



الجمعيّة العلميّة المَلَكِيّة  
Royal Scientific Society

## Resource Efficient and Cleaner Production (RECP) Self-Assessment Checklists for Jordanian Micro-Sized Vegetables and Fruits Production



Implemented by

**giz** Deutsche Gesellschaft  
für Internationale  
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# **This tool was designed and developed as part of “Design and Development of New Resource Efficient and Cleaner Production (RECP) Service Packages for Small and Micro Food Enterprises” project**

Water, Environment and Climate Change Centre (WEC)/Cleaner Production Unit (CPU)

National Energy Research Centre (NERC)

Royal Scientific Society (RSS)

With the support of the “Employment-oriented MSME Promotion” project implemented by the Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

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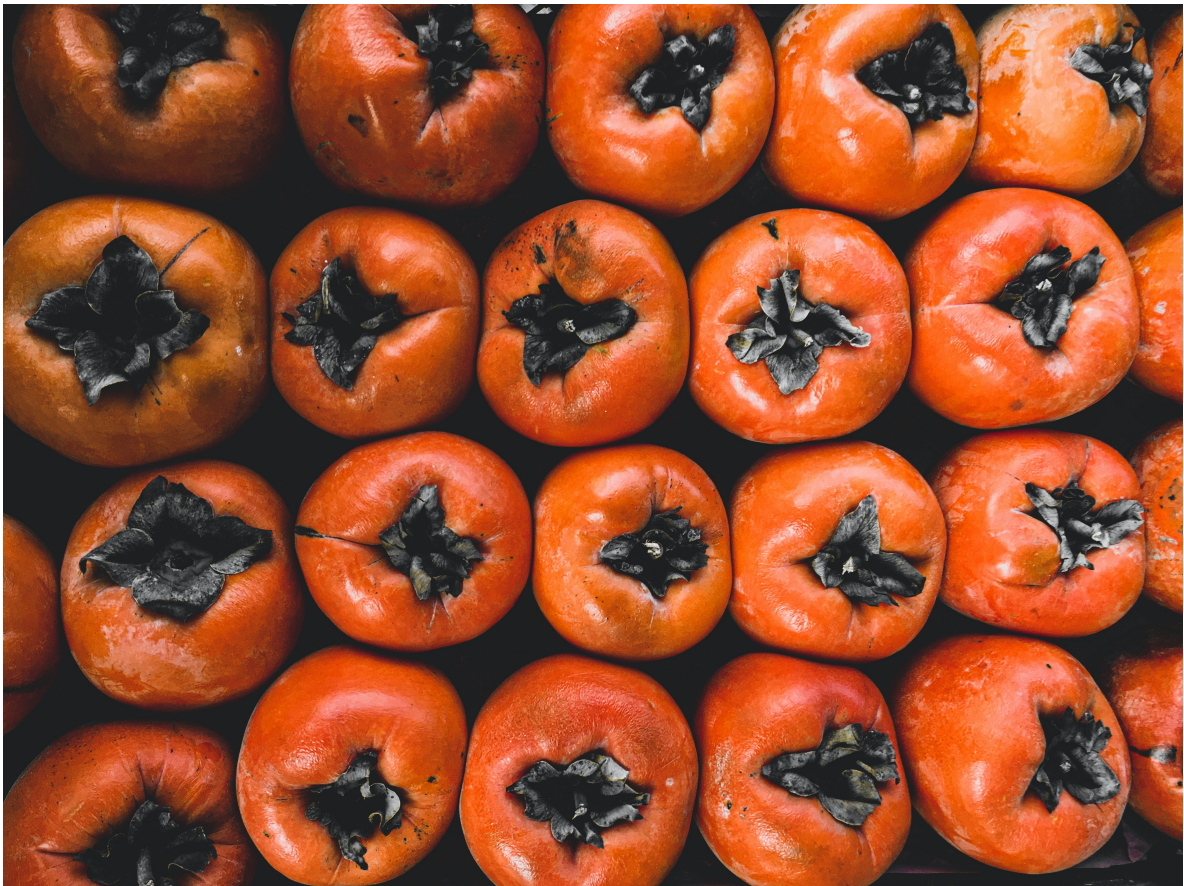
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# Introduction

This Resource Efficient and Cleaner Production (RECP) Self-Assessment Checklists for **Vegetables and Fruits** industries were developed by the Cleaner Production Unit (CPU)<sup>1</sup> and National Energy Research Centre (NERC)<sup>2</sup> at Royal Scientific Society (RSS)<sup>3</sup> – Jordan in cooperation with STENUM<sup>4</sup> and national food experts<sup>5</sup>. This initiative was supported by the “Employment-oriented MSME Promotion” project implemented by the Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)<sup>6</sup> to support Jordanian micro-scale industries to become more competitive by increasing efficiency and productivity, while also reducing environmental impact through implementing RECP. RECP aims at promoting the shift toward sustainable consumption and production (SCP) in Jordan.

This self-assessment checklists are designed to be used by the business owners of micro-scale vegetables and fruits industries including home-based businesses in Jordan (4 employees or less) to help them to identify simple and practical RECP measures that can be undertaken to reduce the cost of production and enhance the enterprise’s overall productivity. The checklists cover the following areas:

- General personal hygiene & food safety
- Good housekeeping practices
- Knowledge and know-how
- Information system
- Efficient use of water
- Efficient use of materials
- Efficient use of energy

External RECP experts are required to assist the company to implement the RECP assessment, while this checklists are helpful to be utilized as a tool in the RECP service in addition to their benefit (if used alone) to raise the awareness of the industries toward main issues that may directly or indirectly affect their resource efficient performance.

RECP is a preventive, systematic and continuous improvement approach which minimizes the generation of non-product output at the sources through efficient utilisation of technical/economic and natural resources in the industrial processes, accordingly; assist the industry to prevent or reduce the generation of wastes and emissions, enable it to comply with the environmental regulations and achieve environmental and economic benefits at the same time.

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<sup>1</sup> [www.cp.org.jo](http://www.cp.org.jo)

<sup>2</sup> [www.nerc.gov.jo](http://www.nerc.gov.jo)

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<sup>6</sup> [www.giz.de/en/worldwide/75975.html](http://www.giz.de/en/worldwide/75975.html)



**Do you know that increasing the temperature in a chilled room by 1 °C will reduce energy cost by 4%?**

**If you leave water running from a hose with 1/2-inch outlet diameter, the loss will be 2.5 m<sup>3</sup> per hour!**

**Do you know that by using a bucket and a wristwatch you can characterize such losses?**

RECP is a first step to continuous improvement of the company's operations. It will assist the company to:

- Optimize the utilization of resources and minimize the generation of waste and pollution.
- Create the awareness and knowledge in the field of resource efficiency and build the company's capacity on RECP approach.
- Reduce production cost by minimizing non-product output, and accordingly being able to increase competitiveness and market share.
- Increase the efficiency of production and productivity through better utilization of materials, water, energy, equipment, labour and time, better production planning, more efficient supply chain and waste re-use and recycle.
- Improve health, safety and morale of employees.
- Improve cost accounting/pricing and monitoring systems in addition to the information and management systems for better tracking of resources utilization.
- Being recognized as green industry that can apply for available national resource efficiency initiatives such as the related financing programs, awards and incentives.

The following generic RECP strategies/principles can support the identification of options for any production company.

- Good housekeeping
- Segregation of generated wastes
- Input material change
- Process, technology or production change
- Improved process control
- On-site reuse/recovery or/and recycling
- Production of useful by-products
- Modification of equipment or products.



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# RECP self-assessment checklists

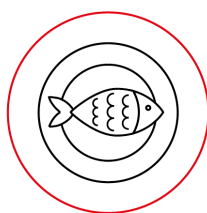
## General personal hygiene & food safety

Good Personal Hygiene and Good Health Practices implementation in food production cycle play an important role in food safety and the health and well-being of the consumers. Implementation of the food safety Five Keys during food handling process is essential to achieve high quality and safer food for the consumers, foodborne illness mostly results from neglecting those keys commonly caused by pathogens like bacteria and viruses and other microbiological, chemical, and physical hazards in raw materials, or end products, resulting as food poisoning out breaks in community.

**Food Safety Five Keys are:**



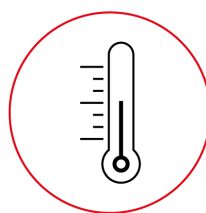
**Keep clean**



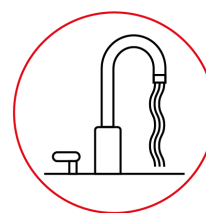
**Separate  
cooked &  
raw food**



**Cook food  
thoroughly**



**Keep food at  
safe  
temperatures**



**Use safe  
water & raw  
materials**



**Do you know that you have to stop food production when you feel sick or having any clinical signs related to contagious diseases like diarrhea or cough or skin irritations or any other epidemic illness?**

**Microbiological** hazards include bacteria viruses, parasites and environmental pathogens. **Chemical** hazards include food allergens, substances such as pesticides and unapproved food additives. **Physical** hazards include potentially harmful foreign matter that may cause choking, injury or other adverse health effects.

**The food safety and quality** are the wings of success in efficient resources management, and any defect in one of them will be a direct reason of product rejection by consumers, and unfortunately lead to decrease market value of the product, and fall to achieve the project goals, from aside, and face legal issues in the other side. The role of awareness manuals and technical assistant for those in charge of projects will guarantee to detect and solve any problem before selling then give safe and high quality products to consumers, and efficient resources management.



## General personal hygiene & food safety

Question	Answer (See Annex 1)
<p>Are production area and tools (floor, counters, cooking surfaces, sinks, bowls, pots, etc.) clean and sanitized? Is there bathroom and washing sink connected to the working area?</p>	
<p>What kind of materials (chemical, soap, water, etc.) do you use to clean and sanitize the surfaces used for ingredients processing and product packaging? Are they food grade materials?</p>	
<p>Are cleaning and sanitizing compounds stored away from the production area in closed place with an informative board?</p>	
<p>Is the kitchen or working area can be easily cleaned? Or there are some inaccessible spaces?</p>	
<p>Are the workers wearing clean clothes (gloves, clean apron, hair covers, etc.)? Do they change the gloves and wash their hands frequently?</p>	
<p>Do you eat, drink or smoke in the production area?</p>	
<p>Do you prepare foods for your family at the same time you are preparing food for your clients?</p>	
<p>Are pets or children allowed to enter the kitchen or the working area?</p>	
<p>How do you balance between the needed time to do your business and your family commitments?</p>	
<p>In case you have to prepare food in large quantities, do you ask for a help from other people who are not working with you permanently? How you make sure they are safe?</p>	
<p>Are raw materials or products stored in separate area from products and handled at proper storage conditions? Are they checked frequently?</p>	
<p>Are the products well packaged/wrapped to prevent cross contamination (Defined as the transfer of bacteria or other microorganisms from one substance to another that can happen during any stage of food production)?</p>	
<p>In case you have to transfer refrigerated products to the market, do you transfer them in mobile refrigerators? How do you control the container's temperature for long rides?</p>	
<p>What is the source of water (municipal water, potable water, rainwater) used in the production? How do you clean your water tanks?</p>	
<p>Are production area/storage areas contain insect traps? Do you use insecticides and rodenticides to control them?</p>	
<p>Once you receive fresh fruits and vegetables, do you check them for mould or rotten spot?</p>	
<p>Do you have disease free certificate for Health Authority? Do you have your national vaccination certificate?</p>	

## Good housekeeping practices

Good housekeeping practices are ongoing operation and the implementation of these practices is relatively easy and the cost is usually low.

Good housekeeping practices includes keeping working area clean and ordered, maintaining floors free of slip, providing adequate and proper layout for the whole production area, providing proper storage areas and removing the waste from production area.

Question	Answer (See Annex 2)
Are there noticeable spills or leaks? Is there any evidence of past spills?	
Are there damaged or defective containers, bags, etc.?	
Are the products labelled and the dates of production and expiry documented?	
Are the conditions of storage areas of raw materials and final products monitored and documented regularly?	
Is the production area (kitchen) well-designed and adequate for your present needs and planned expansion? Does it fit with licensing requirements, 15% of overall house's area?	
Do you have a plan for waste disposal?	
Do you monitor the consumption of fuels used for heating? Do you have solar water heating system?	
Are you aware of local regulations for establishing home-based food business?	
Do you primarily use water for cleaning (floor, kitchen's tools and equipment) in your business?	
Do you monitor and record the volume of water used in each production stage?	
Do you conduct regular cleaning and maintenance for water storage tanks?	
Do you monitor the monthly consumption of primary raw material?	
Do you evaluate and record waste quantities of the final products?	



### Knowledge and know-how

The well knowledge of the raw materials' quality, production processes and operating conditions, cleaning procedures and critical control measures that may affect the safety and quality of the products is very important to produce safe, high quality and competitive products and to reduce the generation of non-product outputs at source.

Question	Answer (See Annex 3)
Do you know the difference between cleaning and sanitizing?	
Are you and your staff aware of the requirements of food safety and personal hygiene?	
Do you know that most fruits are more acidic than most vegetables? And how could cause food poisoning?	
What is the source of your recipes?	
Do you fill the jam inside the jar while it is cold or warm?	
Do you know at which pH value and sugar content you can achieve the perfect texture of the jam?	
Do you face one of the following problems in fruit paste making? How do you solve the problem? <ul style="list-style-type: none"> <li>– Acidic taste</li> <li>– Formation of clots</li> <li>– Formation of liquid at the surface</li> <li>– Crystallization</li> <li>– Formation of mould</li> <li>– Wrong batch</li> </ul>	
At what temperature do fermented pickles take place? And how long it lasts?	
Do you know what could increase the shelf life of pickles?	



## Information system

The monitoring and regular evaluation of the raw materials' quality and consumption, energy and water consumption, production cost per each product, production processes, operating conditions, cleaning procedures and critical control measures that may affect the safety and quality of the products are very important to produce safe, high quality and competitive products and to reduce the generation of non-product outputs at source.

Question	Answer (See Annex 4)
Do you know the value and cost of having a good and accurate information system?	
Do you record the amount of raw materials and ingredients that are used in the production?	
Do you record the main processing conditions in the production process (i.e. time, temperature, etc.)?	
Do you record the daily cash used to buy raw materials, ingredients and packaging materials?	
Do you keep record for your daily sales?	
Do you know how to calculate your profit or loss?	
Do you know how to calculate the actual amount and cost of raw materials and ingredients used in the production?	
Do you know how to calculate your weekly or monthly production rate?	
Do you know how to do a comparative report for your monthly consumptions and sales?	
Do you know how to monitor and improve your business productivity?	



### Efficient use of water

Question	Answer (See Annex 5)
Do you primarily use water for cleaning (floor, kitchen's tools and equipment) in your business? How do you control the water consumption during the cleaning process?	
In which production steps do you use water? And what are the measures you implement to reduce the water consumption?	

### Efficient use of materials

Question	Answer (See Annex 5)
Do you primarily use water for cleaning (floor, kitchen's tools and equipment) in your business? How do you control the water consumption during the cleaning process?	
In which production steps do you use water? And what are the measures you implement to reduce the water consumption?	

## Efficient use of energy

Question	Answer (See Annex 7)
Do you monitor the monthly electricity bills and the monthly LPG bottles changes?	
When you leave your workday or break, do you leave electrical equipment or appliances on?	
Do you turn off the lights you are not occupying?	
Check if your lighting tubes are with "LED" type or not by doing the following quick test: 1. Turn off the light. 2. Turn on the light. 3. Note the fast response and stability of the light or not.	
What is the full capacity of the existing cookers? How much cooking times the cooker used daily?	
Do you check if the gas cooker's eyes are always clean?	
What is the age of used refrigerator? Check if it has an energy label.	
Check if the refrigerator is located near to heating sources (gas cooker, direct sun radiation, etc.)	
Do you have solar water heating system?	





### Evaluation of the improvement of resource efficiency performance

RECP emphasizes on continuous improvement. There should be periodic monitoring to determine whether positive changes are occurring after implementing the RECP assessment and resulted corrective actions to evaluate the level of achievement and take further action to improve the performance.

The typical indicators to evaluate the effectiveness of the implemented RECP actions are:

- Reductions in wastes and emissions per unit of production.
- Reductions in resource consumption (including energy) per unit of production.
- Improved profitability.

To evaluate the actual achieved savings from implementing the RECP actions, the company shall monitor some parameters such as the ones shown in the following table and compare them with baseline indicators of previous year to evaluate the performance progress and take necessary actions to sustain and improve it.

**Table 1: Performance monitoring**

Parameter	Unit of monitoring	Frequency	Current value	Pervious value	Evaluation/ needed actions
Raw materials consumption	kg/kg of products	Monthly			
Water consumption	l/kg of products	Monthly			
Fuel Consumption	No. of LPG bottles/kg of product	Monthly			
Electricity consumption	kWh/kg of products	Monthly			
Solid waste	gr/kg of products	Monthly			

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# Annex 1

## Benefits:

- Reduce losses in raw materials.
- Reduce losses in final products.
- Reduce amount of waste.
- Reduce the needed cost for production.
- Improve hygienic conditions.
- Earn and maintain the trust of the consumer.

Question	Actions to take
<p>Are production area and tools (floor, counters, cooking surfaces, sinks, bowls, pots, etc.) clean and sanitized? Is there bathroom and washing sink connected to the working area?</p>	<ul style="list-style-type: none"> <li>– Food contact surfaces shall be cleaned as frequently as necessary to protect against contamination of food.</li> <li>– All wastes should be placed in bins and not letting them accumulate on the floor.</li> <li>– Wastes should never be left in the production area overnight.</li> <li>– Clean the production area, toilets and washing facilities and stores every day.</li> <li>– Do not leave dirty equipment until the end of the day.</li> <li>– Keep the area around the production area clean and tidy.</li> <li>– Maintain optimal drainage system in the processing area and ensure abundant water supply for effective cleaning.</li> </ul>
<p>What kind of materials (chemical, soap, water, etc.) do you use to clean and sanitize the surfaces used for ingredients processing and product packaging? Are they food grade materials?</p>	<ul style="list-style-type: none"> <li>– No chemicals are recommended to be used to clean and sanitize food contact surfaces. Cleaning and sanitizing of food contact surfaces can be achieved by using water and soap. Then rinse them with chlorinated water.</li> <li>– Allow them to dry in the air, because wiping with cloths can re-contaminate them.</li> <li>– If cloths are used, they should be washed with detergent and boiled for 10 – 15 minutes to sterilize them. They should be hung on a line to dry. Coloured cloths should be used as coloured threads can be seen more easily than white threads if they are lost in tools or in the product.</li> <li>– Using brushes with coloured bristles is the effective way to clean the surfaces.</li> <li>– Product packages (glass jars) can be sanitized in an oven at 100 °C for 10 – 15 minutes or in boiled water for a similar time.</li> </ul>
<p>Are cleaning and sanitizing compounds stored away from the production area in closed place with an informative board?</p>	<p>All cleaning and sanitizing compounds shall be identified, held, and stored away from production area in a closed labelled place.</p>



Question	Actions to take
Is the kitchen or working area can be easily cleaned? Or there are some inaccessible spaces?	Inaccessible spaces in the production area will lead to the accumulation of dirt and organic matter and hence increase the chance of food contamination.
Are the workers wearing clean clothes (gloves, clean apron, hair covers, etc.)? Do they change the gloves and wash their hands frequently?	<p>All employees shall conform to hygienic practices to protect against contamination of food by:</p> <ul style="list-style-type: none"> <li>– Wearing gloves, clean apron, hairnets, headbands, caps, beard covers and mask.</li> <li>– Washing hands thoroughly (and sanitizing if needed) before starting work, after each absence from the work station, after touching raw food and at any other time when the hands may have become contaminated.</li> <li>– Don't work when you are sick, it is better to lose sales than to cause a foodborne illness.</li> <li>– Keep fingernails cut short.</li> <li>– Do not wear perfume or nail varnish as these can contaminate products.</li> <li>– Cover all cuts, burns, sores and abrasions with clean, waterproof plasters.</li> <li>– Don't wear rings or accessories during work it may fall in products.</li> </ul>
Do you eat, drink or smoke in the production area?	<ul style="list-style-type: none"> <li>– Do not eat food, chew gum, drink beverages or smoke inside the kitchen or working area.</li> <li>– Wash your hands and wrists thoroughly after eating, drinking or smoking. Dry them on a clean towel.</li> </ul>
Do you prepare foods for your family at the same time you are preparing food for your clients?	<ul style="list-style-type: none"> <li>– Do not cook at the same time in order to prevent cross contamination.</li> </ul>
Are pets or children allowed to enter the kitchen or the working area?	<ul style="list-style-type: none"> <li>– Keep pets, children and non-food workers out of the production area to prevent food poisoning, as a result from contamination.</li> <li>– Highly recommended to set aside time to finish your business or to separate the production area where you run your business from your own kitchen.</li> </ul>
How do you balance between the needed time to do your business and your family commitments?	Set aside time to finish your business or separate the production area where you run your business from your own kitchen.
In case you have to prepare food in large quantities, do you ask for a help from other people who are not working with you permanently?	<ul style="list-style-type: none"> <li>– Check the knowledge of the worker in food safety and proper food handling techniques.</li> <li>– Try to not involve the worker in the critical production processes.</li> </ul>

Question	Actions to take
How you make sure they are safe?	
Are raw materials or products stored in separate area from products and handled at proper storage conditions? Are they checked frequently?	<ul style="list-style-type: none"> <li>- Raw vegetables and fruit should be stored in a cool and dry store, highly recommended to store them in refrigerator especially vegetables as they are considered as medium risk foods.</li> <li>- Products should be stored off the floor in a cool, dark store that has good ventilation and protection against insects and rodents.</li> <li>- Store fried fruits away from heat and sunlight to avoid the development of a rancid taste in the product.</li> <li>- Store dried fruits and vegetables in a cool dry place away from sunlight. Protect fragile products from crushing.</li> <li>- Store pickles, sauces, jam, jelly or marmalade in cool dry place away from sunlight.</li> <li>- Store doors should not have gaps beneath them and should be kept closed to prevent insects and rodents from getting in and destroying stocks of product, ingredients or packaging materials.</li> <li>- All products should be well packaged/wrapped to prevent product contamination. The following are the more important general requirements of products packaging materials/containers: <ul style="list-style-type: none"> <li>- Must be non-toxic and certified food grade</li> <li>- Sanitary protection</li> <li>- Moisture protection</li> <li>- Air and odour protection</li> <li>- Light protection</li> <li>- Resistance to impact</li> <li>- Ease of opening</li> <li>- Ease of disposal</li> <li>- Low cost</li> </ul> </li> </ul>
In case you have to transfer refrigerated products to the market, do you transfer them in mobile refrigerators? How do you control the container's temperature for long rides?	<ul style="list-style-type: none"> <li>- Microorganisms can grow on chilled product if it is not kept cold.</li> <li>- Cross contamination can occur if different types of products are not segregated.</li> <li>- Products can be contaminated by chemicals, foreign bodies or a dirty vehicle.</li> <li>- While transporting the product make sure that: <ul style="list-style-type: none"> <li>- The interior of the vehicle is clean and free from conditions that could cause food contamination.</li> <li>- Frozen products is transported under refrigerated conditions using clean and cold container or icebox and the temperature shall be monitored</li> </ul> </li> </ul>

Question	Actions to take
	<p>regularly using thermometer. The temperature shall not exceed 5 °C.</p> <ul style="list-style-type: none"> <li>- Segregate the product from any other materials.</li> </ul>
<p>What is the source of water (municipal water, potable water, rainwater) used in the production? How do you clean your water tanks?</p>	<ul style="list-style-type: none"> <li>- Water used in production processes should be free of chemicals and microbial contamination.</li> <li>- Use potable water, however, other sources of water could be used after checking its quality according to JS 286/2015 for drinking water.</li> <li>- Rainwater is relatively free from impurities, but it could be contaminated with the impurities picked up by rain from the atmosphere and during harvesting and storage of rainwater. Higher microbial concentrations are generally found in the first flush of rainwater. Rainwater is slightly acidic and very low in dissolved minerals and it can dissolve heavy metals (zinc &amp; lead) from the metallic roofs and storage tanks or from atmospheric pollution. Microbial quality indicated by E. coli or thermo-tolerant coliforms and the physical quality (pH, turbidity, colour and smell) of rainwater needs to be monitored. The levels of lead, zinc or other heavy metals in rainwater should also be measured, when it is in contact with metallic surfaces during collection or storage. In case rainwater is disinfected with chlorine, the levels of total halogenated methane, chlorine dioxide and chlorite should be monitored. The quality of rainwater should be evaluated according to the limits stated in JS 286/2015 for drinking water.</li> </ul>
<p>Are production area/storage areas contain insect traps? Do you use insecticides and rodenticides to control them?</p>	<ul style="list-style-type: none"> <li>- Install fly and insect screens on windows and doors that are opened for ventilation.</li> <li>- Keep windows and door close, if opening them would result in food contamination.</li> <li>- Do not use insecticides and rodenticides chemicals during production.</li> <li>- All insecticides and rodenticides chemicals shall be identified, held, and stored in a manner that protects against contamination of food, food-contact surfaces, or food packaging materials.</li> </ul>
<p>Once you receive fresh fruits and vegetables, do you check them for mould or rotten spot?</p>	<ul style="list-style-type: none"> <li>- The main contaminants found in fruits and vegetables are (1) foreign material (leaves, stems, stalks, sticks, stones, etc.), (2) infestation by insects, excreta, hair from rodents or feathers from birds, (3) mould growth and (4) chemical residues (e.g., insecticides, fertilizers). Mould contamination could affect flavour and shelf life of product.</li> <li>- Badly damaged raw materials and foreign matter can contaminate the final product.</li> </ul>

Question	Actions to take
	<ul style="list-style-type: none"> <li data-bbox="624 297 1361 465">– Poor quality raw materials produce poor quality final products and it is not possible to improve the quality of raw materials by processing them. All visible foreign materials, mouldy, rotten, and badly damaged fruit should be removed before processing.</li> <li data-bbox="624 472 1361 607">– Careful inspection by well trained staff to inspect and sort out raw materials before money is spent on processing them is one of the most cost effective methods of ensuring a uniformly high quality in the final product.</li> <li data-bbox="624 613 1361 678">– The more worker that examine the raw materials the greater the level of control.</li> </ul>
<p data-bbox="205 710 576 775">Do you have disease free certificate for Health Authority?</p> <p data-bbox="205 781 520 846">Do you have your national vaccination certificate?</p>	<ul style="list-style-type: none"> <li data-bbox="624 710 1305 775">– It is important to be certified to be able to expand your production through having the needed licenses.</li> </ul>



## Annex 2

### Benefits:

- Reduce losses in raw and packaging materials.
- Reduce losses in final products.
- Reduce amount of waste.
- Reduce the needed cost for production.
- Control or eliminate hazards at production area.
- Conserve water and save energy.
- Reuse and recycling a maximum of raw and packaging materials.
- Improve working conditions and occupational safety.
- Reduce the volume of wastewater.

Question	Actions to take
Are there noticeable spills or leaks? Is there any evidence of past spills?	<ul style="list-style-type: none"> <li>– The best way to control spills is to stop them before they happen.</li> <li>– Conduct regular cleaning of the production area and clean spills immediately once they are occurred.</li> <li>– Drip pans and guards where possible spills might occur.</li> </ul>
Are there damaged or defective containers, bags, etc.?	<ul style="list-style-type: none"> <li>– Store raw and packaging materials and final products in proper storage areas and do not put them directly on the floor. All storage areas should be clearly marked</li> <li>– Stored materials should not obstruct aisles, stairs or exits.</li> <li>– Stacking raw and packaging materials and final products inside cartons and cross tying.</li> <li>– Ensure that the workers are handling and transferring these materials in a proper way.</li> <li>– Prepare cleaning and maintenance schedule for de-contamination, cleaning or disinfecting of storage areas.</li> </ul>
Are the products labelled and the dates of production and expiry documented?	<ul style="list-style-type: none"> <li>– Document the date of preparation as it will help you sell the older products before the new products. (First In ...First Out)</li> <li>– If the product is offered in the markets, the name of the product, dates of production and expiry, name and address of the producer should be documented, by clear font with non-easily removed label (Product's Display Label).</li> </ul>
Are the conditions of storage areas of raw materials and final products monitored and documented regularly?	<ul style="list-style-type: none"> <li>– Refer to "General personal hygiene &amp; food safety" for the proper storage conditions.</li> <li>– Assign a worker to monitor the temperature of storage conditions on daily basis and document the readings in a logbook.</li> <li>– Verification can be conducted by putting glass of water inside the refrigerator for 24 hours, then measure the</li> </ul>

Question	Actions to take
	<p>temperature of water using thermometer. Do not measure the temperature directly from raw material or product.</p>
<p>Is the production area (kitchen) well-designed and adequate for your present needs and planned expansion? Does it fit with licensing requirements, 15% of overall house's area?</p>	<ul style="list-style-type: none"> <li>- Ensure that production area have an enough space for workers to move around easily. This reduces the likelihood of accidents, or workers getting in each other's way.</li> <li>- Ensure that the production area is hygienically designed and easily cleaned to prevent contamination by insects, rodents or micro-organisms.</li> <li>- Ensure that floors have a proper drainage channels and keep the drains closed.</li> <li>- Prepare maintenance schedule for the internal space of your production area to remove cracks, peeling paint, toxic material on walls and floors.</li> <li>- Make sure that the production area has a good ventilation system to avoid mould growth on walls.</li> <li>- Maintain light fixtures regularly as dirty ones reduce essential light levels. Clean light fixtures can improve lighting efficiency significantly.</li> </ul>
<p>Do you have a plan for waste disposal?</p>	<ul style="list-style-type: none"> <li>- Collect the waste regularly and don not keep it in the production area.</li> <li>- Separate materials that can be recycled from those going to waste disposal facilities. All waste receptacles should be clearly labelled (e.g., recyclable glass, plastic, cartoons &amp; papers, tins etc.).</li> <li>- Collect the waste generated from each step and weigh it at the end of each batch. This will help you to define the causes of losses in raw materials, semi-finished and final products (human error, tools, etc.).</li> </ul>
<p>Do you monitor the consumption of fuels used for heating? Do you have solar water heating system?</p>	<p>Normally home-based and micro-scale food businesses use LPG for heating, the following could be implemented to monitor and control the consumption of fuel used in all production processes:</p> <ul style="list-style-type: none"> <li>- Record your consumption of LPG cylinders on monthly basis.</li> <li>- Check the LPG hose regularly for any signs of wear and tear.</li> <li>- Ensure that the workers are aware of the safety and maintenance tips for domestic LPG cylinders</li> <li>- Add a cover to the vessels used for cheese boiling and crud cheese production.</li> <li>- Preferred to have a manual fire extinguisher at your kitchen.</li> </ul>

Question	Actions to take
Are you aware of local regulations for establishing home-based food business?	<ul style="list-style-type: none"> <li>– Under the Home-based Business Licensing Instructions for the Year 2020, Greater Amman Municipality (GAM) allows certain professions to be practiced from home. Article (9) of the Instructions stipulates special conditions relating to construction, equipment, production processes, storage, transportation of food items and general safety requirements. These instructions are available online.</li> <li>– In case you propose to GAM to get home based production license, you have to get approval from Jordan Food and Drug Administration (JFDA), as the official governmental body responsible of food safety and security in Jordan. JFDA inspection teams check your kitchen to be sure that you are implementing all the requirements, then you will proceed again to GAM to get your license.</li> </ul>
Do you primarily use water for cleaning (floor, kitchen's tools and equipment) in your business?	<ul style="list-style-type: none"> <li>– Implement dry clean-up (sweep the floor or wipe the kitchen's tools and equipment) before washing with water. This action reduces the amount of water required to remove solid wastes.</li> <li>– Use hot water to clean oily surfaces.</li> <li>– Use low-volume and high-pressure water, this action involves only adding a new nozzle to the end of the hose or water tap.</li> <li>– Make sure that water taps are in good working conditions and there is no spillage and leakage.</li> <li>– Monitor water tanks and prevent spillage.</li> <li>– Turn off the water when not in use.</li> <li>– Instruct the workers to reduce the water consumption as much as possible.</li> </ul>
Do you monitor and record the volume of water used in each production stage?	<ul style="list-style-type: none"> <li>– Record the volume of water used during each production stage on monthly basis.</li> <li>– Cooling water can be used for irrigation and floor clean-up operation.</li> <li>– Use low-volume and high- pressure water, this action involves only adding a new nozzle to the end of the hose or water tap.</li> <li>– Make sure that water taps are in good working conditions and there is no spillage and leakage.</li> <li>– Turn off the water when not in use.</li> <li>– Instruct the workers to reduce the water consumption for the cleaning of raw materials as much as possible (e. g. by washing in containers/bowls and closing the water taps immediately after use).</li> </ul>
Do you conduct regular cleaning and maintenance for water storage tanks?	<ul style="list-style-type: none"> <li>– Make sure that the tank is covered to avoid any microbiological and chemical contamination.</li> <li>– Conduct regular cleaning for the tank.</li> </ul>

Question	Actions to take
	<ul style="list-style-type: none"> <li>– Conduct regular check for the tank and hoses to avoid losses due to spillage or leakage.</li> </ul>
<p>Do you monitor the monthly consumption of primary raw material?</p>	<p>Keep good records (quality, quantity and cost) of consumed primary raw material to help you:</p> <ul style="list-style-type: none"> <li>– Determine your consumption per batch and hence determine the sources and causes of losses (human error, low quality inputs, etc.) if occurred.</li> <li>– Help you to take the needed corrective actions for unnecessary losses.</li> </ul>
<p>Do you evaluate and record waste quantities of the final products?</p>	<p>Record the waste volumes in the final product will help you to identify the problems (low quality inputs, human error, safety issues, lack of knowledge of food hygiene, etc.) and to take the needed corrective actions. The following actions could reduce the losses in the final product:</p> <ul style="list-style-type: none"> <li>– Check the quality of received raw materials.</li> <li>– Check the quality of water. More details are given in <b>General personal hygiene &amp; food safety</b>.</li> <li>– Check the storage conditions. More details given in <b>General personal hygiene &amp; food safety</b>.</li> <li>– Attend training courses on food safety and vegetables and fruits processing.</li> </ul>

# Annex 3

## Benefits:

- Improve hygienic conditions
- Reduce losses in raw material.
- Reduce losses in final products.
- Reduce amount of waste.
- Reduce the needed cost for production.
- Control or eliminate hazards at production area.

Question	Actions to take
Do you know the difference between cleaning and sanitizing?	<b>Sanitizing</b> is destruction of microbial organisms, but <b>cleaning</b> is removing visible soil or dirt. So, in cleaning which is the first step, you are trying to get rid of visible soils and removing them in the rinse phase. After that you have to do the sanitizing phase, where the sanitizer will come into contact for a specified period of time to kill the bacteria. Sanitation is what preserves your ability to sell a good product.
Are you and your staff aware of the requirements of food safety and personal hygiene?	Workers should be able to attend training courses to upgrade their skills on basic food safety and hygiene principles and they shall be aware of Five Food Safety Keys. For those who have time constraints due to other social duties (family and children), special institutions should be able to organize and provide learning opportunities within their convenient hours or through online platforms.
Do you know that most fruits are more acidic than most vegetables? And how could cause food poisoning?	<ul style="list-style-type: none"> <li>- Food poisoning bacteria cannot grow in more acidic fruit products. However, in case moulds and yeast grow, they produce obvious signs of spoilage, which stops consumers eating them.</li> <li>- Vegetables are less acidic than fruits and food poisoning bacteria are able to grow in many vegetable products. Some types of bacteria produce poisons in the food without signs of spoilage and consumers may be unaware of the contamination and eat the poisoned food.</li> </ul>
What is the source of your recipes?	<ul style="list-style-type: none"> <li>- Highly recommended to attend a training course in fruits and vegetables processing.</li> <li>- Staff development is an important aspect of forward planning, and the business should be willing to invest in its employees.</li> </ul>
Do you fill the jam inside the jar while it is cold or warm?	<ul style="list-style-type: none"> <li>- Jam should be filled and sealed in a glass jar when it is still hot (around 80 °C). If the jam's temperature is too high, steam condenses to water on the inside of the lid and dilutes</li> </ul>



Question	Actions to take
	<p>sugar at the surface of the jam, which can cause mould growth. While Jam will thicken as it cools and will be difficult to pour into the jar.</p> <ul style="list-style-type: none"> <li>- The jar should be almost full (approximately 9/10ths full), too much space between the top of the jam and the inside of the lid results in a lot of trapped air under the seal and the heating process may not be long enough to expel all the air. This may weaken the seal and allow mould to grow.</li> </ul>
<p>Do you know at which pH value and sugar content you can achieve the perfect texture of the jam?</p>	<p>Gel formation is dependent on the percentage of carbohydrate pectin in the fruit, acidity (pH of 3.2 – 3.4) and high sugar content (68 – 72%). The sugar content (68 – 70 %) can be achieved when the temperature reaches 104 – 105 °C.</p>
<p>Do you face one of the following problems in fruit paste making? How do you solve the problem?</p> <ul style="list-style-type: none"> <li>- Acidic taste</li> <li>- Formation of clots</li> <li>- Formation of liquid at the surface</li> <li>- Crystallization</li> <li>- Formation of mould</li> <li>- Wrong batch</li> </ul>	<p><b>Acidic taste:</b> If the product is too acid, replace the citric acid by tartaric acid (63% of the amount of citric acid).</p> <p><b>Formation of clots:</b> If batch clots, it is probably due to the pH being too low or solids being too high; correct accordingly.</p> <p><b>Formation of liquid at the surface:</b> If liquid forms at the surface, it is probably due to too low pH or too low pectin content.</p> <p><b>Crystallization:</b></p> <ul style="list-style-type: none"> <li>- If liquid forms on the surfaces, then the pH is too low; reduce the acid content</li> <li>- If liquid does not form on the surface, then solids or pH is too high.</li> </ul> <p><b>Formation of mould:</b> The filling may have been done at low temperature. If the containers are large, wait until they are cold before closing.</p> <p><b>Wrong batch:</b> dilute the jam with water to 30% solid; cook briefly. Add this diluted jam to a new batch but in a ratio not exceeding 10%.</p>
<p>At what temperature do fermented pickles take place? And how long it lasts?</p>	<p>Fermentation is carried out at 20 – 30° C. This step takes generally 4 – 8 weeks. Acidity reaches a maximum pH value of 4.1.</p>
<p>Do you know what could increase the shelf life of pickles?</p>	<p>Storage temperature will determine the shelf life of the product. After fermentation stage, the product has to be stored at low temperature.</p>

# Annex 4

Question	Actions to take																								
<p>Do you know the value and cost of having a good and accurate information system?</p>	<p>Value of having good information system:</p> <ul style="list-style-type: none"> <li>- Detailed knowledge about the production processes of your business</li> <li>- Identification of trends</li> <li>- Accurate control over finances and product quality</li> <li>- Identification of individual costs to allow changes to a product or process to optimize profits</li> <li>- Keeping track of money owed to the business</li> </ul> <p>Cost of having good information system:</p> <ul style="list-style-type: none"> <li>- Time spent learning how to keep records</li> <li>- Time spent writing the records</li> <li>- Cost of materials such as notebook and pens</li> </ul> <p>Workers should know the value of having accurate information system and why it is being collected.</p>																								
<p>Do you record the amount of raw materials and ingredients that are used in the production?</p>	<p>Records of the amount and quantity of raw materials and ingredients should be kept to ensure that the workers mix together the same quantity of raw materials and ingredients at each batch. The following table can be used to record the needed information:</p> <table border="1" data-bbox="624 1301 1386 1688"> <thead> <tr> <th colspan="3" data-bbox="624 1301 1386 1346">Product name:</th> </tr> <tr> <th data-bbox="624 1346 1010 1406">Raw material/ingredient</th> <th data-bbox="1010 1346 1173 1406">Batch number</th> <th data-bbox="1173 1346 1386 1406">Quantity (Kg) / volume (L)</th> </tr> </thead> <tbody> <tr> <td data-bbox="624 1406 1010 1453"></td> <td data-bbox="1010 1406 1173 1453"></td> <td data-bbox="1173 1406 1386 1453"></td> </tr> <tr> <td data-bbox="624 1453 1010 1500"></td> <td data-bbox="1010 1453 1173 1500"></td> <td data-bbox="1173 1453 1386 1500"></td> </tr> <tr> <td data-bbox="624 1500 1010 1547"></td> <td data-bbox="1010 1500 1173 1547"></td> <td data-bbox="1173 1500 1386 1547"></td> </tr> <tr> <td data-bbox="624 1547 1010 1594"></td> <td data-bbox="1010 1547 1173 1594"></td> <td data-bbox="1173 1547 1386 1594"></td> </tr> <tr> <td data-bbox="624 1594 1010 1641"></td> <td data-bbox="1010 1594 1173 1641"></td> <td data-bbox="1173 1594 1386 1641"></td> </tr> <tr> <td data-bbox="624 1641 1010 1688"></td> <td data-bbox="1010 1641 1173 1688"></td> <td data-bbox="1173 1641 1386 1688"></td> </tr> </tbody> </table>	Product name:			Raw material/ingredient	Batch number	Quantity (Kg) / volume (L)																		
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Question	Actions to take																																										
<p>Do you record the main processing conditions in the production process (i.e. time, temperature, etc.)?</p>	<p>Records to the main processing conditions should be kept to ensure that the workers process raw materials and ingredients according to the recipe and under the same processing conditions each time. The following table can be used to record the needed information:</p> <table border="1" data-bbox="625 506 1385 891"> <tr> <td colspan="5" data-bbox="625 506 1385 562"> <b>Product name:</b> Jam  <b>Batch number:</b> 01         </td> </tr> <tr> <th data-bbox="625 562 767 705">Process</th> <th data-bbox="767 562 909 705">Parameter</th> <th data-bbox="909 562 1051 705">Target condition</th> <th data-bbox="1051 562 1193 705">Actual condition</th> <th data-bbox="1193 562 1385 705">Effect of the change from the target on the quality of final product</th> </tr> <tr> <td data-bbox="625 705 767 790">Filling jam into jars</td> <td data-bbox="767 705 909 790">Jam's temperature</td> <td data-bbox="909 705 1051 790">80 °C</td> <td data-bbox="1051 705 1193 790">100 °C</td> <td data-bbox="1193 705 1385 790">Increase the chance of mould growth</td> </tr> <tr> <td data-bbox="625 790 767 840"></td> <td data-bbox="767 790 909 840"></td> <td data-bbox="909 790 1051 840"></td> <td data-bbox="1051 790 1193 840"></td> <td data-bbox="1193 790 1385 840"></td> </tr> <tr> <td data-bbox="625 840 767 891"></td> <td data-bbox="767 840 909 891"></td> <td data-bbox="909 840 1051 891"></td> <td data-bbox="1051 840 1193 891"></td> <td data-bbox="1193 840 1385 891"></td> </tr> </table>	<b>Product name:</b> Jam <b>Batch number:</b> 01					Process	Parameter	Target condition	Actual condition	Effect of the change from the target on the quality of final product	Filling jam into jars	Jam's temperature	80 °C	100 °C	Increase the chance of mould growth																											
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<p>Do you record the daily cash used to buy raw materials, ingredients and packaging materials?</p>	<p>Record of the cash used to buy raw materials, ingredients and packaging materials should be kept. The following table can be used to record the needed information:</p> <table border="1" data-bbox="625 1128 1385 1568"> <thead> <tr> <th data-bbox="625 1128 727 1272">Date</th> <th data-bbox="727 1128 893 1272">Item (raw material, ingredient or packaging material)</th> <th data-bbox="893 1128 1007 1272">Supplier</th> <th data-bbox="1007 1128 1161 1272">Quantity (Kg) / volume (L)</th> <th data-bbox="1161 1128 1270 1272">Quality*</th> <th data-bbox="1270 1128 1385 1272">Cash out (JD)</th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <p>* determined after inspection upon arrival</p> <p>Having records for the purchased raw materials, ingredients and packaging materials over a specific period of time would help you to manage and plan your inventory. As you are working in a micro scale, there is no need to buy materials in bulks, as holding them for a long period of time may results in spoilage and it would increases the cost of production.</p>	Date	Item (raw material, ingredient or packaging material)	Supplier	Quantity (Kg) / volume (L)	Quality*	Cash out (JD)																																				
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Do you keep record for your daily sales?	<p>Record of the daily cash that comes into your business should be kept. The following table can be used to record the needed information:</p> <table border="1" data-bbox="625 434 1386 790"> <thead> <tr> <th>Date</th> <th>Product</th> <th>Quantity sold (Kg, bag, jar, etc.)</th> <th>Cash in (JD)</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> </tbody> </table> <p>When you have records for the daily sales, this would help you to find out whether demand for a certain product is increasing or decreasing. Accordingly, you can draw up future plans to cope with the expected changes in demand.</p>	Date	Product	Quantity sold (Kg, bag, jar, etc.)	Cash in (JD)																																																				
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Do you know how to calculate your profit or loss?	<p>Profit and loss describes how money comes into and leaves your business during a specific period of time. This allows you to have an indication about the progress of your business and compare your trend with other months. The following table can be used to record the needed information:</p> <table border="1" data-bbox="625 1238 1386 1832"> <thead> <tr> <th colspan="4">Period: month, week, etc.</th> </tr> <tr> <th colspan="4">Product:</th> </tr> <tr> <th>No.</th> <th>Item</th> <th>In (JD)</th> <th>Out (JD)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Income from sales</td> <td> </td> <td> </td> </tr> <tr> <td>2</td> <td>Purchases of raw materials, ingredients and packaging materials</td> <td> </td> <td> </td> </tr> <tr> <td>3</td> <td>Salaries</td> <td> </td> <td> </td> </tr> <tr> <td>4</td> <td>Rental costs</td> <td> </td> <td> </td> </tr> <tr> <td>5</td> <td>Transportation</td> <td> </td> <td> </td> </tr> <tr> <td>6</td> <td>Electricity/fuel cost</td> <td> </td> <td> </td> </tr> <tr> <td>7</td> <td>Water cost</td> <td> </td> <td> </td> </tr> <tr> <td>8</td> <td>Any other costs (expired raw materials or products)</td> <td> </td> <td> </td> </tr> <tr> <td>9</td> <td>Gross profit (JD)</td> <td>= item No. 1</td> <td> </td> </tr> <tr> <td>10</td> <td>Total expenses (JD)</td> <td> </td> <td>=∑ item 2-8</td> </tr> <tr> <td>11</td> <td>Net profit/loss (JD)</td> <td>= item No. 9 – item No. 10</td> <td> </td> </tr> </tbody> </table>	Period: month, week, etc.				Product:				No.	Item	In (JD)	Out (JD)	1	Income from sales			2	Purchases of raw materials, ingredients and packaging materials			3	Salaries			4	Rental costs			5	Transportation			6	Electricity/fuel cost			7	Water cost			8	Any other costs (expired raw materials or products)			9	Gross profit (JD)	= item No. 1		10	Total expenses (JD)		=∑ item 2-8	11	Net profit/loss (JD)	= item No. 9 – item No. 10	
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<p>Do you know how to calculate the actual amount and cost of raw materials and ingredients used in the production?</p>	<p>The actual amount of each raw material and ingredient used during production is known as the “yield”. The value of the yield determined according to the percentage of losses generated during preparation or processing of raw materials and ingredients. Therefore, the actual cost for the processed raw material or ingredient is expected to be higher than the original paid cost. The following tables represent the typical losses during preparation and processing of some fruits and vegetables.</p> <p><b>Typical losses (%) during preparation of some fruits and vegetables</b></p> <table border="1" data-bbox="673 721 1345 1182"> <thead> <tr> <th>Fruit or vegetable</th> <th>Typical losses (%)</th> <th>Notes</th> </tr> </thead> <tbody> <tr><td>Apples</td><td>25</td><td>peeled &amp; cored</td></tr> <tr><td>Apricot halves</td><td>12</td><td>de-stoned</td></tr> <tr><td>Bananas</td><td>40</td><td>peeled</td></tr> <tr><td>Cabbages</td><td>30</td><td>-</td></tr> <tr><td>Carrots</td><td>4</td><td>(bought without leaves)</td></tr> <tr><td>Cauliflowers</td><td>38</td><td>-</td></tr> <tr><td>Currants</td><td>3</td><td>seeds &amp; skins removed</td></tr> <tr><td>Figs</td><td>2</td><td>-</td></tr> <tr><td>Grapes</td><td>19</td><td>skins &amp; pips removed</td></tr> <tr><td>Guavas</td><td>22</td><td>-</td></tr> <tr><td>Lemons</td><td>40</td><td>peel &amp; seeds removed</td></tr> <tr><td>Mangoes</td><td>45</td><td>peeled &amp; de-stoned</td></tr> <tr><td>Melons</td><td>42</td><td>peel &amp; seeds removed</td></tr> <tr><td>Okra</td><td>12</td><td>-</td></tr> <tr><td>Onions</td><td>3</td><td>-</td></tr> <tr><td>Oranges</td><td>25</td><td>peel &amp; seeds removed</td></tr> <tr><td>Passion fruits</td><td>58</td><td>peel &amp; seeds removed</td></tr> <tr><td>Paw paws</td><td>38</td><td>peel &amp; seeds removed</td></tr> <tr><td>Peas</td><td>50</td><td>bought in pods</td></tr> <tr><td>Peppers - chilli</td><td>15</td><td>seeds &amp; stalk removed</td></tr> <tr><td>Peppers - green</td><td>14</td><td>seeds &amp; stalk removed</td></tr> <tr><td>Pineapples</td><td>48</td><td>peeled &amp; cored</td></tr> <tr><td>Plantains</td><td>39</td><td>peeled</td></tr> <tr><td>Tomatoes</td><td>4</td><td>seeds &amp; skin removed</td></tr> </tbody> </table> <p>(Source: Fellows, P., Midway Technology Ltd, Bonsall, UK, 1997)</p> <p><b>Typical losses (%) during processing of some fruits and vegetables</b></p> <table border="1" data-bbox="673 1328 1345 1753"> <thead> <tr> <th>Stages in a Process</th> <th>Typical Losses</th> </tr> </thead> <tbody> <tr><td>Washing fruits/vegetables</td><td>0-10</td></tr> <tr><td>Sorting</td><td>5-50</td></tr> <tr><td>Peeling</td><td>5-60</td></tr> <tr><td>Slicing/dicing</td><td>5-10</td></tr> <tr><td>Batch preparation/weighing</td><td>2-5</td></tr> <tr><td>Boiling</td><td>5-10</td></tr> <tr><td>Drying</td><td>10-20</td></tr> <tr><td>Packaging</td><td>5-10</td></tr> <tr><td>Machine washing</td><td>5-20</td></tr> <tr><td>Accidental spillage</td><td>5-10</td></tr> <tr><td>Rejected packs (does not include evaporation losses)</td><td>2-5</td></tr> </tbody> </table> <p>(Source: Fellows, P., Midway Technology Ltd, Bonsall, UK)</p> <p>Yield is calculated as follow:</p>	Fruit or vegetable	Typical losses (%)	Notes	Apples	25	peeled & cored	Apricot halves	12	de-stoned	Bananas	40	peeled	Cabbages	30	-	Carrots	4	(bought without leaves)	Cauliflowers	38	-	Currants	3	seeds & skins removed	Figs	2	-	Grapes	19	skins & pips removed	Guavas	22	-	Lemons	40	peel & seeds removed	Mangoes	45	peeled & de-stoned	Melons	42	peel & seeds removed	Okra	12	-	Onions	3	-	Oranges	25	peel & seeds removed	Passion fruits	58	peel & seeds removed	Paw paws	38	peel & seeds removed	Peas	50	bought in pods	Peppers - chilli	15	seeds & stalk removed	Peppers - green	14	seeds & stalk removed	Pineapples	48	peeled & cored	Plantains	39	peeled	Tomatoes	4	seeds & skin removed	Stages in a Process	Typical Losses	Washing fruits/vegetables	0-10	Sorting	5-50	Peeling	5-60	Slicing/dicing	5-10	Batch preparation/weighing	2-5	Boiling	5-10	Drying	10-20	Packaging	5-10	Machine washing	5-20	Accidental spillage	5-10	Rejected packs (does not include evaporation losses)	2-5
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Question	Actions to take
	<p><i>Yield (%)</i>  <math display="block">= \frac{\text{weight of raw material actually used in the process}}{\text{weight of raw material as purchased}} \times 100</math></p> <p>The true cost of raw materials or ingredients depends on the yield and can be calculated as below:</p> <p><i>True raw material or ingredient cost</i>  <math display="block">= \frac{\text{cost or raw materials that is bought}}{\text{yield}} \times 100</math></p> <p><b>Example:</b> You purchased 10 Kg of oranges for 0.5 JD per kg. Upon peeling and seeds removal, there are 2.5 Kg losses.</p> <p><math display="block">\text{Yield (\%)} = \frac{10 - 2.5}{10} \times 100 = 75\%</math></p> <p><math display="block">\text{True cost} = \frac{10 \times 0.5}{75} \times 100 = 6.67 \text{ JD}</math></p> <p>The amount of waste can be:</p> <ul style="list-style-type: none"> <li>– Weighted by collecting the waste from each production process and weighing them at the end of the day. Each raw material or ingredient should be weighted separately.</li> <li>– Calculated according to the values mentioned in the above tables as follow:</li> </ul> <p><i>Amount of waste</i>  <math display="block">= \text{weight of raw material as purchased} \times \text{typical losses (\%)}</math></p> <ul style="list-style-type: none"> <li>– Estimated according to the experience of the workers, but this method is not accurate.</li> </ul>
<p>Do you know how to calculate your weekly or monthly production rate?</p>	<p>The production rate is calculated as follows:</p> <p><i>Production rate (kg or litres/day)</i>  <math display="block">= \frac{\text{amount of product sold per week or month (kg or litres)}}{\text{Number of working days per week or month}}</math></p> <p>The number of working hours per day or the number of working days per week or month should be recorded.</p> <p><b>Example:</b>  Your monthly sales are 50 Kg pickles, assuming that production takes place for 8 hours each day for 20 days per month, then the daily production rate will be:</p>

Question	Actions to take																																				
	$\text{Production rate } \left( \frac{Kg}{\text{day}} \right) = \frac{50 \text{ Kg}}{20 \text{ day}} = 2.5 \text{ Kg/day}$																																				
<p>Do you know how to do a comparative report for you monthly consumptions and sales?</p>	<p>A comparative monthly report is used to compare the current month's results with the previous months. According to the results of comparison, the business owner can decide if the operation is under control. The following table can be used to compare the results between the months:</p> <table border="1" data-bbox="624 591 1386 1066"> <thead> <tr> <th colspan="3" data-bbox="624 591 1386 629">Product name:</th> </tr> <tr> <th data-bbox="624 629 783 714">Month</th> <th data-bbox="783 629 1126 714">Monthly consumption (JD) (raw material, ingredients or packaging materials)</th> <th data-bbox="1126 629 1386 714">Monthly sales (JD)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	Product name:			Month	Monthly consumption (JD) (raw material, ingredients or packaging materials)	Monthly sales (JD)																														
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<p>Do you know how to monitor and improve your business productivity?</p>	<p>In order to assess whether your production process needs specific improvement measures and options, it is necessary to record the consumption of resources (main or essential raw material, main or essential ingredients, packaging materials, water and energy) and waste. These figures can be used to calculate a baseline for the following indicators:</p> <ul style="list-style-type: none"> <li>– Material/ingredient use indicator: Actual consumption; not the amount planned to be used in the recipe but the actual amount used during production; of raw materials and ingredients per unit of product.</li> <li>– Water use indicator: Total volume of water used per unit of product</li> <li>– Energy use indicator: Total energy (kWh or MJ) used per unit of product</li> <li>– Generated waste indicator: Total amount of waste (ton) produced per unit of product</li> </ul> <p>After establishing the baseline, your performance could be evaluated at different points in time, by comparing the baseline after implementing any measures and options for improvement with the first baseline before applying the options. Or by comparing the actual consumption of material/ingredient per</p>																																				

Question	Actions to take
	<p>unit product with the ideal amount of material/ingredient described in the recipe, the ideal consumption is what your consumption would be if you process the raw materials and ingredients with no waste. This number will give you a target value that could help you to reduce waste and prevent losses. The closer your ideal and actual consumptions are, the more profitable your business.</p>



## Annex 5

Question	Actions to take
<p>Do you primarily use water for cleaning (floor, kitchen's tools and equipment) in your business? How do you control the water consumption during the cleaning process?</p>	<ul style="list-style-type: none"> <li>– Excess water use incurs not only unnecessary high water cost, but also energy cost for pumping and the environmental impact associated to the energy consumption. Excess use of water could lessen your access to water, especially if the source of water is limited.</li> <li>– Implement dry clean-up (sweep the floor or wipe the kitchen's tools and equipment) before washing with water. This action reduces the amount of water required to remove solid wastes.</li> <li>– Sterilize glass jars in an oven at 100 °C for 10 – 15 minutes instead of soaking them in boiled water for a similar time.</li> <li>– Use hot water to clean oily surfaces.</li> <li>– Use low-volume and high- pressure water, this action involves only adding a new nozzle to the end of the hose or water tap.</li> <li>– Make sure that water taps are in good working conditions and there is no spillage and leakage.</li> <li>– Monitor water tanks and prevent spillage.</li> <li>– Turn off the water when not in use.</li> <li>– Instruct the workers to reduce the water consumption as much as possible.</li> </ul>
<p>In which production steps do you use water? And what are the measures you implement to reduce the water consumption?</p>	<ul style="list-style-type: none"> <li>– Remove solid materials manually before washing raw materials with water.</li> <li>– Use of air cooling instead of water cooling.</li> <li>– Cooling water can be used for irrigation, preliminary wash of raw materials and in floor clean-up operation.</li> <li>– Avoid continuous rinsing with water and check the possibility of rinsing in still baths.</li> <li>– Use low-volume and high- pressure water, this action involves only adding a new nozzle to the end of the hose or water tap.</li> <li>– Make sure that water taps are in good working conditions and there is no spillage and leakage.</li> <li>– Turn off the water when not in use.</li> <li>– Instruct the workers to reduce the water consumption for the cleaning of raw materials as much as possible (e. g. by washing in containers / bowls and closing the water taps immediately after use).</li> </ul>

## Annex 6

Question	Actions to take
<p>Do you monitor the monthly consumption of primary raw materials and ingredients?</p>	<p>Keep good records (quality, quantity and cost) of consumed primary raw materials and ingredients to help you:</p> <ul style="list-style-type: none"> <li>– Determine your consumption per batch and hence determine the sources and causes of losses (human error, low quality inputs, etc.) if occurred.</li> <li>– Detailed knowledge about the operation and trend of your business.</li> <li>– Help you to take the needed corrective actions for unnecessary losses, the following actions could reduce the losses in raw materials and ingredients:               <ul style="list-style-type: none"> <li>– Use older purchased materials before recently purchased materials in order to prevent the accumulation of expired materials.</li> <li>– Train the staff and control their performance while processing fruits and vegetables (coring, peeling and slicing) to minimize losses in raw materials.</li> <li>– All fruits and vegetables should be processed as soon as possible after harvest to reduce the risk of spoilage before processing.</li> </ul> </li> </ul>
<p>Do you have detailed written recipe for each product that the workers shall follow it? Do you have working sheets for workers?</p>	<p>Having detailed written recipe (type and amounts of the ingredients, required tools (i.e. calibrated cups and spoons, graduated jugs, balance, etc.)) is critical to both the quality of the final product and the financial viability of your business and it enables uniform products to be made in every batch and avoids wastage of primary raw materials and ingredients.</p> <p>Staff should be well trained and aware of the processing conditions (temperature, time, acidity, texture, etc.) to achieve high quality and uniform final product.</p> <p>Highly recommended to attend a training course in fruits and vegetables processing.</p>
<p>Do you evaluate and record waste volumes of the final products?</p>	<p>Record the waste volumes in the final product will help you to identify the problems (low quality inputs, human error, safety issues, lack of knowledge of food hygiene, improper food processing, etc.) and to take the needed corrective actions. The following actions could reduce the losses in the final product:</p> <ul style="list-style-type: none"> <li>– Check the quality of primary raw materials of fruits and vegetables and check the possibility of having them from a</li> </ul>

Question	Actions to take
	<p>local/nearby source. This will reduce the cost of transportation and the risk of spoil of bulky raw materials.</p> <ul style="list-style-type: none"> <li>- Remove mouldy, rotten, badly damaged raw materials and all foreign material (i.e. leaves, stems, stalks, sticks, and stones) before start processing them. Mould contamination could affect flavour and shelf life of product. Badly damaged raw materials and foreign matter can contaminate the final product.</li> <li>- Do simple tests to investigate the purity of main ingredients like sugar and salts. Their purity can be checked by dissolving a small amount in hot water and allowing any dirt to settle out. If salt has a pink tinge it should not be used, as this is an indication of bacterial contamination.</li> <li>- Check the quality of water. More details are given in General personal hygiene &amp; food safety.</li> <li>- Check the acidity of certain products using pH paper, it can be dipped into a sample of product and the colour change compared with a reference chart. For greater accuracy a pH meter should be used. This action cannot be applied for pickles and sauces.</li> <li>- Moisture content of dried fruits and vegetables can be checked by drying them at 100 °C for 4 hours and reweighed. Then put them back into the oven and check again at hourly intervals until they do not lose any more weight. Generally, fruits and vegetables should be dried to below 10% moisture in order to ensure that they do not go mouldy during storage. The moisture content is calculated using the formula:</li> </ul> $\% \text{ moisture} = \frac{\text{Initial weight of sample} - \text{Final weight of sample}}{\text{Initial weight of sample}} \times 100$ <p>Total solids content = 100- % moisture.</p> <p>For storage trials, samples of dried product are packed and checked for spoilage each day after storage for 3 – 4 weeks. Those that have not gone mouldy are checked to find the moisture content.</p> <ul style="list-style-type: none"> <li>- Check the storage conditions. More details given in General personal hygiene &amp; food safety.</li> <li>- Pickles should remain submerged in brine or oil (for pickled olives) at all times during production and storage, because any pieces exposed to the air will spoil.</li> <li>- Attend training courses on food safety and fruits and vegetables processing.</li> </ul>



## Annex 7

Question	Actions to take
Do you monitor the monthly electricity bills and the monthly LPG bottles changes?	Keep good records (quantity and cost) of consumed electricity and LPG to help you: <ul style="list-style-type: none"> <li>– Determine your consumption per production and hence determine the sources and causes of energy wastes if occurred.</li> <li>– Help you to take the needed corrective actions for energy waste reduction.</li> </ul>
When you leave your workday or break, do you leave electrical equipment or appliances on?	<ul style="list-style-type: none"> <li>– Make sure that all equipment are turned-off except these necessary to be kept on (Like refrigerators).</li> </ul>
Do you turn off the lights you are not occupying?	<ul style="list-style-type: none"> <li>– Make sure that all lights are turned-off except in the occupied areas.</li> </ul>
Check if your lighting tubes are with “LED” type or not by doing the following quick test: <ol style="list-style-type: none"> <li>1. Turn off the light.</li> <li>2. Turn on the light.</li> <li>3. Note the fast response and stability of the light or not.</li> </ol>	<ul style="list-style-type: none"> <li>– The fast light response indicates that the existing lighting tube is with LED type, which is the best case.</li> <li>– In case of slow response of the light, it indicates that the existing lighting tube is with fluorescent type, which consumed more than LED type and has lower lifetime (it is recommended to replace it with LED tube).</li> <li>– Make sure that all lighting units used are with LED type.</li> </ul>
What is the full capacity of the existing cookers? How much cooking times the cooker used daily?	<ul style="list-style-type: none"> <li>– Using large cooker is more efficient for large amount of raw materials used, which reduce the cooking times needed and reduce the waste heat.</li> </ul>
Do you check if the gas cooker’s eyes are always clean?	<ul style="list-style-type: none"> <li>– Any clogging in the gas cooker eyes will cause inefficient firing and increase energy waste.</li> </ul>
What is the age of used refrigerator? Check if it has an energy label.	<ul style="list-style-type: none"> <li>– New efficient refrigerator is recommended with energy labelling.</li> </ul>
Check if the refrigerator is located near to heating sources (gas cooker, direct sun radiation, etc.)	<ul style="list-style-type: none"> <li>– Make sure that the location of the refrigerator should be far away from any heating source and keeping 30 cm space between the wall and the back of the refrigerator to insure good heat exchange.</li> </ul>
Do you have solar water heating system?	<ul style="list-style-type: none"> <li>– The use of solar water heating system reduces the consumption of electricity and fuel to produce hot water such that needed for cleaning.</li> </ul>



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بدعم من مشروع “تشجيع المؤسسات الميكروية والصغيرة والمتوسطة لأجل التشغيل” المنفذ من قبل GIZ بالنيابة عن الوزارة الاتحادية للتعاون الاقتصادي والتنمية BMZ