ZA Foods Industries Ltd	Processed Food	Faisalabad	Central Punjab		
83	Formal	Nagina Sweets & Bakers	Bakery and Confectionery	Faisalabad	Central Punjab	0300-7643762	
84	Formal	Sultana Oil Mills	Edible Oils	Faisalabad	Central Punjab		
85	Formal	Vita pakistan	Processed Food	Faisalabad	Central Punjab		
86	Formal	GOMI INTERNATIONAL	Processed Food	Faisalabad	Central Punjab		
87	Formal	Haji Faquir Mills	Processed Food	Vihari	South Punjab	067-3501510	
88	Formal	Shakar Ganj Industries	Processed Food	Vihari	South Punjab	067-3501511	

S.N o	Nature of the Company	Comapny Name	Industry	City	Region	Contact No	Email Address
89	Formal	Faiz Bakers and general Store	Bakery and Confectionery	Vihari	South Punjab		
90	Formal	JP Food Industry	Processed Food	Sahiwal	South Punjab	040-4551891	
91	Formal	Moazzm Azim Food Products	Processed Food	Sahiwal	South Punjab	040-4552235	
92	Formal	Madina Water	Beverages Production	Bhawalnagar	South Punjab	063-2273707	
93	Formal	Almas Food Industries	Processed Food	Bhawalnagar	South Punjab	063-2017280	
94	Formal	Rehman Sweets & Bakers	Bakery and Confectionery	Bhawalnagar	South Punjab		
95	Formal	Al Faisal Sweets & bakers	Bakery and Confectionery	Bhawalnagar	South Punjab		
96	Formal	Baker Grand MA Food	Processed Food	Sahiwal	South Punjab		
97	Formal	Khawaja Industries	Processed Food	Narowal	North Punjab	0572-410445	
98	Formal	KC Grill	Processed Food	RWP/ISB	North Punjab	0312-5100784	
99	Formal	Ajab Marketing Lays	Processed Food	RWP/ISB	North Punjab	051-2615216	humayun iqbal
100	Formal	Mehbood Food industries	Processed Food	Bahawalpur	South Punjab	041-2653294	ajalbmarketing@yahoo.com
101	Formal	Haji Rasheed Industries	Processed Food	Bahawalpur	South Punjab		
102	Formal	Data Foods Factory	Processed Food	Bahawalpur	South Punjab		
103	Formal	United Factory	Processed Food	Faisalabad	Central Punjab	0622-889583	
104	Formal	Asal Foods Factory	Processed Food	Faisalabad	Central Punjab		
105	Formal	Al Qadri Idali Foods	Processed Food	Faisalabad	Central Punjab		
106	Formal	Aslam Foods	Processed Food	Faisalabad	Central Punjab		
107	Formal	Al Hameed Industries	Processed Food	Sahiwal	South Punjab		

List of Informal Establishments

S.N o	Nature of the Company	Comapny Name	Industry	City	Region	Contact No	Email Address
1	Informal	Aslam Foods	Processed Food	Lahore	Central Punjab		
2	Informal	Al MeraJ Foods	Processed Food	Gujranwala	Central Punjab		
3	Informal	Treasures Factory	Processed Food	Gujranwala	Central Punjab		facebook.com/sweettreasures
4	Informal	Saleem Industries	Processed Food	Multan	South Punjab		
5	Informal	Waseem Juice (Pvt) Ltd	Beverages Production	Multan	South Punjab		
6	Informal	Alzal & Sons Foods	Processed Food	Multan	South Punjab	0304-9096620	
7	Informal	Mastan Industries	Processed Food	Multan	South Punjab	0301-7471737	
8	Informal	Malik Sons Bakers	Bakery and Confectionery	Multan	South Punjab	0303-5442721	
9	Informal	Perfect Foods	Processed Food	Multan	South Punjab	061-6525912	
10	Informal	N & N Salt Makers	Processed Food	Multan	South Punjab		
11	Informal	Al Habib Food (pvt) ltd	Processed Food	Multan	South Punjab	061-6775758	
12	Informal	Al Madina Factory	Processed Food	Multan	South Punjab	0304-7182600	alhabibfoods@gmail.com
13	Informal	Amar Foods Factory	Processed Food	Multan	South Punjab	0310-0069394	
14	Informal	Dilwar Foods	Processed Food	Multan	South Punjab	0306-2588370	
15	Informal	Ali Abbas Industries	Processed Food	Multan	South Punjab		
16	Informal	Rao Rashid Industries	Processed Food	Multan	South Punjab		
17	Informal	Abid Factory	Processed Food	Multan	South Punjab		
18	Informal	Pizza Track	Processed Food	Multan	South Punjab	061-4500934	hussainptrack82@gmail.com
19	Informal	Real Rooters	Processed Food	Multan	South Punjab	0302-8488111	
20	Informal	Nice & Tasty Foods	Processed Food	Lahore	Central Punjab		
21	Informal	Tariq Foods	Processed Food	Lahore	Central Punjab		
22	Informal	Muslim Sweets	Bakery and Confectionery	Sargodha	Central Punjab		
23	Informal	Pakeeza Foods	Processed Food	Sargodha	Central Punjab	0321-7903898	
24	Informal	Asif Ice Cream Factory	Beverages Production	Lahore	Central Punjab		
25	Informal	Sona Bakers	Bakery and Confectionery	Lahore	Central Punjab	0423-75975899	
26	Informal	Royal Bakers	Bakery and Confectionery	Lahore	Central Punjab		royalbakers@yahoo.com
27	Informal	Al Mashoor Pvt Ltd	Processed Food	Lahore	Central Punjab	0423-7654131	
28	Informal	Aqua Blue	Beverages Production	Lahore	Central Punjab		
29	Informal	Family Food industries	Processed Food	Lahore	Central Punjab	042-3791774	
30	Informal	Al Meeraj Bakers	Bakery and Confectionery	Gujranwala	Central Punjab	055-4552571	
31	Informal	Ghulam Froze Food Factory	Processed Food	Gujranwala	Central Punjab		
32	Informal	Water World Applied Aqua	Beverages Production	Lahore	Central Punjab		
33	Informal	Aqua Zoom	Beverages Production	Lahore	Central Punjab		
34	Informal	Abbas Factory	Processed Food	Lahore	Central Punjab	7142508, 7141922	facebook.com/the cake fCTORY123
35	Informal	Home Waters	Beverages Production	Lahore	Central Punjab		
36	Informal	Blue and Co	Beverages Production	Lahore	Central Punjab		
37	Informal	Delite Store	Processed Food	Lahore	Central Punjab		
38	Informal	Rehmani Sweets and bakers	Bakery and Confectionery	Gujranwala	Central Punjab	35865312	Asifdelite@hotmail.com
39	Informal	National Bakery	Bakery and Confectionery	Faisalabad	Central Punjab		
40	Informal	Manzoor Qadria Bakery	Bakery and Confectionery	Faisalabad	Central Punjab	0321-6625706	
41	Informal	Javed and Sons	Processed Food	Faisalabad	Central Punjab	041-2405609	
42	Informal	Shaheen Foods Factory	Processed Food	Faisalabad	Central Punjab		
43	Informal	Majid Foods Factory	Processed Food	Faisalabad	Central Punjab		
44	Informal	Shama Sweets And Bakery	Bakery and Confectionery	Faisalabad	Central Punjab	041-32562318	
45	Informal	Aslam Food Center	Processed Food	Gujranwala	Central Punjab		
46	Informal	Sakhi Lalpal Foods	Processed Food	Lahore	Central Punjab		

S.N o	Nature of the Company	Comapny Name	Industry	City	Region	Contact No	Email Address
47	Informal	Bassani Sweets	Bakery and Confectionery	Lahore	Central Punjab	042-37427935	
48	Informal	Malik Sweets	Bakery and Confectionery	Lahore	Central Punjab		
49	Informal	Agha Blue	Beverages Production	Sialkot	North Punjab	052-3484139	
50	Informal	Ibrahim Foods Ltd	Processed Food	Sialkot	North Punjab		
51	Informal	Ghulam Rasool Sweets & Bakers	Bakery and Confectionery	Sialkot	North Punjab		
52	Informal	Hot Foods Factory	Processed Food	RWP/ISB	North Punjab	0321-6125717	
53	Informal	Hassan Bakery	Bakery and Confectionery	Faisalabad	Central Punjab		
54	Informal	Anmol Sweets and Bakers	Bakery and Confectionery	Faisalabad	Central Punjab		
55	Informal	Tawakal Sweets	Bakery and Confectionery	Faisalabad	Central Punjab	0300-7849051	
56	Informal	United Sweets Baker	Bakery and Confectionery	Faisalabad	Central Punjab		
57	Informal	AMIN SLANTY	Processed Food	Faisalabad	Central Punjab		
58	Informal	Lasani Sweets & Bakers	Bakery and Confectionery	Vihari	South Punjab	067-770780	
59	Informal	Decent Bakery & Sweets	Bakery and Confectionery	Vihari	South Punjab		
60	Informal	Batal Food Industries	Processed Food	Sahiwal	South Punjab	040-4502409	
61	Informal	Mumtaz Foods	Processed Food	Bhawalnagar	South Punjab		
62	Informal	Rahat Bakery	Bakery and Confectionery	Attock	North Punjab	703025	
63	Informal	Ali Noor Industries	Processed Food	Attock	North Punjab	0572-611425	
64	Informal	Hamza Industries	Processed Food	Attock	North Punjab	0572-700135	hamzatraders14@gmail.com
65	Informal	Halal Foods	Processed Food	Narawal	North Punjab		
66	Informal	Milan Industries	Processed Food	Narawal	North Punjab	0542-411155	
67	Informal	Rasheed Sweets	Bakery and Confectionery	RWP/ISB	North Punjab	0345-5535058	
68	Informal	Irfan Brother Enterprises	Processed Food	RWP/ISB	North Punjab	051-4321201	
69	Informal	Kamran Industries	Processed Food	RWP/ISB	North Punjab		
70	Informal	Shamin Industries	Processed Food	Bahawalpur	South Punjab	062-2870140,2978143	062-2878143
71	Informal	Lucky Food Industries	Processed Food	Bahawalpur	South Punjab	062-2860481	
72	Informal	Foods Center and Factory	Processed Food	Faisalabad	Central Punjab		
73	Informal	Amadadi Foods Factory	Processed Food	Faisalabad	Central Punjab		
74	Informal	Yadgar Foods	Processed Food	Faisalabad	Central Punjab	041-2695381	
75	Informal	AL Hram Foods	Processed Food	Faisalabad	Central Punjab		
76	Informal	Al Brakat Foods	Processed Food	Faisalabad	Central Punjab		
77	Informal	Pak land Foods	Bakery and Confectionery	Faisalabad	Central Punjab		
78	Informal	Ambala Sweets Bakers	Bakery and Confectionery	Faisalabad	Central Punjab		

List of Training Service Providers

List of TSPs									
S.No.	TSPs	City	Contact Person	Designation	Contact No	Email	Add1	Add2	Add3
1	COTHM College of Tourism & Hotel Management	Rawalpindi	Naveed Rehmat	Director- Coordination	0300-6329014	naveed@cothm.edu.pk			
2	NIFSAT Agriculture Farms	Faisalabad				dean.agri@uaf.edu.pk	Agriculture Faisalabad	Sarfraz Colony Rd Faisalabad	
3	Baba Uddin Zakariya University Multan	Multan			61 9210071, UAN 111 22 99 88	registrar@bzu.edu.pk	Bahauddin Zakariya University	Bosan Road, Multan,	Punjab, Pakistan
4	The Islamia University of Bahawalpur	Bahawalpur			62 - 9250235	info@iuh.edu.pk			
5	PMAS – Arid Agriculture University, Rawalpindi	Rawalpindi	Prof. Dr. Saifdar Ali	Dean - Faculty of Crop and Food Sciences	92-051-9290466	asafdar@uaar.edu.pk	Sharnabad	Muree Road	
6	Government College of Technology, Sahiwal	Sahiwal			40 9200406, 9239	get_sahiwal@yahoo.com	Sahiwal		
7	Government College of Technology, Faisalabad	Faisalabad	Engineer Muhammad Ali	Principal	041-9200320, 041-2561715	principal@getfsd.edu.pk	Sarnanabad		
8	Government College University, Faisalabad	Faisalabad		Director - Food Technology	041-9201315		GC University	Allama Iqbal Road	
9	University of Sargodha	Sargodha							
10	Government College University, Faisalabad	Faisalabad	Dr. Faqir Muhammad Anjum	Director - Department of Food Sciences, Nutrition & Vice Chancellor	041-9201315 Ext. 135		GC University	Allama Iqbal Road	
11	University of Punjab	Lahore	Prof. Dr. Mujahid Kamran		42-99231098, 42-99231102	info@pa.edu.pk			
12	Star Farms	Lahore			+92 (0)42 35788783	info@starfarm.com.pk	803-D, City Towers,	Main Boulevard, Gulberg II	

Sector Experts list

S.No.	Name	Designation	Category	Organization	Address	City	Telephone No.
1	Prof.(R) Dr. Faqir Muhammad Anjum	President	Overall Sector	The Pakistan Society of Food Scientists and Technologists,	National Institute of Food Science and Technology, University of Agriculture, Faisalabad-Pakistan	Faisalabad	041 9201105, 041 9200008
2	Dr. Aureng Zeb	Vice President	Overall Sector	The Pakistan Society of Food Scientists and Technologists,	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	041 9201105, 041 9200008
3	Dr. Masood Sadiq Butt	Director General	Overall Sector	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
4	Dr. Tahir Zahoor	Professor	Food safety - Bio-technology, bio-preservation etc	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
5	Dr. Imran Pasha	Asstt. Professor	Cereals Expert	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
6	Dr. Salim-Ur-Rehman	Professor	Value added fruits & Vegetables expert	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
7	Dr. Moazzam Rafique Khan	Asstt. Professor	Value added fruits & Vegetables expert	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
8	Dr. Muhammad Inam-Ur-Rahim	Lecturer	Value added fruits & Vegetables expert	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
9	Dr. Mian Kamran Sharif	Asstt. Professor	Edible Oil	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
10	Dr. Muhammad Asim Shabbir	Asstt. Professor	Edible Oils & Fats	National Institute of Food Science and Technology	National Institute of Food Science and Technology University of Agriculture, Faisalabad-Pakistan	Faisalabad	
11	Mr. Abdul Malik	Chairman	Value added fruits & Vegetables expert	All Pakistan Fruit & Vegetable Exporters, Importers & Merchants Association	Shop No 53, 54 Block B-2 Potato, Onion Section New Sabzi MANDI Super Highway Karachi	Karachi	0092-21- 36871620 0092- 344-2001234

S.No.	Name	Designation	Category	Organization	Address	City	Telephone No.
12	Ch. Majid Ahmed	Sr. Vice Chariman	Value added fruits & Vegetables expert	All Pakistan Fruit & Vegetable Exporters, Importers & Merchants Association	Citro Fresh Processing Unit, 6-K.M Anjala Road, Chak 10, N.B. Bhalwal Sargodha	Sargodha	0092-48-6645110 0092-300-8601455
13	Rizwan Ur Rab Malik	Member	Value added fruits & Vegetables expert	All Pakistan Fruit & Vegetable Exporters, Importers & Merchants Association	Agro Industries (Pvt) Ltd 65-A Lalazar Thokar Niaz Baig Lahore. Lalazar Colony Raiwand Road Lahore	Lahore	0092-21- 35314164 0092-300-8461314
14	Dr. Ijaz Ahmed	Principal Scientific Officer	Dept. of Food & Bio-Technology Research Center, PCSIR,	PCSIR	Dept of Food & Bio-Technology Research Center, PCSIR, Ferozpur Road Lahore	Lahore	
15	Dr. Rabia Shabbir Ahmed	Asstt. Professor	HACCP & Food Analysis	Dept. of Food Science, Nutrition & Home Economics	Government College University Faisalabad	Faisalabad	
16	Dr. Mohammad Tahir Nadeem		Cereals, Fruits & Vegetable Processing Expert	Dept. of Food Science, Nutrition & Home Economics	Government College University Faisalabad	Faisalabad	
17	Dr. Muhammad Imran	Asstt. Professor	Thermal Food Processing Expert	Dept. of Food Science, Nutrition & Home Economics	Government College University Faisalabad	Faisalabad	
18	Dr. Sarfraz Hussain	Director General	Overall Sector	Institute of Food Science & Nutrition	University of Sargodha	Sargodha	
19	Mr. Atif Ikram Sheikh	Chairman	Edible oil	Pakistan Vanaspati Manufacturers Association.	PVMA Secretariat Office House No. 386, Street No. 11, Sector I-8/2, Islamabad.	Islamabad	Tel : 051-4437597, Fax : 051-4440773 Email : info@pvma.com.pk
20	Mian Tasadduq Rasool	Sr. Vice Chairmen	Edible oil	Pakistan Vanaspati Manufacturers Association.	PVMA Secretariat Office House No. 386, Street No. 11, Sector I-8/2, Islamabad.	Islamabad	Tel : 051-4437597, Fax : 051-4440773 Email : info@pvma.com.pk
21	Sheikh Khurram Ikram	Director Operations	Edible oil	Mujahid Group of Industries	191-192, Street # 6 Sector I9-2, Industrial Area Islamabad 44000, Pakistan.		Tel: 051-4430237-38 Fax : 051-4433043 Email : info@mujahidgroup.com
22	Mr. Shehzad Umer	Head of HR	Overall Sector	Nestle Pakistan	Nestle Corporate Office 308 Upper Mall Lahore	Lahore	042 - 111637853
23	Mr. Mohammad Najeeb	Director	Overall Sector	Shakarganj foods (Pvt.) Ltd.	10th Floor, The Bank of Punjab Tower, 10-B, Block-E-2, Gulberg-III	Lahore	042-35783801 042-35783802 111-912-912, 0301-8444418
24	Mr. Faisal Rasheed Awan	Project Implementation Officer	Overall Sector	Trade Development Authority of Pakistan	Block - A, Finance and Trade Center, Shara-e-Faisal Karachi	Karachi	111-444-111

S.No.	Name	Designation	Category	Organization	Address	City	Telephone No.
25	Mr. Mujeeb Rashid	CEO	Overall Sector	Mitchells Fruit Farms (Pvt.) Ltd.	39 - A, D - 1, Gulberg III	Lahore	042-35872392-96
26	CEO	CEO	Cereals	Fauji Cereals	Dhamial Road, Islamabad	Islamabad	(92 51) 5126556, 5126557
27	Mr. Ansar Yahya	CEO	Overall Sector	Rafhan Maize Products	Rakh Canal East Road, P.O. Box 62, Faisalabad - 38060 Pakistan	Faisalabad	Tel: (92-41) 8540121-23 Fax: (92-41) 8711016 - 8502197
28	Mr. Faisal Farooq	Director	Ethnic Confectionery	Nirala (Pvt.) Ltd.	Nirala Centre, 10- Jail Road, Lahore	Lahore	Ph(Off) : 042-37587674
29	Ch. Muhammad Nawaz Chatha	Managing Partner	Beverage	Gourmet Foods	2-Quaid-E-Azam Town, Industrial Area, Hamdard Chowk, Kot Lakhpat Lahore	Lahore	Ph(Off) : 042-35145493 042-35145496
30	Mr. Fida Hussain	Director	Bakery & Confectionery	A. Rahim Food Industries (Pvt.) Ltd.	39-Industrial Estate, Kot Lakhpat, Lahore	Lahore	111-1111-999
31	Dr. Muhammad Suleman Saeed	Director	processed food	Ramna Food Products (Pvt) Ltd	Industrial Area Plot No.334 Township Lahore	Lahore	Ph(Off) : 042-35120341 042-35120342
32	Mr. Anwaar Hussain	CEO	Frozen Food	Dawn Frozen Foods Company Limited	8-Km, Mouza Rossa, Raiwind Manga Road, Kasur	Lahore	Ph(Off) : 042-35505772
33	Mr. Yawar Ali	Chairman	Overall Sector	Nestle Pakistan	Nestle Corporate Office 308 Upper Mall, Lahore	Lahore	042 - 111637853
34	Mr. Akhter Abbas Bharwana	Advisor Projects & Planning	Overall Sector	TEVTA	TEVTA Secretariat, 96-H, Gulberg Road, Lahore.	Lahore	Phone No. : +92 - 42 - 99263055-59
35	Ms. Saima Javed	DGM Academics	Overall Sector	TEVTA	TEVTA Secretariat, 96-H, Gulberg Road, Lahore.	Lahore	Phone No. : +92 - 42 - 99263055-59
36	Mr. Mohammad Nazar Khan Niazi	Zonal Manager South	Overall Sector	TEVTA	Street No. 29-B, Zakaria Town, Bosan Road Multan.	Multan	Ph: 061-9239005 Ph: 061-9239065
37	Ms. Farhat Jahan Raja	District Manager	Overall Sector	TEVTA	Technical Training Programme (ABAD) Complex, Satellite Town, Murree Road, Rawalpindi.	Rawalpindi	051-9290347

COURSE LEVELS

- ❑ This section provides a brief introduction of each Training Service Provider along with the courses/programs levels they offer.

COTHM COLLEGE OF TOURISM & HOTEL MANAGEMENT

- ❑ The College of Tourism & Hotel Management (COTHM) was established in the year 2002. The institute provides courses in various disciplines for example Hospitality, Culinary Arts, Travel and Tourism Management education and training in Pakistan. Driven by a professional vision that addresses the need and challenges of human resource development in the hospitality sector of the modern era, the core philosophy of education at COTHM is to combine two elements of education - theory and practice - which balances the academic learning with hands-on training.

TSPs	Program	Eligibility Criteria			Course Duration	Fee Structure		No. Of Seats Available	Examining Body
		Age	Education	Gender (M, F)		Open = O	Scholarship = S		
COTHM COLLEGE OF TOURISM & HOTEL MANAGEMENT	Food and Beverage Basics	18 Years	Intermediate/FA	M,F	9 Months	Rs. 80,000		200 Seats	COTHM Management
	Food and Beverage Specialization	18 Years	Intermediate/FA	M,F	12 Months	Rs. 80,000		150 Seats	COTHM Management

BAHA UDDINZAKARIYA UNIVERSITY MULTAN

- ❑ The BahaUddinZakariya University was established in 1975 by an Act of the Punjab Assembly. The main objective of the University is to provide facilities of higher education and research to the population of the Southern region of the Punjab. Currently it has more than 30 departments/institutes/colleges and out of a total of 523 faculty members, 175 hold doctoral degrees in various disciplines. Currently The Department of Food Science and Technology is providing technical courses for skilled manpower in food industry, details of which are presented in the table below.

S. No	TSPs	Program	Eligibility Criteria			Course Duration	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Open = O	Total	
1	<u>BAHA UDDIN ZAKARIYA UNIVERSITY/MULTAN</u>	Professional Bakery	18 Years	Middle	M,F	3 Months		1,500		500 Seats	BZU
2		Professional Bakery	18 Years	Matric	M,F	6 Months		6,000		560 Seats	BZU
3		Food Safety Hygiene	18 Years	FA/BA	M,F	12 Months		12,000		500 Seats	BZU

THE ISLAMIA UNIVERSITY OF BAHAWALPUR

- ❑ The Islamia University of Bahawalpur initially started its operations with 10 departments and today the university has 45 departments offering courses in up to 75 disciplines including food & technology. The University lays great emphasis on providing quality education to its students that fosters developmental skills for the practical world. Details of courses offered pertaining to the food sector are presented in the table below:

S. No	TSPs	Program	Eligibility Criteria			Course Duration	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Open = O	Total	
1	<u>THE ISLAMIA UNIVERSITY OF BAHAWALPUR</u>	BS Food Sciences	18 Years	F.S.C.	(M,F)	4 years	20 k (morning) 30 k (evening)			300 Seats	Department
2		MS Food Sciences	22 Years	BS Food Sciences	(M,F)	2 years	30 k (morning) 40 k (evening)			380 Seats	Department
3		M Phil Food Sciences	23 Years	BS Food Sciences /MS Food Sciences	(M,F)	2 years	40 k (morning) 50 k (evening)			300 Seats	Department

PMAS – ARID AGRICULTURE UNIVERSITY, RAWALPINDI

- ❑ Established in 1994, the PMAS-Arid Agriculture University's mandate is to produce high-quality agricultural scientists and to form an organized scientific infrastructure for teaching and research for the development of dry land regions of the country. The faculty of Crop & Food Sciences at PMAS-Arid Agriculture University comprises of qualified professionals who hold PHD degrees. The department has also been accredited by National Agriculture Education Accreditation Council of HEC., details of courses offered are presented in the table below.

S. No	TSPs	Program	Eligibility Criteria			Course Duration	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Open = O	Total	
1	<u>PMAS – ARID AGRICULTURE UNIVERSITY, RAWALPINDI</u>	B.Sc. (Hons) Agri (FT)	25 years	FSC (Pre Medical)	M,F	4 Years		19,800		300 Seats	COE
2		M.Sc(Hons.)	25 years	BSC (Hons) Agri	M,F	2 years		3,000		248 Seats	COE

GOVERNMENT COLLEGE OF TECHNOLOGY, SAHIWAL

- ❑ Affiliated to Punjab Technical and Vocational Training Authority, the college offers B-Tech in Auto and Farm and Mechanical Production (2 years) and provides a 3 year diploma in food processing and preservation techniques. The institute has a batch of almost 50 students currently. Comprehensive details of the programs offered are presented in the table below.

S. No	TSPs	Program	Eligibility Criteria			Course Duration	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Open = O	Total	
1	<u>GOVERNMENT COLLEGE OF TECHNOLOGY, SAHIWAL</u>	DAE -Food Technology (Morning)	18 Years	S.S.C.	Male	3 years		15000		500 Seats	Information not available
2		DAE Food Technology (Evening)	18 Years	S.S.C.	Male	3 years		25000		400 Seats	Information not available

GOVERNMENT COLLEGE OF TECHNOLOGY, FAISALABAD

- ❑ Government College of Technology Faisalabad was established in 1966 in order to meet the demand of Engineering Technicians, Technologists and Field Engineers in various fields offering 3-year Diploma of Associate Engineer Program along with couple of Degree Programs i.e. B.Tech. (Pass) and B-Tech (Hons) under University of Engineering & Technology. Details of certificate courses related to food sciences is presented in the table below:

S. No	TSPs	Program	Eligibility Criteria			Course Duration Total	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Total		
1	GOVERNMENT COLLEGE OF TECHNOLOGY, FAISALABAD	DAE -Food Sciences	18 Years	Matric Science	Male	3 years	10,000		400 Seats	Information not available	
2		B. Tech. (Hons) Food Sciences	18 Years	Matric Science	Male	3 years	20,000		350 Seats	Information not available	

UNIVERSITY OF SARGODHA

- ❑ Established in 2002, the University of Sargodha has an Institute of Food Science and Nutrition. The Department of Food Science and Technology was established in August 2005 and promoted as Institute of Food Science & Nutrition in 2010. The university primarily focuses on developing professional and entrepreneurship skills in its students and also facilitates on the job trainings through internships in the food industry, chain restaurants, five star hotels, catering institutions and research organizations . Details of courses offered are presented in the table below:

S. No	TSPs	Program	Eligibility Criteria			Course Duration Total	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Total		
1	<u>UNIVERSITY OF SARGODHA</u>	BS Food Sciences	18 Years	F.Sc.	(M,F)	3 years	10 k (morning) 20 k (evening)		1000 Seats	Department	
2		MS Food Sciences	22 Years	BS Food Sciences	(M,F)	2 years	20 k (morning) 30 k (evening)		800 Seats	Department	
3		M. Phil. Food Sciences	22 Years	BS Food Sciences / MS Food Sciences	(M,F)	2 years	30 k (morning) 40 k (evening)		900 Seats	Department	

UNIVERSITY OF PUNJAB

- ❑ Established in 1882 at Lahore, the University of the Punjab is the largest and the oldest higher education institute in Pakistan. The institute offers degree programs in various disciplines such as plant pathology, horticulture and food technology. Due to strong collaboration with a number private companies such as producer of fertilizers, pesticides, farm machinery and food processing there are numerous employment opportunities available for its graduates. Details of courses offered are depicted in the table below:

S. No	TSPs	Program	Eligibility Criteria			Course Duration Total	Fee Structure		No. Of Seats Available	Examining Body
			Age	Education	Gender (M, F)		Open = O Scholarship = S	Total		
1	UNIVERSITY OF PUNJAB	B.Sc. Food Technology	24 Years	FSc-Pre Medical	M,F	4 yrs.	Rs. 104,850	500 Seats	In house	
2		M.Sc. Food Technology	18 Years	16 years of education	M,F	2 yrs.	Rs. 71,500	400 Seats	In house and External	
3		PHD Agriculture	18 Years	18 years of education	M,F	Min. 3 yrs.	Rs. 165,725	200 Seats	In house and foreign faculty	

STAR FARMS

- ❑ Star Farm (Metro Group owned Company) is a consultancy firm providing consultancy for Agriculture Stakeholders, Productivity Enhancement, and Traceability of Food Supply Chain and Market linkages to the Global Market. The Company has trained over 150 government employees (100 Agri / 50 Livestock) and 150 private employees, and provided consultation to more than 55 agro/food Suppliers. Details of training courses offered are presented in the table below:

S. No	TSPs	Program	Eligibility Criteria			Course Duration Total	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O Scholarship = S		Total		
1	<u>STAR FARMS</u>	Food processing & professional technical pre/post-harvest product enhancement	14-35 Years	Matric	Female only	3 months	PSDF Free of cost		100 Seats	Pir Mehar Ali Shah University	
2		Skills for farming	21-35 Years	Matric	M,F	12 months	Free		200 Seats	Information not available	
3		Farm management	21-35 Years	Matric	M,F	12 months	Psdf Free of cost		200 Seats	Information not available	
4		Vegetable Pest and Disease Management	21-35 Years	Matric	M,F	3 months	PSDF free of cost		200 Seats	Information not available	
5		IFS (International Featured Standards)-Skills for marketing for entrepreneurs	18 Years	Industry & Board Staff Workers	M,F	10 days	3-4 Lacs		100 Seats	Information not available	

GOVERNMENT COLLEGE UNIVERSITY FAISALABAD

- ❑ The Government College University, Faisalabad aims to produce high caliber food, science and nutrition graduates who will be well equipped through the training they receive by offering students hands-on science dealing with real-world applications; friendly atmosphere and world-class internship experiences in collaboration with international institutions. The university aims to support the rapid changes in food industries. Details of programs offered relating to food industry are depicted in the table on the next page:

S. No	TSPs	Program	Eligibility Criteria			Course Duration Total	Fee Structure		No. Of Seats Available		Examining Body
			Age	Education	Gender (M, F)		Open = O	Scholarship = S	Total		
1	<u>GOVERNMENT COLLEGE UNIVERSITY FAISALABAD</u>	BSC Food Science and Technology	18 Years	Intermediate/FSC	M,F	4 years	RS. 154,000		75 Seats		Lab Processing
2		BS Human nutrition	18 Years	Intermediate/FSC	M,F	4 years	RS. 154,000		75 Seats		Lab Board
3		BS Food Sciences	18 Years	Intermediate/FSC	M,F	4 years	RS. 154,000		150 Seats		Lab Board
4		MS Food Science and technology	23 Years	BS Food Sciences	M,F	2 years	Above Rs. 50,000		75 Seats		Lab Board
5		MS Food nutrition	23 Years	BS Hons. Food Sciences	M,F	2 years	Above Rs. 50,000		75 Seats		Lab Board
7		MS Food nutrition	23 Years	BS Hons. Food Sciences	M,F	2 years	Above Rs. 50,000		75 Seats		Lab Board
8		MS Human nutrition	23 Years	BS Hons. Food Sciences	M,F	2 years	Above Rs. 50,000		75 Seats		Lab Board
		PHD Food Science and Technology	23 Years	MS Food Sciences	M,F	3 Years	Above Rs. 55,000		75 Seats		Lab Board
		PHD Food nutrition	23 Years	MS Food Nutrition	M,F	3 Years	Above Rs. 55,000		75 Seats		Lab Board

NIFSAT AGRICULTURE FARMS

- ❑ NIFSAT at UAF is one of the dedicated Food Science and Technology Institute in the country. The institute comprises of six sections which are as follows:

- Grain Science & Technology,
- Dairy & Meat Technology,
- Fruits & Vegetables Technology,
- Oil & Sugar Technology,
- Food Microbiology & Biotechnology,
- Nutrition & Food Safety.

❑ The institute also comprises of university one functional centre by the name of Food Technology Transfer Centre (FTTC) the main objective of the institute is application of Food Technology to cope with the challenges of the rapidly growing industry. The institute is offering degree programs leading to Ph.D. Food Technology, M.Sc. (Hons.) Food Science & Technology, M.Sc. (Hons.) Dairy Science & Technology, B.Sc. (Hons.) Food Science & Technology, B.Sc. Food Science & Nutrition. Details of programs are depicted in the table on the next page:

No	TSPs	Program	Eligibility Criteria		Course Duration Total	Fee Structure		No. Of Seats Available	Examining Body
			Age	Education		Open = O	Scholarship = S		
1	NIFSAT AGRICULTURE FARMS	BS Food Sciences	18 Years	Intermediate/FSC	4 Years	Self		200 Seats	Information not available
2		BS Human nutrition	18 Years	Intermediate/FSC	4 Years	Self		200 Seats	Information not available
3		B.Sc. Food Science and Technology	18 Years	Intermediate/FSC	4 Years	Self		250 Seats	Information not available
4		BS Hons. Food Science and Technology	18 Years	Intermediate/FSC	4 Years	Self		200 Seats	Information not available
5		MS Food Science and technology	23 Years	Graduate	2 Years	Self		200 Seats	Information not available
6		MS Human nutrition	23 Years	Graduate	2 Years	Self		200 Seats	Information not available
7		PHD-Food Technology	23 Years	MSC	3 Years	Self		100 Seats	Information not available

Local and Foreign Partnerships:

TSPs	Local	Foreign
COTHM College of Tourism & Hotel Management	• Chefs Association of Pakistan • Confederation of Tourism and Hospitality	• American Hotel and Lodging Education Institute • World Associations of Chefs societies • EURHODIP Leading Hotel school in Europe • CHRIE the hospitality & Tourism • ICM Educators
Government College University Faisalabad	None	None
Baha Uddin Zakariya University Multan	• Doaaba Foundation • Fornet Independent Foundation • Punjab Skills Development Fund (PSDF)	Golf International industries
The Islamia University of Bahawalpur	Higher Education Commission	None
PMAS – Arid Agriculture University, Rawalpindi	None	None
Government College of Technology, Sahiwal	Punjab Board of Technical Education	None
Government College of Technology, Faisalabad	None	None
University of Sargodha	• Higher Education Commission • USAID	None
University of Punjab	• Institute of Research and Promotion • ORIC -Office of Research Innovation & Commercialization	None
Star Farms	None	None
NIFSAT Agriculture Farms	None	None
Government College University, Faisalabad	None	None

Accreditation Profiles

TSPs	Local	Foreign
COTHM College of Tourism & Hotel Management	COTHM Hospitality Foundation	COTHM Manpower and Education Promoters
Government College University Faisalabad	Higher Education Commission	None
Baha Uddin Zakariya Universit Multan	Not provided	None
The Islamia University of Bahawalpur	Higher Education Commission	None
PMAS – Arid Agriculture University, Rawalpindi	- Punjab Board of Technical Education, - National Agriculture Education Accreditation Council (HEC)	None
Government College of Technology, Sahiwal	None	None
Government College of Technology, Faisalabad	Punjab Board of Technical Education	None
University of Sargodha	Higher Education Commission	None
University of Punjab	National Agriculture Education Accreditation Council (HEC)	None
NIFSAT Agriculture Farms	None	None
Government College University, Faisalabad	None	None

FOOD PROCESSING SURVEY QUESTIONNAIRE

FOOD PROCESSING SURVEY QUESTIONNAIRE

COMPANY'S GENERAL INFORMATION

Company Name		
Address Line 1		
Address Line 2		
Address Line 3		
City		
Region		
Phone		Fax
Company Email		
Company Website		
Year Of Establishment		

RESPONDENT INFORMATION

SECTION A

FIRMOGRAPHICS

QA1.How many employees do you currently have in your organization?

Organization Size	Number of Employees	Code
Micro Scale	1 - 10	1
Small Scale	11 – 30	2
Medium Scale	31 – 99	3
Large Scale	100 and above	4

:

QA2. Is your entity registered? (Name of the Registering Authority -----?)

Yes	Registered	1
No	Unregistered	2

QA3. What type of ownership do you hold?

Type of Ownership	Code
Proprietorship	1
Partnership	2
Public Limited	3
Private Limited	4

QA4. Are you a _____? (Read from the list below and circle the relevant code)

Producer	1
Distributor/supplier	2
Importer	3
Exporter	4

QA5. Please let us know your destination markets.

Local Markets	International Markets
1	2

QA6. What is the average annual sales turnover of your company?

Company Size	Annual Sales Turnover (Rs.)	Code
Micro	Less than 1 Million	1
Small	1 Million - 10 Million	2
Medium	11 Million – 30 Million	3
Large	31 Million – 50 Million and above	4

QA7. Can you please let us know what type of production facility do you have? Probe for details and code accordingly.

QA7		
Production Facility	Code	Description
Fully Automated	1	Designed for institutional use/ large production units. Raw materials fed at one end and finished products received at the other end. Involves low level of Human intervention; however the process is monitored by highly skilled machine operators/ supervisors at each level of production.
Semi - Automated	2	Each process performed on oversized heavy duty machinery designed for institutional use/ large production units with auto control system to carry out single process or multiple but related tasks. Each machine is operated by a single skilled machine operator.
Manual-By Machine	3	Each job performed by an operator on simple but slightly larger sized machines designed for small scale production units. Does not require high level of expertise to operate the machine.
Manual –With Hand/ tools	4	Most of the work is done by hand with use of simple hand tools.

QA8. Ask the respondent to specify the category, sub-category and products they deal in and record in GRID “A”

FOOD PROCESSING SURVEY QUESTIONNAIRE

GRID A		
Category	Sub-category	Products
Processed Foods	Value Added & Frozen Food Processing	1 Frozen Foods
		1 Frozen Vegetables
		2 Frozen Snacks/ Frozen Meals (only wheat and vegetable based products)
		Value Added Processed Foods
		3 Jams, Jellies, Marmalades
		4 Chutneys, Pickles, Achaar
		5 Sauces and Vinegar
		6 Squashes, Concentrates, Fruit Juices & Fruit Juice Drinks
		7 Seasonings & Spices
		8 Dry Vermicelli, Noodles & Spaghetti, Pasta & Macaroni
		9 Canned Fruits and Vegetables
		10 Snack Foods (potato crisps, salted nuts, products from rice flakes & corn grits, lentil & gram snacks)
		11 Cereals (corn flakes, rice cereals, porridge)
		12 Value Added Fruit & Vegetable and Intermediate products
		Others _____
	Edible Oil & Fats	13 Vegetable Oil
		14 Fruit Oil
		15 Ghee
		16 Margarine
	Beverage Production	Others _____
		17 Aerated Drinks
		18 Juices
		19 Bottled Water
		Others _____

GRID A				
Category	Sub-category			
Bakery and Confectionery	General Bakery Products/ Bakers	4	Cakes/Pastries	20
			Breads	21
			Rusks	22
			Doughnuts	23
	Ethnic & Other Confectionery Products		Pies	24
			Muffins	25
			Others _____	
			Ethnic Confections (Mithais and Nimkos)	26
	Biscuits & Other Dry Bakery Products	5	Other Confectionery	27
			Toffees	28
			Candies	29
			Bubble Gum	30
	Jellies	31		
	Chocolates			
	Others _____			
	Biscuits	32		
	Specialty Mixes & Concentrates	33		
	Others _____			

SECTION B

WORKFORCE CHARACTERISTICS

QB1. At present how many employees are working on production site/factory (Please include all workers in the factory of their employment status i.e. permanent employment/ contractual/ daily wagers/ workers in seasonal employment).

ACTUAL NUMBER:

--	--	--	--

QB2. How many of your organization's employees can be categorized into each of the groups below?

QB2		
Employment Status	Code	Total
Permanent	1	
Contractual	2	
Daily wage workers paid on daily rate	3	
Daily wage workers paid on an hourly rate	4	
Others 1(Please Specify)		
Others 2 (Please Specify)		

QB3.What is the average wage of a worker (worker level) in your organization for each category of employment status mentioned in QB2?

QB3		
Employment Status	Code	Average Wages (in Rupees/ month)
Permanent	1	
Contractual	2	
Daily wage workers paid on daily rate	3	
Daily wage workers paid on an hourly rate	4	
Others 1(Please Specify)		
Others 2 (Please Specify)		

QB4.On an average what is the turnover rate per year for the employees on your permanent payroll both from middle management group and workers group?

QB4	
Turnover Rate	
Middle Management	Workers Level

FOOD PROCESSING SURVEY QUESTIONNAIRE

QB5a. Do you have employees at the production site who are working at **Managers** level?

If "Yes" ask

QB5b.How many employees are working at managers Level

QB5c.Of these how many are male employees and how many are female employees

Job Titles	Q5a	Q5b	Q5c
	Total no Of Employees	Number of Male Employees	No of Female Employees
Managers			
Technicians and Associate Professionals			
Craft & Related Trade Workers			
Plant and Machine Operators			
Clerical Support Workers			
Other Skilled Workers			
Elementary Occupations			
TOTAL			

Ask for All Major Job Groups mentioned in QB5a

QB6. You have employees at the production site who are working at **Managers** level?

What are the various job titles/job roles they hold at this level?

QB7. What are the key functions or tasks that they generally perform under this role?

Similarly ask for other Job Levels (**Technicians and Associate Professionals, Craft & Related Trade Workers, Plant and Machine Operators, Clerical Support Workers, Other Skilled Workers, Elementary Occupations mentioned in Q5a**).

FOOD PROCESSING SURVEY QUESTIONNAIRE

Job Level	QB6 Job Titles	Code	QB7	
			Tasks performed (record code from Task list)	Tasks performed
Managers	Productions Manager	11		Others:
	Operations Manager	12		
	Quality Control Manager	13		
	Procurement Manager	14		
	Distribution Manager	15		
	Warehouse Manager	16		
	Others.....			
Technicians and Associate Professionals	Others.....	31		Others:
	Factory Supervisor	32		
	Line Supervisor	33		
	Others.....	34		
Professional Degree Holders	Food Technologist	51		Others:
	Bio Technologist	52		
	Others.....			
Craft & Related Trade Workers	Baker	71		Others:
	Chocolate Maker	72		
	Confectioner	73		
	Pastry Cook	74		
	Fruit Preserver	75		
	Oil Expeller	76		
	Food Grader	77		

Job Level	QB6		QB7		
	Job Titles	Code	Tasks performed (record code from Task list)	Tasks performed	Code
	Food Taster	78			
	Others.....				
Plant and Machine Operators	Fully Automated Plant Operator	91		Others:	
	Oversized Heavy Duty Machine Operator	92			
	Medium-sized Machine Operator	93			
	Packing/ Bottling Machine Operator	94			
	Others.....				
Clerical Support Workers + Office Staff					
	Production Clerk	101		Others:	
	General Office Clerk	102			
	Payroll Clerk	103			
	Stock Clerk	104			
Other Skilled Workers	Others.....				
	Batch Maker	121		Others:	
	Lorry/ Heavy Truck/ Fork Lift Operator	122			
	Simple Machine Operator	123			
	Others.....				

Job Level	QB6		QB7		
	Job Titles	Code	Tasks performed (record code from Task list)	Tasks performed	Code
Elementary Occupations-Semi Skilled, Unskilled					
	Helper	151		Others:	
	Packer	152			
	Cleaner	153			
	Loader/ Un-loader	154			
	Laborer	155			
	Workers performing work manually	156			
	Workers performing work with simple hand tools	157			
	Others.....				

Task List				
Tasks Performed	Code	Tasks Performed	Code	
Oversee factory/production operations	1	Confectionery making	15	
Oversee plant operations	2	Food Grading	16	
Operating Machines	3	Food Tasting	17	
Conceptualize, design, and implement plant improvement projects	4	Chocolate Making	18	
Conduct area inspections and audits	5	New product/ recipe development	19	
Perform calibration check of scale accuracy at the beginning of each batch	6	Record keeping	20	
Control and operate equipment	7	Perform simple routine operation	21	
Perform preventive and routine maintenance	8	Performing packing related tasks manually (packing, labeling, wrapping etc.)	22	
Replenish inventory as needed	9	Assisting senior workers to make their job easier	23	
Hire, train, and supervise employees	10	Performing work manually or using simple tools (sorting, grading, cutting, peeling, chopping, deseeding, dividing, washing etc.)	24	
Devise schedules and shifts	11	Perform general cleaning	25	
Food Tasting	12	Loading/unloading of raw materials and finished goods	26	
Baking, icing, cake decoration, pastry-making	13	Performing all kind of work that requires physical strength (labour)	27	
Cooking, frying	14	Others ...(please specify)		

QB8. What are the qualification levels of the employees who are working at **Managers** level?

QB9. Do the **Managers** working at this level hold any qualification/ diploma/ certification specific to food processing? If “Yes” which qualification/ diploma/ certification do they hold at this level?

Similarly ask for other Job Levels (**Technicians and Associate Professionals, Craft & Related Trade Workers, Plant and Machine Operators, Clerical Support Workers, Other Skilled Workers, Elementary Occupations, Un-Skilled and Semi-Skilled**).

Job Level	QB8												QB9				
	Qualification												Qualification (relevant to food processing only)				
	MBA / Post Graduates	Graduates	Diploma Holder /DAE	Intermediate	Matric	Middle	Primary	Less than Primary	Education/ Religious	Illiterate	Others	Phd. /MSc. In food technology	Bachelor in food technology	DAE Food Technology	Apprentice	Others 1	Others 2
Managers	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Technicians and Associate Professionals	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Professional Degree Holders	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Craft & Related Trade Workers	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Plant and Machine Operators	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Clerical Support Workers	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Other Skilled Workers	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	
Elementary Occupations- Un-Skilled and Semi-Skilled	1	2	3	4	5	6	7	8	9	10		21	22	23	24	25	

SECTION C**Prompted**

QC1. Please have a look at this card and tell us what are the skills required in the food processing sector?
(Record all the answers under column QC1)

Probe . Are there any other skills which you feel are essential/required in the food processing sector other than those mentioned on the card ? (Record in Blank Spaces)

For each of the skills mentioned in QC1 ask QC2 - QC4

QC2. What are the skills from the list you identified in QC1 for which you feel Technical and Vocational training is required (Record your answer in QC2)

QC3. What are skills for which you think on-the-job training is best suited (Record your answer in QC3)

QC4. What are the skills for which you think off-the-job training is best suited (Record your answer in QC4)

QC5a. In your opinion would there be a future need for _____ Skills?

(If No = Insert code 99, If yes, ask Q5b)

QC5b. You have mentioned that there would be a future need for ----- (skill), can you please let me know what would be the future demand in the next five years for this particular skill by your organization?

QC6. You have mentioned that _____ (skill) is required in the food processing sector; let me know if it is easily available in the market. (Record your answer in QC6)

For Each of the skill where code "2" (not easily available) Ask QC7 & QC8

QC7. In your opinion what are the main reasons that these skills are not easily available? (Record your answer in QC8)

QC8. What is your organization doing to overcome the difficulties in finding these skills? (Record your answer in QC9)

List of possible skills	FOOD PROCESSING SURVEY QUESTIONNAIRE					
	Skills required Prompted (SHOW CARD "A") QC1	Skills where TVE is required QC2	OJT best suited QC3	Off-the-Job trainings best suited QC4	Future Skills Needs Yes=Actual Demand No=99 QC5	Skills Availability Yes=1 No=2 QC6
Managerial Skills	1	1	1	1		
Administrative Skills	2	2	2	2		
Leadership Skills	3	3	3	3		
Project Management Skills	4	4	4	4		
Training Skills/ Coaching Skills	5	5	5	5		
People Management Skills	6	6	6	6		
Supervisory Skills	7	7	7	7		
Problem Solving Skills	8	8	8	8		
General Office Work Skills	9	9	9	9		
Record Keeping/ Maintaining Skills	10	10	10	10		
Plant & Machine - Operating Skills	11	11	11	11		
Plant & Machine - Repairing Skills	12	12	12	12		
Plant & Machine - Maintenance Skills	13	13	13	13		
Plant & Machine - Health & Safety Skills	14	14	14	14		
Packing Skills	15	15	15	15		
Basic Hand tools skills	16	16	16	16		
Simple Machine/Tools Operating Skills	17	17	17	17		
Technical Skills	18	18	18	18		
Communication	19	19	19	19		
Numeracy	20	20	20	20		
Information Technology/ICT	21	21	21	21		
Team Working and Interpersonal Skills	22	22	22	22		
Others 1 (Please Specify).....						
Others 2						
Others 3						
Others 4						
Others 5						
Others 6						

Reasons (QC7)		Code	Measures Taken (QC8)					Code		
Lack of required qualification		1	Increased training activity					1		
Lack of required skills (technical/ practical)		2	Introduction to new technology/ Eliminate workforce					2		
Lack of soft skills (communication, numeracy, etc.)		3	Promoting exposure to practical and theoretical training					3		
Lack of required experience to perform the job		4	Changing work practices/ reallocating work					4		
Lack of training opportunities (OJT, off-the-job training)		5	Increase recruitment activity/ Introduce new channels for recruitment					5		
Skill Code	Reason Code					Measures Taken Code				
	Others:					Others:				
	Others:					Others:				

	Others:					Others:				
	Others:					Others:				
	Others:					Others:				

Future Demand

Thinking about the future needs of the employees who are working at the production site can you please let me know

For Each Job Title/Role Mentioned Ask

QC9c. How many employees under these job titles/roles you think your company will require in next 3-5 years?

QC9d. What are the key skills you look for in the employees that your company will require in next 5 years?

[illegible]

SECTION D

RECRUITMENT & SELECTION

QD1a. What methods do you apply for hiring workers?

Methods of Recruitment	Code
Advertisements in newspaper	1
Referrals by existing employees	2
Notice at factory gate	3
Contact labor contractors/labor intermediaries	4
Internet	5
University/training institutes placement office	6
Others (Specify).....	

QD2.What is the minimum qualification required for (Job Level)?

QD3.What is the minimum experience required for (Job Level)?

QD4. Can the desired qualification be replaced with experience, if yes minimum how many years of experience is required?

QD5. Do you think TVET is essential for this role?

Job Levels	QD2		QD3		QD4		QD5
	Minimum Qualification		Minimum Experience		Qualification replaced by Experience		
Managers							TVET Yes=1 No=2
Technicians and Associate Professionals							
Craft & Related Trade Workers							
Plant and Machine Operators							
Clerical Support Workers							
Other Skilled Workers							
Elementary Occupations							

Qualification (Education Level/ Certification)	Code
Professional	1
MBA / Post Graduates	2
Graduates	3
Diploma holder /DAE	4
Intermediate	5
Matric	6
Middle	7
Primary	8
Less than Primary	9
Some Education/ Religious Education	10
Illiterate	11
Others	
Others	

QD6. Whattype of workers were hired during the last 2 years? (List down in table below)

For each type of workers hired ask

QD7. How many workers were hired in total?

QD8. Of these how many were hired at new jobs (QD8a) and how many were hired as replacement (QD8b)?

QD9. Of those who were hired during the last 2 years, how many are still working with you?

QD10. How many current vacancies do you have in your company at this moment?

QD11. You said that there are ____ (no. of current vacancies) at ____ (job level). Please let us know of these how many are hard-to-fill vacancies?

QD12. What are the levels at which you prefer to train and employ women? How many?

QD6	QD7 Total Number of Workers Hired	QD8a Hired on New Positions	QD8b Hired as Replacement	QD9 Still Working	QD10 No. of Current Vacancies	QD11 No. of Hard-To- Fill Vacancies	QD12 Women Hired
Managers	1						
Technicians and Associate Professionals	2						
Craft & Related Trade Workers	3						
Plant and Machine Operators	4						
Clerical Support Workers	5						
Other Skilled Workers	6						
Elementary Occupations	7						

SECTION E**On-The-Job Trainings****QE1.** Do you provide on-the-job trainings to your employees?

Yes	1	Continue
No	2	Ask QE3

QE2a. What are the job levels for which you provide on-the-job trainings to your employees?**QE2b.** What are the various methods which you adopt to provide on-the-job training to employees at each of these levels?

JOB LEVELS	Managers	Technicians and Associate Professionals	Craft & Related Trade Workers	Plant and Machine Operators	Clerical Support Workers	Other Skilled Workers	Elementary Occupations
OJT Provided	01	02	03	04	05	06	07
Methods							
Close observation	1	1	1	1	1	1	1
Each one teach one	2	2	2	2	2	2	2
Theoretical training followed by practical exposure	3	3	3	3	3	3	3
Working under direct supervision of an expert	4	4	4	4	4	4	4
Job rotation	5	5	5	5	5	5	5
Others(Please specify)							
Others							

QE3. What are the reasons for not providing OJT to the employees?

Reasons QE3	Code
Nature of work does not require OJT	1
Hire/recruit only trained/ expert staff	2
Waste of time and resources	3
Lack of facilities required to provide OJT (space/ financial constraints etc.)	4
Lack of trained staff/ expertise to provide OJT	5
Others(Please specify)	
Others	

SECTION F**Off-The-Job Trainings****QF1.** Do you provide off-the job trainings to your employees?

Yes	1	Continue
No	2	Go To Section G

QF2. Do you have any budget allocated for off the job training?

Yes	1	Ask QF3
No	2	Ask QF4

QF3. What percentage of the total expenditure do you spend on off the job trainings?
 %
QF4. What are the various Training Courses for which you provide off-the-job trainings to your employees at **Managers** level? (Circle all course codes for which off- the- job -trainings are provided in column 01 for **Managers** level)**For each course mentioned in column 01 ask QF5****QF5.** On an average how many employees do you register each year for this course? (Record the number in column 01)Similarly ask for other Job Levels (**Technicians and Associate Professionals, Craft & Related Trade Workers, Plant and Machine Operators, Clerical Support Workers, Other Skilled Workers, Elementary Occupations**).

Record all the answers below in GRID B

GRID B												
TRAINING COURSES	JOB LEVELS											
	Managers	Technicians and Associates Professionals	Craft & Related Trade Workers	Plant and Machine Operators	Clerical Support Workers	Other Skilled Workers	Elementary Occupations					
	01	02	03	04	05	06	07					
	Code	No.	Code	No.	Code	No.	Code	No.	Code	No.	Code	No.
Food chemistry	1	1	1	1	1	1	1	1	1	1	1	1
Physical properties of Food Materials	2	2	2	2	2	2	2	2	2	2	2	2
Post-harvest engineering	3	3	3	3	3	3	3	3	3	3	3	3
Food Preservation	4	4	4	4	4	4	4	4	4	4	4	4
Heat and Mass Transfer	5	5	5	5	5	5	5	5	5	5	5	5
Post-harvest handling of fruits and vegetables	6	6	6	6	6	6	6	6	6	6	6	6
Food regulations and legislations	7	7	7	7	7	7	7	7	7	7	7	7
Food Engineering Design	8	8	8	8	8	8	8	8	8	8	8	8
Food process engineering	9	9	9	9	9	9	9	9	9	9	9	9
Material and energy balance	10	10	10	10	10	10	10	10	10	10	10	10
Food quality control	11	11	11	11	11	11	11	11	11	11	11	11
Food processing and preservation	12	12	12	12	12	12	12	12	12	12	12	12
Food micro biology	13	13	13	13	13	13	13	13	13	13	13	13
Food product and plant design	14	14	14	14	14	14	14	14	14	14	14	14
Food packaging	15	15	15	15	15	15	15	15	15	15	15	15
Agricultural	16	16	16	16	16	16	16	16	16	16	16	16

GRID B												
TRAINING COURSES	JOB LEVELS											
	Managers	Technicians and Associate Professionals	Craft & Related Trade Workers	Plant and Machine Operators	Clerical Support Workers	Other Skilled Workers	Elementary Occupations					
	01	02	03	04	05	06	07					
	Code	No.	Code	No.	Code	No.	Code	No.	Code	No.	Code	No.
processing engineering												
Product Development	17	17	17	17	17	17	17	17	17	17	17	17
Operate Computing Technology In Food Processing Work Place	18	18	18	18	18	18	18	18	18	18	18	18
Advance Technology	19	19	19	19	19	19	19	19	19	19	19	19
Merchandising, Food Processing Retail	20	20	20	20	20	20	20	20	20	20	20	20
Minor Machine Maintenance /Repair	21	21	21	21	21	21	21	21	21	21	21	21
Quality Assurance/ Control	22	22	22	22	22	22	22	22	22	22	22	22
Costing /Basic Costing	23	23	23	23	23	23	23	23	23	23	23	23
Work Safety	24	24	24	24	24	24	24	24	24	24	24	24
Others												
Others												
Others												

SECTION G**Training Service Providers**

QG1. There are a number of training providers involved in technical and vocational food processing trainings. Please have a look at this list and tell us what are the various Technical and Vocational Food Processing Education Centers in Punjab?

Yes	1	Record their names in Column "G1"
No	2	Skip Section G

QG2. Do you receive regular information about the food processing training courses from any of these institutions? (Record in Column "G2")

QG3. Have you in the last 5 years hired employees holding certification/diploma from any of these institutions (Record in Column "G3")

QG4. Do you intend to hire employees holding certification/diploma from any of these institutions (Record in Column "G4")

G1		G2		G3		G4	
TSPs		Receive information on training courses		Employees Hired		Intention to Hire	
	Code	Y	N	Y	N	Y	N
The University of Faisalabad	1	1	2	1	2	1	2
University of Agriculture Faisalabad	2	1	2	1	2	1	2
Baha Uddin Zakariya University Multan	3	1	2	1	2	1	2
The Islamia University of Bahawalpur	4	1	2	1	2	1	2
PMAS – Arid Agriculture University, Rawalpindi	5	1	2	1	2	1	2
Government College of Technology, Sahiwal	6	1	2	1	2	1	2
Government College of Technology, Faisalabad	7	1	2	1	2	1	2
Government College University, Faisalabad	8	1	2	1	2	1	2
Jinnah University for Women, Karachi	9	1	2	1	2	1	2
University of Karachi	10	1	2	1	2	1	2
Sindh Agriculture University, Tando Jam	11	1	2	1	2	1	2
University of Sargodha	12	1	2	1	2	1	2
University of Punjab	13	1	2	1	2	1	2
Star Farms	14	1	2	1	2	1	2
Others 1:							
Others 2:							
Others 3:							

QG5. Will your company be willing to provide practical/ theoretical/ on-the-job training to students of food processing institutes attending trainings in relation to food processing during their course of study?

Yes	Ask	QG6
No	Ask	QG8

QG6. What are the various courses for which your company will be willing to provide practical/ theoretical/ on-the-job training to students of food processing institutes attending trainings in relation to food processing during their course of study? (Please list down in Column G6)

For each course mentioned ask

QG7. How many trainees will your company be able to accommodate each year?

QG6		QG7	
Skills/ Courses		Code	No. of Trainees / year
Food chemistry		1.	
Physical properties of Food Materials		2.	
Post-harvest engineering		3.	
Food Preservation		4.	
Heat and Mass Transfer		5.	
Post-harvest handling of fruits and vegetables		6.	
Food regulations and legislations		7.	
Food Engineering Design		8.	
Food process engineering		9.	
Material and energy balance		10.	
Food quality control		11.	
Food processing and preservation		12.	
Food micro biology		13.	
Food product and plant design		14.	
Food packaging		15.	
Agricultural processing engineering		16.	
Product Development		17.	
Operate Computing Technology In Food Processing Work Place		18.	
Advance Technology		19.	
Merchandising, Food Processing Retail		20.	
Minor Machine Maintenance /Repair		21.	
Quality Assurance/ Control		22.	
Costing /Basic Costing		23.	
Work Safety		24.	
Others 1			
Others 2			
Others 3			

QG8. Please state the reasons for which you will not be able to provide practical/ theoretical/on-the-job training to students from Food processing institute during the course of their training?

Reasons	Code
Unwillingness towards work	1
Low concentration level/ Do not learn from mistakes	2
Poor response to Supervisors/ Co-workers	3
Low productivity/ Causes waste of time and resources	4
Lack of expertise to train/ Training staff	5
Lack of facilities/ Resources to provide training	6
Others(Please specify)	

QG9. Will you be willing to or you normally relieve your workers (for a certain period) for training outside your factory?

Yes	1	Ask QG10 to QG12
No	2	Ask QG13

QG10. For how long would you be willing to relieve your workers for training outside your factory?

Duration	Code
Day Course(s)	1
Less than 1 week	2
1 week	3
2 week	4
3 week	5
One Month	6
2 Month	7
3 Month	8
6 Month	9
One Year	10
2 Year	11

QG11. Will you be willing to co-finance the training of your existing workers? If 'Yes' to what extent?

No	1	Yes	2	%
----	---	-----	---	---

QG12. Will you be willing to pay their salary/stipend during the period of their training? How much? If 'Yes' then to what extent?

No	1	Yes	2	%
----	---	-----	---	---

QG13. What are the reasons you are not willing to relieve your workers for training outside your factory?

Reasons	Code
Lack of appropriate training courses/ training facilities	1
Lack of information on training opportunities	2
Better in-house training/ Arrange for customized courses at own premises	3
Provide on the job training	4
Lack of funds for training	5
Employees switch the jobs	6
Others	
Others(Please specify)	

QG14. In future do you intend to setup Food Processing training centre within your facility? (Yes/ No)

	If "Yes" then you intend do to it through:	Code
Yes	Self –Financing	1
	Any other organization/ institute willing to support/ finance the setup	2
	Others(Please Specify)	
No	Go to Section H	3

SECTION H**Punjab Skill Development Fund (PSDF)****QH1.** Have you heard of PSDF?

Yes	1	Continue
No	2	Thank and End The Questionnaire

QH2. What do you know about PSDF and its role in Punjab?

Relevant Points	Code
It's a Non – Profit Organization	1
Collaboration between government of Punjab and Department of International Development (UK)	2
Provide skills and vocational training opportunities	3
Works across 14 districts of Punjab	4
Others(Please specify)	
Others(Please specify)	

QH3. How can PSDF help the industry and especially those who are willing to develop their career effectively in food processing industry?

Relevant Points	Code
Respond to industry needs for skills	1
Work closely with industry and TSPs for filling the gaps between skills supply and skills demand.....	2
Increase role of the establishment in providing training through existing capacity enhancement	3
Introduce flexible/ multiple delivery system	4
Others 1..... (Please specify)	
Others 2..... (Please specify)	

**Interview Guidelines
TSPs**

1.	Name:	2.	Job Title :																																
3.	Name of Organization :																																		
4.	Telephone :	5.	Fax:																																
6.	Email:	7.	Website :																																
8.	Year Of Establishment:	9.	Type of entity (Government /Private):																																
10.	Total number of Permanent Employees: _____ (including general and instructional/teaching staff)	11.	Total Instructional /teaching staff: Permanent: _____ Part Time/Visiting: _____																																
12.	Total number of current students: _____	13.	Number of students passed out in last five years or since inception: _____ (Please try to acquire Average No. of students passed out /year _____)																																
14.	Average graduates/certificates and diploma holders your institution produce per year: _____	15.	Do you conduct Regular financial Audits:(Yes /No)																																
16.	How many branches/ affiliated institutes you have in Pakistan: _____	17.	How many of them are in Punjab? (Please provide complete addresses, contact person/s and telephone numbers)																																
18.	What are the various course levels offered (Relevant To Food Processing Sector)																																		
<table border="1"> <thead> <tr> <th colspan="2">Technical Education</th><th colspan="2">Vocational Education</th></tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> </tbody> </table>				Technical Education		Vocational Education																													
Technical Education		Vocational Education																																	
Get the list of all the courses offered (relevant to food processing only)																																			
19.	PARTNERSHIPS: Yes _____ No _____ (If Yes name them)																																		
<table border="1"> <thead> <tr> <th colspan="2">Local</th><th colspan="2">International</th></tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> </tbody> </table>				Local		International																													
Local		International																																	

20.	ACCREDITATIONS: Yes _____ No _____ (If Yes name them)	
	Local	International

A.	Main Question: Programs/courses offered by the Institute <u>Sub Questions:</u> Q1. What are the various programs /courses offered by your institute (Relevant to Food Processing Sector only)? Ask Q2 to Q8 for the programs /courses offered by the institute, record all answers in “GRID A” Q2. What are the eligibility criteria for the admission in the (Programs / courses)? 2a) Is there any age limit? 2b) Is there any minimum qualification? 2c) Is the course available for both Male and Female? Q3. What is the duration of(Program/course)? Q4. What is the total fee (including materials /other charges) for (Program / course)? Q5. What is the total number of seats available for(Program/course)? Q6. How many students have registered this year for (Program / course)? Q7. What was the passing percentage for (Program / course)? Q8. Which key Food Processing trade/technology do you cover under this program? Q9. Could you briefly let us know the course content/main topics/skills covered under each course? Q10. Can you provide the examining body for the course offered?
----	--

GRID“A”

S. No.	Program	Eligibility Criteria			Course Duration	Fee Structure	No. Of Seats Available	Total No Of Registered Students		Passing Percentage	Key Trade	Course Content				Examining Body	
		Q2(a, b ,c)						Q6	Q7			Q9					Q10
		Age	Education	Gender (M,F, M/F)								M	F				
1.																	
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

D.	Q11a. Do you have a mechanism to track graduates' employment status and other details? (Ask for documents/online data / records)
	Q11b. For each course (mentioned in list), how soon (average) do previously unskilled graduates acquire jobs after completing the training course?(Ask for records / data)

S. No	Program	Mechanism to track Alumni/Alumni Status (Q11a)	Employee status after graduation (Q11b)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

A.	Ask Q12 to Q17 for the Programs' starting salary, Employment status, Declined application, Reasons & Rating of Attributes, record all answers in "GRID B" Q12. What starting salary are your graduates offered after successfully completing the course? Q13. Against which Programs/Courses employment stats/employability ratio are better, please mention your answer in percentage Q14.Which course is most popular/in demand? Please Rank them on the basis of the applications you receive against each course? If the total number of seats available (Q5) is greater than or equal to total number of registered students (Q6) Ask Q14a Q14a. The total number of seats available is equal to or greater than the total number students registered for this course. Have you declined applications in this particular course due to unavailability of seats? If Yes in Q14a askQ14b Q14b. Could you please let us know how many applications have you declined due to limited seats in the course? If the total number of seats available (Q5) is less than total number of registered students (Q6) ask Q15 Q15. The total number of seats available is less than the total number students registered for this course. What were the reasons for this? Q16. The students make a selection of courses on various key attributes. On scale of 1 to 5 (where 5 = "High in Demand" and 1= "Not at all in Demand") please rate the attributes for each program/course Q17. After successful completion of course(s) (listed) where did the graduates acquire jobs? e.g. which Food Processing trade/sector? Which companies? Please comment
-----------	---

GRID“B”

S. No.	Program	Starting Salary	Employment Status	Declined applications (Q14)		Reasons	Rating Of Attributes									Post Successful course completion (Q17)	
				Q14a	Q14b		Q15	Q16								Sector/ trade/ Company	Comments
			Q13	Yes=1 No=2	Number		Qualification	Age Limit	Fee Structure	Course Duration	Demand in Market	Starting salary	Access to Institute	Employability factor	On the job training / internship opportunity		
1.																	
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

Q18. What type of equipments / machinery / tools are you using for training purposes
(For each training program mentioned above)
Q18a. Are they harmonized with current industry demand? (Y/N).
Q18b. Please comment on above.

GRID “C”

S. No.	Machinery / Equipments / Tools			
	Program	List of Machineries Q18	Harmonized (Y/ N) Q18a	Comments Q18b
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

B.	Main Question - What are the selection criteria for Food Processing Trades/sub-sections/technologies for which trainings/courses are offered? <u>Sub Questions</u> - Who is involved in selection of these trades - What are the key selection criteria for selecting/finalizing Food Processing trade/technology, for which training courses are offered? - Do you have any written policy or procedure for envisaged selection - Do you conduct any survey before selecting a trade/technology - Do you obtain opinion of the industry experts before selecting a trade - Do you get any request to develop/introduce industry specific trades - Do you regularly check for new courses available abroad for specific trade/technology for which you are offering courses/trainings Response:
C.	Main Question - Development of Curriculum/course content <u>Sub Questions</u> - What are the envisaged objectives of the curriculum - What organizations / Industry / Business are responsible for development of curriculum (e.g. education professionals specializing in curriculum designing for food industry, food processing industry experts, foreign/local consultants, regulatory/government bodies like Punjab board of technical education, Higher education commission, etc.) - Who is involved in designing, reviewing and finalizing the curriculum (e.g. education professionals specializing in curriculum designing for food industry, food processing industry experts, foreign/local consultants, regulatory/government bodies like Punjab board of technical education, Higher education commission, etc.) - Do you review the curriculum of the benchmark and comparator countries while developing the curriculum - How often do you review the existing curricula - How often is the curriculum revised to keep it up-to-date with the changing technology and with similar courses/curriculum being offered abroad - When was the present curriculum revised (most recently)? - Is there uniform curriculum used in all schools offering same courses - Does the curriculum have life skills and work skills(employability skills) integrated in to it - To what extent the curriculum content are related to the requirements of the job Market
D.	Main Question Selection and Recruitment of The Training Staff <u>Sub Questions</u> Who are involved in Selection and Recruitment of the Training Staff (e.g.

	Industry experts/experts panel, industry consultants, top tier management of institute like vice chancellor, department chairman, senior teaching staff etc. - Do you review the job profiles/job description of the training staff of developed/underdeveloped countries during the selection/recruitment process - Is there any requirement of Industrial experience for technical subject teachers? - Do you provide pre-service training to your staff - Are there specialized teachers for teaching technical subjects - Are there organized Professional Development / Capacity building Programs for your teachers? - Do you have industry experts who visit regularly to provide training to the teaching staff - Are the pay scales of Technical Subject Teachers same as those of general education teachers? - Is there any ladder of promotion available to them - How favorable are the avenues of promotion as compared to those offered to teachers belonging to the mainstream/non-TVET education system? - Are modern Teaching-Learning Resources including, training manuals and materials, machinery & equipment and other training tools available to your teachers in schools for effective teaching
E.	Main Question Post Training Facilities <u>Sub Questions</u> - Do you provide any post training facilities to graduating students e.g. facilitation in providing Jobs or internships/On the job training - Do you have any industry liaison office/management and what are their roles in building strong relationship of your institution with the industry (e.g. graduate alumni portals, providing knowledge of online job portals, organizing job fairs etc.) - Do you keep records for your graduates/students employability ratio - If yes please share the ratios for the past 5 years or since inception - How many of your students in last five years have become trainers and providing successful trainings in your institute - In your opinion are there any gaps between the skills set of trainees and industry requirement
F.	Main Question Plans for Expansion <u>Sub Questions</u> - Are you happy with your existing infrastructure / facilities your institute is providing, if answer is 'NO' then please ask for reasons - What is your current source of funding(s), please list all - Do you have any recent or next 5 years plans for expansion (Yes /No) - If yes then please explain which type of expansions are you anticipating (e.g.

	expansions in overall capacity, introduction of new courses and technologies, global / national business expansion etc. For envisioned expansion(s) are you exploring options (other than your current source of funding) for investment by public/industry/private providers/investors or your institution is self-sufficient for envisaged expansion
G.	Main Question Awareness of PSDF <u>Sub Questions</u> - Do you know about PSDF its role, vision , mission and responsibilities in Punjab - In your opinion how PSDF can help your institution (e.g. in future skill demands of your teachers, finalization and selection of latest curricula, etc.) and Food Processing industry of Punjab. - Are you aware of or have you heard about PSDF's model of funding privately-delivered trainings through a competitive bidding process, if their answer is 'NO' then please share details with respondent - Would you be interested in bidding as a TSP if PSDF were to launch a similar scheme for the Food Processing sector - Any suggestions or improvements you recommend for PSDF Response
H.	Main Question Intention to Add trades/technologies/courses and international certifications related to Food Processing <u>Sub Questions</u> - Would you like to offer new courses/trades/ technologies related to Food Processing trainings you are successfully conducting - In your opinion will it be easy to design courses related to Food Processing or not(ask for reasons and main challenges) - Do you know which type of courses are available abroad - Do you have plans for introducing / conducting these courses in your institute/in Pakistan - How will you successfully procure these courses in Pakistan - What type of international certifications you are planning to acquire in near future or in next 5 years (please list down) - Do you have the existing capacity or planning for future expansion; for providing options of distance learning or online testing if required for attaining above certifications

Q9- Courses/Programs	Code
Food chemistry	1
Physical properties of Food Materials	2
Post harvest engineering	3
Food Preservation	4
Heat and Mass Transfer	5
Post harvest handling of fruits and vegetables	6
Food regulations and legislations	7
Food Engineering Design	8
Food process engineering	9
Material and energy balance	10
Food quality control	11
Food processing and preservation	12
Food micro biology	13
Food product and plant design	14
Food packaging	15
Agricultural processing engineering	16
Product Development	17
Operate Computing Technology In Food Processing Work Place	18
Advance Technology	19
Merchandising, Food Processing Retail	20
Minor Machine Maintenance /Repair	21
Quality Assurance/ Control	22
Costing /Basic Costing	23
Work Safety	24
Language	25
Research And Apply Techniques For The Design Of Wearable Objects	26
Procurement	27
Basic Business Planning	28
General/Applied Management(Marketing, Management, Finance/Financial Controls, Human Resource Management, Setting Up A Business/ Entrepreneurship Development /Industrial /Cost Accountancy	29

In-depth Interviews Guideline
Industry Experts

Q16 - Course Content	Rating on Key Attributes
Excellent	5
Good	4
Average	3
Not So Good	2
Not at All Good	1

Select Subsector/s (expert is associated with):

Value Added Processed and Frozen Food	Edible Oil & Fats
Beverage Production	General Bakery
Ethnic & Other Confectionary	Biscuits & Other Dry bakery products

1.	Name:	2.	Designation:
3.	Name of Organization/Institution:		
4.	Telephone :	5.	Age:
6.	Address:	7.	Fax:
8.	Email:	9.	Education:
10.	Professional Memberships: Yes ☐ No ☐ If yes Please mention:	11.	Experience Food Processing Category Wise Experience Years Total Experience in Food Processing Sector Years Teaching /Training Experience Years
12.	Areas of Expertise (relevant to Food Processing):	13.	Exposure to Industries (Food Processing Industries):

DISCUSSION POINTS – Take Notes

1.	Main Question: <u>Global Food Processing Industry</u> Sub Questions - What have been the major strengths and challenges of global Food Processing industry in last 5 years (in terms of technology, Human resource, industry trends etc.) - Where do you see the global industry going in the next 5 years? What major developments do you foresee? Business as usual? - What will be the key success factors and opportunities for the global industry in next five years (especially in terms of trading, business development, global business expansion for countries like USA, Japan, China, India, Russia, UK, etc.)
2.	Main Question: <u>Pakistan Food Processing Industry</u> Sub Questions - What have been the most significant challenge/threats for the Food Processing sector in Pakistan in the last five years? Which challenges will be there in the next five years? (in terms of technology, Human resource) - Please tell us about any technological/operational advancements which you foresee in the next 2 years. How will the existing workforce tackle this challenge? What new skills will be required to tackle these technological advancements?
3.	Main Question: <u>Hard to Fill Vacancy</u> Sub Questions - In your opinion what are hard-to-fill vacancies in food processing sector, i.e. those positions against which establishments are unable to find suitable candidates within the relatively medium to long term at prevailing wages through the usual recruitment procedures. Why are these Hard -to -fill? Probe for reasons - What role do the labor intermediaries play in providing the labor force with required skills?
4a.	Main Question: <u>On -the -Job</u> Sub Questions - What are the skills for which you think on-the-job training is best suited ?List - What role do industry players have in providing on-the job trainings? - Will the industry players be willing to provide on-the-job training to recent graduates? If yes, what are the various trades/skills for which the companies will be willing to provide on-the-job training to unemployed people (for enhancing skill levels)
4b.	Main Question: <u>Off –the-job training</u> Sub Questions - What are skills for which you think off-the-job training is best suited? List - What are the various opportunities available for off- the- job trainings? - How would you rate the quality of these trainings? Do they meet the industry requirements?

- If, not what measures should be taken and the role industry can play to improve quality of training provided?

5.

Main Question:

Training and Education in the Food Processing Sector

Sub Questions

- What are the skills for which you feel Technical and Vocational training is required? List
- What are the various Technical and Vocational training options (courses offered/ training programs) available for enhancing the skills
- Has the Technical and Vocational training options increased for those who wish to build their career in food processing industry, if yes how?

Training Institutes/Vocational and Technical Training Centers' Awareness

- What are the various Technical and Vocational Education Centers in Punjab that provide training on trades/skills specific to food processing?
- Do you receive regular information about the food processing training courses from any of these institutions?
- Do companies in the Food Processing sector prefer to hire employees holding certification / diploma from these institutions over non trained staff?
- Do you think they provide trainings in food processing trades/technology which meets the industry demands (Rate on a scale from 1 to 5, where 1 = 'strongly disagree', 2 = 'disagree', 3 = 'Neither agree nor disagree', 4 = 'agree' and 5 means 'strongly agree')

TSPs	Receive information on training courses		Prefer to Hire		Training in relevant Trades/ Technology
	Y	N	Y	N	(Please circle)
The University of Faisalabad	1	2	1	2	1 2 3 4 5
University of Agriculture Faisalabad	1	2	1	2	1 2 3 4 5
Baha -Uddin Zakariya University Multan	1	2	1	2	1 2 3 4 5
The Islamia University of Bahawalpur	1	2	1	2	1 2 3 4 5
PMAS – Arid Agriculture University Rawalpindi	1	2	1	2	1 2 3 4 5
Government college of technology Sahiwal	1	2	1	2	1 2 3 4 5
Government college of technology Faisalabad	1	2	1	2	1 2 3 4 5
University of Engineering and Technology Lahore	1	2	1	2	1 2 3 4 5
University of Punjab	1	2	1	2	1 2 3 4 5
University of Karachi	1	2	1	2	1 2 3 4 5
Sindh Agriculture university Tando Jam	1	2	1	2	1 2 3 4 5
University of Sargodha	1	2	1	2	1 2 3 4 5
Other 1 _____	1	2	1	2	1 2 3 4 5
Other 2 _____	1	2	1	2	1 2 3 4 5

	What are your suggestions/ recommendations for TSPs in meeting the skills requirements/ demands for the food processing sector? <u>Involvement with TVET/TSP in Developing Curricula, Teachers Training, Assessments</u> In your opinion should the TSPs in the food processing sector involve industry experts in () (Read items mentioned below in column 1, one after the another and circle which applies)Have the TSPs in the food processing sector ever approached you in () (Read items mentioned below in column 1, one after the another and circle which applies) <table><tr><th>Level of Involvement</th><th>Industry involvement</th><th>Respondent's Involvement</th></tr><tr><td>Identifying Skills /Trades</td><td>1</td><td>1</td></tr><tr><td>Curricula Development</td><td>2</td><td>2</td></tr><tr><td>Examination /Assessment</td><td>3</td><td>3</td></tr><tr><td>Formulation Of Policies</td><td>4</td><td>4</td></tr><tr><td>Selection And Recruitment Process Of Teachers</td><td>5</td><td>5</td></tr><tr><td>Training Of Trainers</td><td>6</td><td>6</td></tr><tr><td>Assessment Of Trainers</td><td>7</td><td>7</td></tr></table> What would you suggest; for improving coordination and building strong relationships between the Industry Experts and the TVET/TSP.	Level of Involvement	Industry involvement	Respondent's Involvement	Identifying Skills /Trades	1	1	Curricula Development	2	2	Examination /Assessment	3	3	Formulation Of Policies	4	4	Selection And Recruitment Process Of Teachers	5	5	Training Of Trainers	6	6	Assessment Of Trainers	7	7	
Level of Involvement	Industry involvement	Respondent's Involvement																								
Identifying Skills /Trades	1	1																								
Curricula Development	2	2																								
Examination /Assessment	3	3																								
Formulation Of Policies	4	4																								
Selection And Recruitment Process Of Teachers	5	5																								
Training Of Trainers	6	6																								
Assessment Of Trainers	7	7																								
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7.	Main Question: <u>Government Sector</u> <u>Sub Questions</u> - What plans does Government have at the moment to support education and training in the Food Processing sector? - Is the government taking any measure to bring the Technical and Vocational Institutes and the food processing sector closer to promote and provide demand driven technical education & vocational training in the region - What role the government can play in developing a roadmap for human resources development for the food processing sector in the country. - Is the government playing any role to enhance the capacity of training service providers																									

ORGANIZATIONAL PROFILE									
Year of Establishment	Type of entity	Total no. of Instructional / Teaching staff (Permanent)	Total Instructional/ teaching staff (Part Time / Visiting)	Total number of current Students	Number of students passed out in last five years or since inception	Average / graduates / certificates and diploma holders your institution produce per year			
2011	Private Entity	2 Employees	Information not available	350	1,800	300			
2004	Government Entity	2 Employees	11 Employees	1,215	6,050	1,100			
1959	Government Entity	21 Employees	Information not available	1,350	6,800	1,300			
2008	Government Entity	12 Employees	Information not available	1,560	7,950	1,500-1550			
2013	Government Entity	3 Employees	Information not available	980	5,000	800-900			
1994	Government Entity	7 Employees	6 Employees	548	2,780	500			
2007	Government Entity	100 Employees	Information not available	900	45,000	900			
1988	Government Entity	Information not available	Information not available	750	3,500	Information not available			
2004	Government Entity	2 Employees	11 Employees	1,600	8,000	1,500			
2002	Government Entity	250 Employees	100 Employees	2,700	Information not available	Information not available			
2010 (Institute of Agriculture Sciences)	Government Entity	40 Employees	20 Employees	1,100	5000	1,000			
2011	Private Entity	20 Employees	12 Employees	800	3,500	600-800			

ORGANIZATIONAL PROFILE									
	COTHM College of Tourism & Hotel Management	Yes	Information not available	Government College University Faisalabad	Information not available	NIFSAT Agriculture Farms	Yes	Bahauddin Zakariya University, Multan	Information not available
	The Islamia University of Bahawalpur	Information not available	Yes	PMAS – Arid Agriculture University, Rawalpindi	Information not available	Government College of Technology, Sahiwal	Information not available	Government College of Technology, Faisalabad	Information not available
	Government College University Faisalabad	Yes on Annual basis	Sahiwal and DG Khan	University of Sargodha	Yes – University has its own audit system	University of Punjab	Yes on Annual basis	Star Farms	All are in Punjab
Conduct Regular Audits	How many branches are in Punjab	6 Branches all over Punjab	universities has its different Campuses	No	Information not available	Yes	Information not available	Information not available	Information not available

Scope of Work

Based on the ‘Terms of Reference’ document and feedback received from PSDF ‘Scope of Work’ for this study is reproduced and is attached as annexure;

- Preparation of questionnaire to be administered to 185 formal and informal units within the food processing sectors of Punjab (defined in Table 1 above)
- Interviews of (up to 36) business experts to identify skill needs and gaps to obtain feedback on the relevance and quality of courses, effectiveness of Training Service Providers (TSPs) and assessment of producers as trainers
- Interviews of 12 TSPs for examining and informing on the current training landscape, including TSPs and in-house training services provided by manufacturers.
- To compile detailed quantitative and qualitative analysis, based on the preceding points, along with recommendations in final report

INDUSTRY SNAPSHOT

- Provide overview of the sector (formal and informal) and its relevance to Pakistan, including production processes, export performance, and regulatory environment;
- Map the sector in terms of the size and product characteristics of its various entities; also identify geographical clusters and specializations within each;
- Provide a brief overview of the sector’s trading performance for key products, including the sector’s global trade position, national sector data, and imports and exports over the last five years;
- Describe briefly the current status of the industry and changes that are beginning to, or are expected to affect it; in particular, technology, organizational changes, price competition, etc. and the sector’s response to these;
- Provide a summary of other studies, reports, policy papers, strategies, etc. developed in recent years for the sector.

WORKFORCE CHARACTERISTICS

- a. Map the structure and status of existing workforce of the subsector; employment numbers (estimates), employment by gender, contractual vs. permanent employment, self-employed and employees, turnover rate, working hours; comparisons of labor productivity with competitor countries, average wages, role of labor intermediaries;
- b. Map for each subsector typical job titles to occupational area using International Standard Classification of Occupation; and
- c. Develop a profile of the current qualification and training status of employed workforce.

SKILLS ANALYSIS

SKILLS DEMAND

- a. Provide an occupation-to-skills mapping, followed by a skills-to-qualifications mapping exercise (map each job title or role to skills if formal qualifications are not available);
- b. Identify existing and future skills gaps in current labor force;
- c. Work out an estimate of skills needs of the sector broken down by qualifications and levels;
- d. Identify existing and future skills shortages in new recruitments;

SKILLS SUPPLY

- a. Identify and assess existing sources of training supply;
- b. Assess employers' ability and capacity (in terms of numbers and trades) to train individuals;
- c. Explore possible training delivery modes which can be funded by PSDF, assess possible levels of industry contributions and that of public-sector TSPs, and shall suggest mechanisms for ensuring job placement of PSDF-funded trainees after completion;

- d. Identify strengths and weaknesses of private-sector TSPs; propose areas for investment by public providers, append to the report a list of TSPs with courses and enrolment capacity;
- e. Point out gaps and areas where curricula development is needed;
- f. Analyze certification options (national and international) and provide an assessment in view of industry needs;

Sources of Information

- i. Pakistan Agricultural Research Council (PARC),
- ii. Pakistan Vanaspati Manufacturers Association (PVMA)
- iii. Pakistan Edible Oil Refiners Association (PEORA)
- iv. Pakistan Flour Mills Association (PFMA)
- v. Punjab Food Authority (PFA)
- vi. Mango Growers Association Pakistan
- vii. IFTECH Pakistan (International Food Technology exhibition)
- viii. Punjab Agriculture and Meat Company (PAMCO),
- ix. Pakistan Agriculture and Dairy Farmers Association,
- x. Halal Industry Research Centre Pakistan (HIRC),
- xi. Ministry of Food, Agriculture and Livestock, Government of Pakistan
- xii. Pakistan Standards and Quality Control Authority (PSQCA),
- xiii. Pakistan Council for Scientific and Industrial Research (PCSIR),
- xiv. University of Agriculture, Faisalabad,
- xv. Arid Agriculture University, Rawalpindi,
- xvi. Small and Medium Enterprises Development Authority (SMEDA)
- xvii. Industries, Commerce and Investment Department, Government of Punjab
- xviii. Federal Chambers of Commerce,
- xix. TDAP- Trade Development Authority of Pakistan
- xx. WTO Cell of Government of the Punjab
- xxi. Lahore Chamber of Commerce & Industry (LCCI)
- xxii. Punjab Board of Investment and Trade (PBIT)
- xxiii. Federal Bureau of Statistics,
- xxiv. Federation of Pakistan Chambers of Commerce & Industry -FPCCI
- xxv. UN COMTRADE Data
- xxvi. Punjab Development Statistics,
- xxvii. Pakistan Institute of Trade and Development (PITAD) – Agriculture Sector,
- xxviii. Pakistan Tanners Association (PTA),
- xxix. Pakistan Institute of Development Economics (PIDE) etc.

TASKS PERFORMED

Based on the survey results, the typical 'job titles' under each job level along with the major tasks performed by the employees currently holding these positions are shown below.

TABLE 1: TASKS PERFORMED

Job Level	Job Titles	Tasks performed
Managers	Production Manager	- Oversee plant operations and Operating Machines - Conceptualize, design, and implement plant improvement project - Conduct area inspections and audits - Perform preventive and routine maintenance - Conduct area inspections and audits - New product/recipe development - Record keeping - Food Procurement and field testing - Oversee distribution operations - Devise schedules and shifts - Oversee warehouse operations - Conduct health and safety inspections - Oversee plant operations and operating Machines - Conceptualize, design, and implement plant improvement project - Perform preventive and routine maintenance - Devise schedules and shifts
	Operations Manager	- Perform preventive and routine maintenance - Hire, train, and supervise employees - Replenish inventory as needed - Food Tasting - Record keeping - Food Grading - Food Tasting - Record keeping
	Quality Control Manager	- Food Grading - Devise schedules and shifts - Food Tasting
	Procurement Manager	Record keeping
	Distribution Manager	Record keeping
	Warehouse Manager	- Hire, train, and supervise employees - Record keeping
	Factory Supervisor	- Baking, icing, cake decoration, pastry-making - Cooking, frying - Food Grading - Food Tasting - Record keeping

Job Level	Job Titles	Tasks performed
Professional Degree Holders	Line Supervisor	- Oversee plant operations - Operating Machines - Control and operate equipment - Devise schedules and shifts - Record keeping - Perform simple routine operations
	Food Technologist	- Conduct area inspections and audits - Food Grading - New product/ recipe development - Food Tasting
	Bio Technologist	- Conduct area inspections and audits - Food Grading - New product/ recipe development - Food Tasting
Craft & Related Trade Workers	Baker	- Baking, icing, cake decoration, - Performing packing related tasks manually (packing, labeling) - Perform simple routine operation - Confectionery making - Food Grading - New product/ recipe development
	Chocolate Maker	- Chocolate making - Food Grading - Food Tasting - New product/ recipe development - Performing packing related tasks manually (packing, labeling)
	Confectioner	- Operating Machines - Baking, icing, cake decoration, pastry-making - Food Grading - Perform simple routine operations - Performing packing related tasks manually (packing, labeling)
	Pastry Cooking	- Cooking, frying - Food Grading - New product/ recipe development - Record keeping - Perform simple routine operations
	Fruit Preserver	- Fruit preserving - Performing packing related tasks manually (packing, labeling)-
	Oil Expeller	- Operate oil expeller - Temperature record/record maintaining
	Food Grader	- Food Grading - Record Keeping
	Food Taster	- Food Grading - Record Keeping

Job Level	Job Titles	Tasks performed
Plant and Machine Operators	Fully Automated Plant Operator	- Operating Machines - Control and operate equipment - Perform preventive and routine maintenance - Perform preventive and routine maintenance - Record keeping - Perform simple routine operations
	Oversized Heavy Duty Machine Operator	- Operating Machines - Control and operate equipment - Perform preventive and routine maintenance - Perform preventive and routine maintenance - Perform heavy machine operation
	Medium-sized Machine Operator	- Operating Machines - Perform preventive and routine maintenance - Record keeping - Perform simple routine operations
	Packing/Bottling Machine Operator	- Operating Machines - Record keeping - Perform simple routine operations - Performing packing related tasks manually (packing, labeling)
	Production Clerk	- Replenish inventory as needed - Record keeping - Perform simple routine operations
Clerical Support Workers + Office Staff	General Office Clerk	- General office work - Record keeping - Payroll and related duties
	Payroll Clerk	- Record keeping - Payroll and related duties
	Stock Clerk	- Record keeping - Inventory management - Stock check and updating - Perform simple routine operations
Other Skilled Workers	Batch Maker	Batch making and batch making operations
	Lorry/ Heavy Truck/ Fork Lift Operator	- Transport / fleet managing - Perform heavy duty machine works - Loading/unloading of raw materials and finished goods - Performing all kind of work that requires physical strength
	Simple Machine Operator	- Operating Machines - Perform preventive and routine maintenance - Perform simple routine operations - Performing work manually or using simple tools

Job Level	Job Titles	Tasks performed
Elementary Occupations-Semi Skilled, Unskilled	Helper	- Perform simple routine operations - Performing work manually or using simple tools - Perform general cleaning - Loading/unloading of raw materials and finished goods - Performing all kind of work that requires physical strength
	Packer	- Performing packing related tasks manually (packing, labeling) - Perform simple routine operations
	Cleaner	Perform general cleaning
	Loader/ Un-loader	- Perform general cleaning - Loading/unloading of raw materials and finished goods - Performing all kind of work that requires physical strength
	Laborer	- Perform simple routine operations - Performing work manually or using simple tools - Perform general cleaning - Loading/unloading of raw materials and finished goods - Performing all kind of work that requires physical strength
	Workers performing work manually	- Perform simple routine operations - Performing packing related tasks manually - Performing all kind of work that requires physical strength - Performing work manually or using simple tools - Perform general cleaning - Loading/unloading of raw materials and finished goods
	Workers performing work with simple hand tools	- Performing work manually or using simple tools - Record keeping - Perform simple routine operations

15. SKILLS REQUIREMENTS AND TRAINING NEEDS

15.1 MAPPING OF JOB TITLES AS PER INTERNATIONAL STANDARD OF CLASSIFICATION OF OCCUPATION

15.1.1 The framework and concepts behind the International Standard Classification of Occupation is based on two main concepts; the concept of job and the concept of skills.

1. Job and Occupations -“Job” is defined as set of tasks or duties performed whereas “Occupations” refers to kind of work performed in a job.
2. Skill level and skill specialization- “Skill” is defined as the ability to carry out tasks and duties of a given job. For the purpose of classification two dimensions of skills are used to arrange occupations into groups; skill level and skill specialization

15.1.2 Skill Level is defined as the function of the complexity and range of tasks and duties to be performed in an occupation. Skill level is measured operationally by considering one or more of:

- Nature of work performed
- Level of formal education
- Informal on-the job-training/previous experience

15.1.3 Skill Specialization is considered in terms of four concepts:

- Field of knowledge required
- Tools and machinery used
- Material worked on or with
- Kind of goods and services produced

15.1.4 Based on the above mentioned factors the skills are categorized under four major groups. The definitions of the skill levels, grouping of jobs and levels of education under these skills and typical job titles under food processing sector as mentioned in the International Standard Classification of Occupations 2008 are summarized in Table 1.

TABLE 1: JOB TITLES AS PER INTERNATIONAL STANDARD OF CLASSIFICATION OF OCCUPATION

ISCO Skill Level	Description of Skill Levels	Major Job Groups	Typical Occupations Classified-Food Processing	Education Level
Skill Level 4	- Typically involves the performance of tasks that requires complex problem-solving, decision making and creativity based on an extensive body of theoretical and factual knowledge in a specialized field. - The tasks performed typically include analysis and research to extend the body of human knowledge in a particular field (in this case production process). - Occupations at this skill generally require extended levels of literacy and numeracy, sometimes at a very high level, and excellent interpersonal and communication skills. - These skills usually include the ability to understand complex written material and communicate complex ideas. - The knowledge and skills required for competent performance in occupations are usually obtained as the result of study at a higher educational institution for a period of 3-6 years leading to the award of a first degree or higher qualification. In some cases extensive experience and on-the-job training may substitute for formal education, or may be required in addition to formal education	Professional	- Biotechnologist - Production Engineer - Plant Engineer	1.Second Stage of Tertiary Education (Leading to an Advanced Research Qualification)
		Managers	Sales, Marketing And Public Relations Professionals	2.First Stage of Tertiary Education , 1st Degree (Medium Duration)
Skill Level 3	- Typically involves the performance of complex technical and practical skills that require an extensive body of factual, technical and procedural knowledge in a specialized field. - The tasks performed include: ensuring compliance with health, safety and related regulations; preparing detailed estimates of quantities and costs of materials and labor required for specific projects; coordinating, supervising, controlling and scheduling the activities of other workers and performing technical functions - Occupations at this skill generally require a high level of literacy and numeracy and well- developed interpersonal communication skills. These skills may include the ability to understand complex written material, prepare factual reports, and communicate verbally in difficult circumstances. - The knowledge and skills required for competent performance in occupations are usually obtained as the result of study at a higher educational institution for a period of 1-3 years following completion of secondary education. - In some cases extensive relevant work experience and prolonged on-the-job training may substitute for formal education.	Managers	Production And Specialized Service Manager - Producer - Production Manager - Production And Operations Manager - Production Supervisor Supply, Distribution And Related Managers - Purchasing Manager - Supply And Distribution Manager - Supply Chain Manager - Warehouse Manager	First Stage of Tertiary Education (Short or Medium Duration)
		Technicians And Associate Professionals	- Production Supervisors - Area Coordinator - Assembly Supervisor - Finishing Supervisor - Production Supervisors - Process Control Technicians - Bacteriology Technician - Occupational Health And Safety Inspector	
Skill Level 2	Typically involves the performance of tasks such as operating machine and electronic equipment, driving vehicles, maintenance and repair of electrical and mechanical equipment etc.	Clerical And Support Workers	- General Office Clerk - Accounting and Book Keeping Clerk - Payroll Clerk	1.Post –

Extraction: ISCO-08

ISCO Skill Level	Description of Skill Levels	Major Job Groups	Typical Occupations Classified-Food Processing	Education Level
	- For almost all occupations the ability to read , write and perform simple arithmetical operations is essential - Many occupations require relatively advanced literacy and numeracy skills and good interpersonal communication skills. - Many occupations require high level of dexterity - For competent performance completion of first stage of secondary education is required. - Some occupations require the completion of the second stage of secondary education which may include a significant component of specialized vocational education and on-job-training - Some occupations require completion of vocation –specific education undertaken after completion of secondary education - In some cases experience and on-the - job training may substitute for the formal education.		- Stock Clerk - Production Clerk - Schedule Clerk	Secondary, Non-Tertiary Education
		Service And Sales Workers	Shop Sales Persons - Shop Keeper - Shop Supervisors - Shop Sales Assistant - Cashier	2.Upper Secondary Level Of Education
		Skilled Agriculture , Forestry And Fishery Workers	Not Directly Related To Food Processing Sector	
		Craft And Trade Related Workers	- Baker - Chocolate Maker - Confectioner - Pastry Cook - Food Grader - Food Taster - Chutney Maker - Jam Maker - Fruit And Vegetable Preserver - Oil Expeller - Fruit And Vegetable Pickler	3.Lower Secondary Level Of Education
		Plant And Machine Operators And Assemblers	- Bakery Products Machine Operator - Bread Production Machine Operator - Chocolate Production Machine Operator - Bottling Machine Operator - Bottle Filler - Canning Machine Operator - Labeling Machine Operator - Packing Machine Operator - Wrapping Machine Operator - Car, Truck, Bus, Motor Cycle Driver - Fork Lift Operator , Truck Driver	
		Elementary Occupations	- Cleaners - Helpers/Assistants - Washers - Production Laborers - Hand Packers - Refuse Workers	Primary Level Of Education

15.2 MAPPING OF TYPICAL JOB TITLES PREVAILING IN PAKISTAN AS PER ISCO CLASSIFICATION

15.2.1 As mentioned in ISCO -08 the skills profile of an industry can be assessed in two ways: by the qualification profile of the workers employed in that industry and by the skill level of the occupations relevant to that industry.

15.2.2 On the basis of the classification of skills, job groups and required levels of qualifications, an effort has been made to map the typical job titles in the food processing sector in Punjab/Pakistan and against the four skill levels, major job groups, required qualification and experience prevailing in Food Processing Industry as reported in the study are presented in Table 2.

TABLE 2: MAPPING OF TYPICAL JOB TITLES PREVAILING IN PAKISTAN AS PER ISCO CLASSIFICATION

ISCO Skill Levels	Major Job Groups	Typical Job Titles	Education Level	Required Level Of Experience
Skill Level 4	Professional	Plant Engineer, Food Scientist, Research And Development Manager	PHD, M.Phil, Masters Degree	Extensive Experience Required usually more than 10 years
	Managers	Sales Manager, Distribution Manager ,Research And Development Manager , Quality Control Manager, Quality Assurance Manager	Masters Degree	More than 5 years
Skill Level 3	Managers	Production Manager, Plant Manager, Factory Operations Manager ,Purchase Manager, Procurement Manager Quality Control Manager, Quality Assurance Manager , Research And Development Manager ,Warehouse Manager	Masters Degree, Bachelors Degree	3-5 years
	Technicians And Associate Professionals	Factory Supervisor, Line Supervisor	Bachelors Degree DAE (Diploma in Associate Engineering)	3-5 years
Skill Level 2	Clerical And Support Workers	Production Clerk, General Office Clerk, Stock Clerk, Payroll Clerk	Intermediate	1-3 years
	Service And Sales Workers	Store Manager, Salesmen/Sales Girls, Cashier	Intermediate, Martic	1-3 years
	Craft And Trade Related Workers	Bakers, Confectioner , Mithai Makers, Fruit Preserver, Chocolate Maker, Pastry Cook , Food Preserver, Oil Expeller, Food Grader, Food Taster	Primary- Matric Varied level of qualification backed by experience - based on skill level required	Extensive experience required ,generally more than 3 years - based on skill level achieved
	Plant And Machine Operators And Assemblers	Medium-Sized Machine Operator, Oversized Heavy Duty Machine Operator, Fully Automated Plant Operator, Packing/ Bottling Machine Operator	Primary- Intermediate (Based on size of the organization, size of machinery in use backed by experience)	More than 3 years on fully automated plant, 1-3 years on heavy or medium sized machineries , less than a year on simple machineries/tools
Skill Level 1	Elementary Occupations	General Laborer, Loader/ Un-Loader, Workers Performing Routine Work Either Manually Or With Simple Hand Tools- Cleaner, Packer, Loader /Unloaded,	Generally no or low level of education- less than primary.	Generally no prior experience required, hired as trainees.

15.3 SKILLS REQUIRED IN FOOD PROCESSING SECTOR

15.3.1 There is a wide range of skills required by process operatives and are broadening day after day due to technological advancement. Though not all process operatives require all the same skills to the same level, but can be broadly classified as follows:

TABLE 3: SKILLS REQUIRED

Core Skills	Core Skills are abilities that everyone needs in their work. This is true for every job in every workplace. Employers look for Core Skills when they are appointing new staff. They also expect their existing staff to have these skills. There is a framework of five Core Skills with four levels used in SQA National Qualifications. The skills required at any work place including the Food Processing Sector are quite similar to the ones mentioned in ISCO-2008 and matches with the skills identified during the current study. The skills required in each of the five Core Skills at all the 4 levels as mentioned in SQA National Qualifications are summarized in Table 4 along with the "Skill Gaps" identified during the study.
Non-Sector Specific Skills	Non Sector Specific skills are the common skills that can be applied anywhere in the food processing industry. There was a long list of skill gaps identified. They were grouped under common head of "Skill Required", followed by the summary of responses received as "Skill Gaps", These are summarized in Table 5.
Sector Specific Skills	Sector Specific Skills are the skills particular to sub-sectors under study. Since these skills cannot be applied in elsewhere, these are mostly specialized and scarce too. The skills reported are summarized for each sub sector under study in Table 6.

15.3.2 The tables are based on the study conducted amongst 185 interviews from the firms and 36 In-depth-Interviews with the sector experts. The data on Agri- Products (Fruits and Vegetables, Sugar, Grains and Pulses, Rice and Flour) were limited to secondary research only. Since data on labor force characteristics, skills requirement, skills gaps, training needs etc. on the Agri- based industry were not available for Pakistan/Punjab, the skills have been identified by studying the production process in Agri-based sub-sectors, job-descriptions advertised in newspapers and report on skill development in the sectors of other countries.

15.3.3 An effort has been made to map the "Skills Gaps" against the 9 major job groups as per ISCO-2008 standards and are presented in the following Tables.

TABLE 4: SKILL GAPS-CORE SKILLS

Job Groups	Professional/ Managers	Managers /Technical Professionals	Clerical And Support Workers/ Service And Sales Workers Craft And Trade Related Workers Plant And Machine Operators And Assemblers	Elementary Occupations
SQA Skill Level	6	5	4	3
Communication Skills	Communication Skills - Required	Ability to read, understand and evaluate documents , produce well-structured documents or collection of related documents that conveys several items of complex information, opinions, or ideas or aspects of work and make substantial contribution to discussion on topic related to work or give presentations on work-related topic.	Ability to read, understand and produce straightforward documents and take part in straight forward discussions related to work (letter, e-mail, short report, or leaflet)	Ability to read, understand and produce simple documents and take part in simple discussions related to work (Signs, list of instructions etc)
	Communication Skills - GAPS	Lack English language skills hence unable to produce quality reports and deliver quality presentations as per requirements. They generally hesitate to participate in discussions held in English, hence unable to share their expertise/knowledge. However when discussions are held in Urdu they actively participate and come up with brilliant ideas. Often unable to deal with international clients.	Have average to good Urdu skills, but only able to read write and understand simple Urdu language. However unable to prepare report with details or instructions for workers and need assistance of superiors. They lack English language skills hence dependent on senior staff in all kinds of communication in English. Reading and writing in simple English is rarely available. However some are able to read and follow simple instructions due to the regular usage of it. The clerical staff is mostly involved in recoding data on set format, however unable to develop short reports/summary on the data they collect. Hence their work is mostly restricted to data collection and not reporting. The plant and machine operators are unable to read and understand operating manuals/health and safety etc. in English language. Recipes/instructions for craft related workers (KARIGARS) are often prepared and explained either in URDU or Punjabi.	The employees in this group are mostly illiterate or have very low level of education. Hence majority lack the reading and writing skills. The level of speaking, listening and understanding is also very low, key reason being the diverse dialects prevalent in Punjab, especially amongst the females from rural population. They are unable to read simple instructions, signs etc. at work place, record attendance, perform their signature, unable to read notice boards etc. Hence generally engaged in performing work that requires physical strength or simple/monotonous work with low level of communication skills required.

Job Groups	Professional/ Managers	Managers /Technical Professionals	Clerical And Support Workers/ Service And Sales Workers Craft And Trade Related Workers Plant And Machine Operators And Assemblers	Elementary Occupations
SQA Skill Level	6	5	4	3
Numeracy Skills	Numeracy Skills - Required	Ability to apply a wide range of numerical and statistical skills to solve complex work related problems, extract, analyze and interpret information from complex graphical forms such as qualitative graphs, histograms, graphs showing relationships or complex variables, graphs requiring interpolation and extrapolation and extract, analyze and interpret information from complex graphical forms The fresh graduates lack expertise in applying the theoretical knowledge gained into practical experience as per company's requirements. The experienced staffs though skilled take time to understand and make use of the skills required by their company.	Ability to apply a wide range of numerical skills to solve work related problems, interpret information from a series of straightforward related graphical forms such as tables, graphs, charts or diagrams and select and use appropriate graphical format required at work place. Generally possess good numeracy skills at all levels however room for improvement is always there.	Ability to recognize numbers , carry out a variety of simple number tasks involving calculations requiring one or two steps, read and use simple scales or measuring instruments and read and extract information from graphs related to work With no/ low level of education many employees at this level are even unable to recognize numbers. This is common amongst female employees. The employees are even unable to calculate their wages and this often creates issues. However, they have recognitions for various denominations of local currency and able to count it. Majority able to perform simple additions and subtractions and not more than that. They don't even know the use of simple calculator, measuring scales etc.
	Numeracy Skills - Gaps	Ability to carry out a range of complex ICT activities related to which involves application software, entering, processing and output of data. Generally good but lack required skills and depend on the guidance of the ICT department or outsource the ICT activities (selecting hardware, software etc.). Lack knowledge on latest software /technologies related to FP available and how to make best use of it.	Generally good at numbers, but lack knowledge and experience of using measuring devices /tools in food processing sector. The employees are generally trained while on the job on the use of these scales. The knowledge on use of graphical presentation – reading, interpreting and usage is limited. Majority learn the skill while on the job on the use of these scales. The knowledge of use of graphical presentations- reading, monitoring, interpreting is very limited and gained through practical experience while performing the job under close supervision- the job is often performed without understanding initially and gain expertise over period of time The Clerical staff are limited to work on recording attendance, calculating salary /wages , estimating material requirements at store level etc.	Ability to carry out simple ICT activities related to work, which involves using menu/list-based applications software. Completely lack knowledge on the use of computers at work place.
ICT	Skills - Required	Ability to carry out a range of non-routine ICT activities related to work which involves application software.	Ability to carry out a range of straightforward ICT activities related to work which involves application software.	Ability to carry out simple ICT activities related to work, which involves using menu/list-based applications software.
	Skills - Gaps	Good command of ICT skills in current positions at work place and majority perform work efficiently. Often support the senior staff (at level 4) in performing their work efficiently However, knowledge on optimum use of ICT capabilities applicable to FP sector is still lacking.	Limited knowledge on the use of computers on activities related to work.	Completely lack knowledge on the use of computers at work place.

Job Groups	Professional/ Managers	Managers /Technical Professionals	Clerical And Support Workers/ Service And Sales Workers Craft And Trade Related Workers Plant And Machine Operators And Assemblers	Elementary Occupations
SQA Skill Level	6	5	4	3
Problem Solving	Skills - Required	Ability to investigate and analyze complex problems related to work	Ability to investigate and analyze why non-routine problems in workplace arise and solve them accordingly.	Ability to investigate reasons why simple problems related to work arise and ability to plan organize and resolve them.
	Skills - Gaps	Need an in-depth knowledge of problems of different nature that arise /may arise in FP sector at various levels and plan in advance on how to handle the unforeseen situation.	The staff at this level should be fully aware of the problems that arise at all levels, the nature of problems, ability to develop understanding – how, when and why it happens/happened. Develop plan to handle the situation if arisen in future and train others to handle the situation if arise in future.	Low level of understanding on how, when and why problems arise and how to deal with it effectively. Generally perform same mistakes again and again and do not learn from previous mistakes. Unable to independently handle same /similar situations if arise again and again.
Working with others	Skills - Required	Ability to work co-operatively with others to analyze and organize the requirements of their own role and the roles of others. Negotiate working methods, modify their behavior, and motivate themselves and others to progress towards a common goal.	Ability to work co-operatively with others and identify their main roles within workplace, what role/tasks do they have to perform and how these relate to others.	Ability to work co-operatively with others and identify his/her role and how it relates to the roles of others.
	Skills - Gaps	Generally have low level of interaction with lower levels but there is a need to know how important is to interact at all levels.	Majority of the staff is quite helpful and work cooperatively with peers, superiors and subordinates and support in all respect. Training and guidance is a continuous process for those willing to learn	Generally the staff is very caring and helps the new comers in performing their work well in all respect.

TABLE 5: SKILLS REQUIRED –SKILL GAPS (NON SECTOR SPECIFIC SKILLS)

Non Sector Specific Skills	Skill Level 4	Skill Level 3	Skill Level 2	Skill Level 1
Skills Required –Skill Gaps	Professional	Managers	Clerical And Support Workers	Elementary Occupations
	Managers	Technicians And Associate Professionals	Craft And Trade Related Workers	Plant And Machine Operators And Assemblers
Research and Development Skill- inability to create new products; inability to create new product using existing technology; lack of expertise in new product development on latest available technology ; inability to propose new investment decisions for the plant ; change workplace practice	✓	✓	✓	
Food Technologist/Food Chemistry/Bio technologist/Food Processor/ Food Preservation Expert- unable to find trained and experience staff in the field	✓	✓		
Food Quality Assurance /Quality Control - Inadequate knowledge of ways of maintaining the quality of produce, maintain consistency in product quality all the times; lack knowledge of food legislation and control; food tasting ability to gain consistency in taste and overall quality	✓	✓	✓	
New Product Development Skill/Copying Recipes- Inability to create new and unique products ,develop samples for tests , increase product's shelf life, improve on taste while keeping costs low; achieve the same product quality at a lower cost, improve the quality of product, ensuring that the final product is more consistent; in ability to copy recipes	✓	✓	✓	
Product Knowledge- Inadequate knowledge of cost effective methods used to produce a product; inadequate knowledge of increasing shelf life of produce; lack basic food handling techniques; poor knowledge of making use of by products/wastages during production process		✓	✓	
Sale And Marketing Skills - Lack expertise in customer service, understanding and solving customer problems and handling difficult customers; lack merchandizing skills	✓		✓	
Procurement Skills- In ability to forecast demand; poor negotiation skills; inability to maintain good link with the producers/suppliers; lack negotiation skills	✓	✓		
People Management Skills/Training Skills/Coaching Skills - Lack of skills to train staff; inability to effectively communicate with the team and brief them of production objectives/techniques; inadequate team handling and workers handling skills		✓	✓	✓
Supervisory Skills - Inadequate planning of work schedules/ plan production schedule; inadequate team handling and worker handling skills; inability to handle breakages/breakdown in plants/machines parts		✓		✓
Technical Skills- lack of awareness of latest technology/best practices in use because of lack of training; lack practical exposure and access to other information sources hence unable to apply technical expertise in actual work situations		✓	✓	✓
Plant Operating Skills- lack knowledge on how to start up and shut down plant, operate multi-stage operations, carry out product changeovers , carry out task -hand-over; inadequate knowledge of plant handling, plant controls; lack knowledge on plant repair , maintenance and sanitization ; inability to tackle breakdowns		✓		✓

Sector Specific Skills Processed Foods		Skill Level 4			Skill Level 3			Skill Level 2			Skill Level 1		
		Professional	Managers	Managers	Technicians And Associate Professionals	Clerical And Support Workers	Service And Sales Workers	Craft And Trade Workers	Plant And Machine Operators And Assemblers	Elementary Occupations			
	Skills Required –Skill Gaps												
Edible Oils and Fat	pieces, pulping techniques ; unable to ensure that the products are transferred to the next stage in the process Knives /Cutting Instruments Handling Techniques - various types of knives and cutting instruments used to perform the cutting operations according to requirements; peel by hand using knives or peelers, or using small peeling machines; sharpening knives and cutting instruments; sanitizing knives; storing knives safely; lack of knowledge of storing cutting equipment safely when not in use; sharpening of cutting equipment as required to maintain their effectiveness as a cutting tool.								✓	✓		✓	
	Preparing Of Work Station – lack knowledge on how to preparing work station for performing operations and how it makes easier to perform the task; unwillingness to keeping workstation clean even after work; inefficient and untimely disposal of waste; make equipment and work station ready for future use after the completion of the work required								✓	✓		✓	
	Technical Knowledge Of The Products – lack technical knowledge of processes involved in oils and fats manufacturing, their properties and usage, explore all aspects of the essential ingredients, refining and modification of edible oils for different end applications. oil blending process			✓	✓				✓				
	Oil Expeller Operating Skills- lack of technical know-how on the use of Oil expeller machine and associated aspects with its maintenance, repair etc.				✓				✓				
Beverage Production	Bottling Skills- bottle sanitization and bottle filling techniques, (besides common skills required in fruit handling techniques as mentioned in Processed Food)								✓				

TABLE 7: SKILLS IN DEMAND AND POSSIBLE FOCUS AREAS IN SKILL BUILDING

Skill Level	Job Group	Nature of Work Performed and Desired Skills	Training Requirements
Skill Level 1	Elementary Jobs	The employees are generally raw (JUTT) with no previous experience and in many cases hired as trainee. They generally perform routine tasks that are manual in nature (washing, cleaning, cutting, kneading, and packing etc.) or that requires physical strength (loading, unloading, deep cleaning etc.). Employees mostly work under direct supervision and within the limits of the relevant training undertaken for machinery /equipment/tools used while at the job The employees at this level are desired to possess physical capacity to perform the assigned duties; able to carry out simple routine tasks requiring manual dexterity; basic literacy and numeracy skills; ability to understand and carry out simple verbal instructions. The employers look for employees with basic knowledge of food hygiene and understanding of basic quality control procedures.	Vocational Trade Courses at Vocational Training Centers Customized Training for In-Service Workers
	Sales and Service Workers	The employees at the retail outlets (bakers and confectionery) are responsible for the display and sales of goods and recording of sales. Employers look for multi skilled staff capable of managing routine functions at the retail outlets- display, sales, customer handling, delivery of bulk orders , customized packing etc.	Vocational Certificate Courses at Vocational Training Institutes 1. Basic Level 2. Intermediate Level 3. Advance Level Customized Training for In-Service Workers
	Craft And Trade Related Workers	The craftsmen possess specific skill to perform the job/create a product. Most of the task are creative in nature (cake decoration, cake Icing, creating new recipes for Mithai/bakery and confectionery items/ creating new recipes for dry snacks and Nimco products, achar, chutneys etc.). The crafted related workers mostly perform their tasks either by hand or hand powered tools. There are locally made machines specially designed for the craftsmen/craftswomen are now being used to reduce the amount of physical effort and amount of time required to perform the tasks. They are also responsible to train their assistant/helpers while at job. Expertise are not only gained by performing the job again and again but also by the secrets shared by their "USTAADs" to perform the job accurately and making them learns from the mistakes made. Employers look for multi skilled "KARIGARS" with expertise in their field .Other skills employers look for, are the ability to create new products, efficient use of resources, ability to work independently and as group , train the assistant/helpers, cause minimum wastage. The employers feel a strong need for craft related workers to be conversant with Good Hygiene Practice and Good Manufacturing practice, knowledge of how to work safely in the work environment and ability to deal with unforeseen events such as fire/accidents. Knowledge of First Aid in food processing industry is also desired.	Vocational Certificate Courses at Vocational Training Institutes 1. Basic Level 2. Intermediate Level 3. Advance Level Customized Training for In-Service Workers

Skill Level	Job Group	Nature of Work Performed and Desired Skills	Training Requirements
Skill Level 3	Plant And Machine Operators And Assemblers	Employees at this level are responsible for operating the plant/machinery involved in the production process. In most cases the operators are also required to clean/sanitize and perform minor repair and maintenance too. The plant /machine operators have mostly gained expertise while being at the job for long. The senior operators are often responsible to train their assistants/helpers and other staff by making them work under close supervision. Expertise is gained by performing the task repeatedly. The employers feel a need that the machine/plant operators , besides being physically fit to operate a machine should be able to read and understand the written policies and guidelines to operate the plant/machine, maintain simple records and prepare simple reports where desired. They should be able to follow detailed written instructions and procedures (operating manuals where there is one) and have an understanding of product and process specifications applicable to the work. Employers mostly look for technical skills to operate the plant and perform routine and standard functions associated with it (cleaning, minor repairing & maintenance). Ability to train /pass on knowledge to sub-ordinates is also desired.	Technical School Certificates at General Secondary Schools Vocational Certificate Courses at Vocational Training Institutes 1. Basic Level 2. Intermediate Level 3. Advance Level Customized Training for In-Service Workers
	Technical and Associates Professional	Food scientist and researchers are required to posse's masters or doctoral degree and are hard to find. With limited education and training opportunities in food processing few opt for building career in food processing. The industry demand is currently being met by either Diploma/certificate holders or employees who have gained expertise due their long association in the field, but this too is scarce. A strong need is felt to develop the good quality food researchers, product developers, quality assurance and quality control technicians, food preservers, food processors etc. Quality Management being a regulatory requirement in the food processing industry and for obtaining certifications, the demand for qualified Quality Assurance employees demand is increasing and will see a rise in future too.	Diploma of Associate Engineering B.Sc. In Food Technology and Food Technology M.Sc. In Food Technology and Food Technology

15.4.2 Today the food and beverage industry in Pakistan is experiencing a significant change in its workforce profile; technological advancement in production process operatives being key factor. As the presence of technology is increasing, more and more workers are now operating machinery. Hence, a considerable shift in production workers from Skill Level 1 to Skill level 2 has been reported. According to the current survey with 185 firms around 2 out of every 3 worker is employed at this level.

15.4.3 Our research at this stage indicates a scarce supply of skilled and precision worker across all sub sectors under study. As the presence of technology is expected to increase, their demand is also expected to rise in future.

15.4.4 Less skilled laborers generally start as helpers to experienced workers and learn the skills on the job. Many less skilled jobs are learned in a few days or a week. The present research indicates an ample supply of raw labor. The employee turnover at this level is also reported to be very high.

15.4.5 Training options for elementary level jobs will not only provide better opportunities to the employees by giving them an edge on raw laborers but will create awareness on how they can build up their career in Food Processing industry.

15.4.6 On the other hand it will become easier for employers who look for good, reliable and willing workers by hiring trained staff from reputable training institutes. It will save them the cost of recruitment and training which a continuous process is for them at present.

15.4.7 The suggested areas for skill building are summarized in Table 8 for Non-Sector Specific Skills and in Table 9 for Sector Specific Skills.

TABLE 8: SUGGESTED AREAS FOR SKILL BUILDING- NON SECTOR SPECIFIC SKILLS

Segment In Food Processing	Skills in Demand	Suggested Areas for Skill Building - Non sector Specific Skills
All Segments In Food Processing	Fundamental Skills/Soft Skills	- Communication Skills -ability to communicate in regional language (Punjabi, Sariaiki) with basic understanding of Urdu. Able to listen and follow instructions, share information with others and ask for clarifications where required, communicate workplace information - Literacy Skills- ability to read and write simple Urdu , read instructions related to work , follow and understand signs, record attendance, sign simple document related to work (attendance, wages slip receiving/dispatching goods etc.) - Numeracy Skills- ability to recognize numbers, work with simple number, make simple calculations, ability to make use of simple scales and other measuring devices at work place , take and record basic measurements . - ICT Skills -Basic Knowledge on the use of computers at workplace - Thinking and solving problems - ability to assess the situation and come up with a proper solution, ability to implement the solution/take corrective measures, discuss the problems with others to find a proper solution, ability to take timely decisions - Work effectively with Others , being responsible, being adaptable, team working etc. - Developing working relationships with colleagues
	Research And Development , Quality Assurance	- Food Science, food processing and preservation - Food micro Biology, Food chemistry - Fruit and vegetable , cereal, baking, sugar and confectionery . oil and fat, beverage processing technology - Food engineering - Quality Control - Food Packaging - Waste management - Plant management - Hygiene Management
	Food Processing And Preservation Technology	
	Training Skills	- Ability to train staff –instructive skills, coaching, mentoring - Understand how learning/training opportunities can be provided to staff in the current situation - How to assess the candidates performance through observation and by using range of methods
	Plant/Machine Operating Skills	- How to start up and shut-down the plant and equipment - Basic understanding of working with multi stage operations in plant - Understanding of product changeovers - Carry out task handover procedures - Maintaining record of production operations - Minor repair and maintenance /preventive maintenance - Washing, sanitizing, drying of plant and equipment - Disinfecting plant and equipment

Segment In Food Processing	Skills in Demand	Suggested Areas for Skill Building - Non sector Specific Skills
		Diagnosis of production problems, identifying and implementing solutions
All Segments In Food Processing	Basic Tool Handling Skills In Food Processing	- Knowledge of various tools used in FP sub sectors and its use - Selecting right type of tool for each task - Cleaning , maintenance and safe storage of tools and equipments
All Segments In Food Processing- Retail	Sales And Marketing Skills Store Managing Skills	- Set up and maintain retail operations - Order Processing/sales - Managing cash - Operating Point of Sales - Customer handling - Store Display and Presentation - Product handling - Product Packing /Innovative Packing - Maintain hygiene at retail outlets
All Segments In Food Processing	Packing Skills	- Basic understanding of various types of packing used in FP sector - Types of machines used for each type of packing and how it works - Techniques in filling, sealing, labeling, wrapping, packing, pelleting - Manual packing skills - Use of various types of scales in use - Packaging, storage and distribution
All Segments In Food Processing	Transportation Of Products	- Lift , transfer and position load - Maintain security and safety while loading / unloading - Safe loading and unloading of consignments - Efficient handling of transport - Time management and route management skills
All Segments In Food Processing	Food Safety Management , Food Hygiene And Food Safety Control	- Maintaining personal hygiene - Understanding of sourcing raw materials and ingredients from safe sources - Food safety - Hazard analysis and Critical Control Points (HACCP) - Workplace safety standards - Cleaning in Place (CIP) - Avoid contamination of food - Carry out disinfections - Efficient disposal of waste - Hazard analysis and Critical Control Points (HACCP) - Food safety supervision
	Good Hygiene Practice And Good Manufacturing Practice	

Segment In Food Processing	Skills in Demand	Suggested Areas for Skill Building - Non sector Specific Skills
		- Food preservation techniques for various types of products - Freezing methods - Blanching Methods - Acid dips - Salt dips - Drying
All Segments In Food Processing	Food Preservation Techniques- Basic Skills	- Knowledge of various categories of raw material used in FP - Knowledge of various categories of other ingredients used in FP - Cleaning /washing of raw material/ingredients - Knowledge of storage of raw material and ingredients used - Traditional storage methods in use - Type of shelter/space required - Moisture/humidity control - Temperature /light control
All Segments In Food Processing	Cleaning Of Raw Material And Ingredients In Use And Their Storage	- Plan and organize work activities - Optimize work area - Prepare work station before work - Cleaning of work station after completing the work - Waste minimization - Control energy efficiency - Control water wastage - Control wastage of raw material
All Segments In Food Processing	Plan And Organize Work Stations And Efficient Usage Of Resources	

TABLE 9: SUGGESTED AREAS FOR SKILL BUILDING - SECTOR SPECIFIC SKILLS

Segment In Food Processing	Skills in Demand	Suggested Areas for Skill Building - Sector Specific Skills
Processed Food- Value Added Fruits And Vegetables And Intermediate Products, Juices, Agri Based Products- Fruits And Vegetables	Performing Cleaning, Grading, Sorting And Cutting Operations On Fruits And Vegetables	• Washing of fruits and vegetables • Visual examination of fruits and vegetable • Principles of sorting and Grading of fruits and vegetable • Peeling, slicing, wedging, coring, chopping techniques • Knowledge and usage of tools used in peeling, slicing, wedging, coring, chopping techniques • Safe handling of tools/equipment • Cleaning, washing, sanitizing of tools /equipment • Minimizing wastage
Processed Food- Value Added Fruits And Vegetables And Intermediate Products	Craft Related Skills	• Achar/chutneys and murabba making and preservation techniques • Jam, jellies, marmalade making and preservation techniques • Pulp preparation/production, storage, preservation
Processed Food-Edible Oil And Fats	Industrial Processing Technology Of Edible Oil And Fats – Basic	• Types of oil crops • Raw material preparation • Raw material inspection • Methods of extraction for different oils • Oil clarification and refining process • Process control in oil expelling • Operator training, hygiene and sanitation • Uses of by-products • Process control and the correct operation of equipment • Operator training and hygiene. • The condition of the building and routine cleaning programs • Product quality. • Correct fill weights and scaling of packs • Control over storage and distribution
Processed Food-Beverages	Basic Beverage Technology	• Receiving, sorting and storing raw ingredients • Batch making • Weighing, measuring and mixing raw ingredients • Performing product quality and packaging sampling • Operating mixing, treating, grading, drying, crushing, carbonating, bottling and packaging equipment and machinery • Preparing packaged product for storage, distribution and sale • Sterilizing and performing general maintenance duties on equipment and machinery • Keeping records of stocks.
Bakers And Confectioners - General Bakery Products/Bakers	Basic And Advance Baking Techniques- Product Creation	• New product development • Basic and advanced baking techniques • Cake decoration

Segment In Food Processing	Skills in Demand	Suggested Areas for Skill Building - Sector Specific Skills
Bakers And Confectioners - General Bakery Products/Bakers, Biscuits And Other Dry Products	Basic And Advance Baking Techniques- Processing And Operation	• Icing techniques • Puff pastry making and working with pastry dough • Bread making • Biscuit and cookie making • Other bakery related items • Knowledge on increasing shelf life of baked product • Oven operating skills - operating baking equipment and ovens to bake bread, sponges, cakes and cookies • Knowledge of ingredients and its uses • Selecting, ordering and storing ingredients • Knowledge of tools and utensils and its uses • Measuring ingredients/use of scales • Batch making • Dough making/working with fermented dough • Batter making • Mixing, kneading, molding, shaping and decorating dough and pastries • Preparing and inserting fillings for tarts, biscuits and cakes • Identifying and rectifying process faults
Bakers And Confectioners- Retail	Hand Packing Skills For Various Occasions/Customized Packing Skills	• Preparing Order for dispatch • Manual Packing –making boxes (enfoldng). Filling, labeling, wrapping, sealing, putting on price tags, carton filling, stacking • Knowledge of basic types of packing machines • Use of various types simple machine for packing • Innovative ideas of for various occasions – (engagement, mehdi, mayun, baby shower, bridal shower, Eldetc.) • Packing of Corporate Gifts
Bakers And Confectioners - Ethnic Sweets	Craft Related Skills- KARIGARS	• Multi Skilled – create variety of products • Mithai/halwa making with garnishing techniques • New product development : following/copying recipes • Efficient usage of by products • New product development keeping costs low • Knowledge of working on Chenna (khoya/hung curd) khoya preservation techniques • Ability to train assistants /helper
Bakers And Confectioners - Other Confectionery Items (Sweets, Candies, Chocolates, Gums)	General Skills/Operating Skills –Level 3 And 4	• Weighing and measuring ingredients, mixing, boiling, dissolving, kneading, molding, shaping and decorating lollies and chocolate • Operating machinery and equipment • Monitoring the temperature and pressure in cookers • Monitoring batch consistency and quality • Sorting, inspecting and tasting finished products • Maintaining hygienic equipment and working areas • Packaging product.
Agri Based Products- Fruits	General Skills –Level 3	• Knowledge /technique used in cleaning different types of fruit/vegetable

Segment In Food Processing	Skills in Demand	Suggested Areas for Skill Building - Sector Specific Skills
And Vegetables,	And 4	• Sorting and grading of fruits and vegetable • Solutions to increasing shelf life of fruits and vegetable • Basic skills in fruit and vegetable preservation techniques • Packing techniques to increase shelf life • Storing of fruits and vegetables • Safe Transportation
Agri Based Products- Sugar	General Skills –Level 3 And 4	• Receiving, sorting and storing raw sugar cane • Operating machinery and equipment like conveyor belts, rollers, shredding, boiling, filtration, evaporation, crystallization and drying processes to extract juice from sugar cane • Transporting sugar cane, juice and crystals through the mill using trucks and mill trains • Packaging sugar crystals for sale and distribution • Carrying out routine maintenance on equipment and machinery • Sterilizing equipment and machinery and maintaining a hygienic working environment
Agri Based Products- Grains And Pulses	General Skills –Level 3 And 4	• Types of grains and pulses • Cleaning methods • Splitting techniques • Polishing of grains/pulses • Storage
Agri Based Products-Rice	General Skills –Level 3 And 4	• Type of processes/steps in rice milling • Types of plant/machine/equipment used in rice milling and how to operate it • Rice mixing a per requirements • Bagging the milled rice • Managing the by-products.
Agri Based Products-Flour	General Skills –Level 3 And 4	• Intake/sampling of raw material for milling • Principles of wheat and wheat flour laboratory testing and conducting tests • Control screen room process, gritting in milling • Knowledge of break system, scratch system, reduction • Knowledge of measurement and process control in milling. • Control flour blending, flour specifications and quality assurance • Flour packing, storage and dispatching and handling grains in bulk

15.4.8 According to the current survey, less the 10% of the total workforce comprised of women workers. Of these, 1 out of every 4 women was involved in performing tasks that were menial in nature. The rest (3 out of 4) were involved in work that required high level of dexterity.

15.4.9 Since women are entering a much wider range of jobs – both at higher levels as well as lower level and excel in their field, it is suggested that training opportunities should not be limited to packing skills and food processing and preservation skills; cross the

boundaries (to skill level 3) and create prospects for building career in Food Science, Food Research and development, Food Quality Assurance and Control, Food Safety and Hygiene Management etc.

15.4.10 The skills where women can be trained and create demand for themselves as are presented in Table 10.

TABLE 10: AREAS FOR SKILL BUILDING FOR WOMEN

Non Sector Specific Skills		Sector Specific Skills
Fundamental Skills/Soft Skills		Craft Related - Hand Packing Skills For Various Occasions
Research And Development , Quality Assurance		Craft Related -Basic Baking Skills
Food Processing And Preservation Technology		Craft Related –Advance Baking Skills
Food Safety Management		Craft Related – Industrial Baking
Food Hygiene And Food Safety Control		Craft Related - Cake Decoration, Icing, Topping
Good Hygiene Practice		Craft Related -Mithai / Halwa Making
Good Manufacturing Practice		Craft Related -Achar, Chutneys, Murabba , Sauces, Squashes Making
First Aid In Food Processing		Craft Related- Dry Snacks And Nimco Making
Training Skills		Craft Related- Packing At Retail For Special Occasion
Plant/Machine Operating Skills (That Does Not Require Physical Strength)		Craft Related- Basic Food Preservation Skills
Basic Tool Handling Skills In Food Processing		At Retail Level -Store Managing Skills (Bakers And Confectioners, Sweet Meat Merchants)
Sales And Marketing Skills -Store Managing Skills		Cleaning Of Raw Material And Ingredients In Use And Their Storage
Plan And Organize Work Stations And Efficient Usage Of Resources		Plan And Organize Work Stations And Efficient Usage Of Resources
Cleaning Of Raw Material And Ingredients In Use And Their Storage		Performing Cleaning, Grading, Sorting And Cutting Operations On Fruits And Vegetables; Of Other Raw Material And Ingredients
Packing Skills		Performing Washing Of Fruits And Vegetable And Other Raw Material And Ingredients
Fork Lift Operating		Performing Elementary Tasks In Baking – Weighing, Sieving, Beating, Mixing, Lining Molding, Dividing , Ball Making, Shaping, Rolling, Cutting, Kneading , Topping
Transportation Of Products		Performing Elementary Tasks In Mithai Making - Weighing, Sieving, Beating, Mixing, Cooking On High Flame, Managing Bulk Cooking, Garnishing , Cutting, Shaping, Ball Making, Disc Making , Syrup Making

Source: http://publications.cta.int/media/publications/downloads/1684_PDF.pdf (source: http://www.agrifoodskills.net.au/page/sugar_mill)

Source: QD.R Suite 311 FIS .v.1.2.01/10/13 Knowledge and Skill Requirement for careers in Food Industry

Lahore Office:

House. No: 125, Abu Bakar Block,
New Garden Town, Lahore
Phone: 042-35913540-41
Fax: 042-35913539

Bahawalpur Office:

House. No: 14 - C4 Shabir Shaheed
Road, Model Town A , Bahawalpur
Phone: 062-2889934, 062-2889935
Fax: 062-2889937 info@psdf.org.pk
Web: www.psdf.org.pk



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