IMPROVE FOOD SAFETY SYSTEM AT RICE MILLS
:: CAMBODIA

HACCP: Training the Trainers

Tutor: Odette Mangaban
Objectives of the Course

1. To give working knowledge on how to identify the food safety hazards per process steps
2. To understand the principles of HACCP
3. To understand how to document a HACCP system appropriate for food operations
4. To produce safe food
5. To produce a HACCP plan
6. To be able to train the trainers on handling and delivery of HACCP training course
Pre-Test
15 minutes
## DAY 01

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 08:15</td>
<td>Pre-Test</td>
</tr>
<tr>
<td>08:15 – 09:00</td>
<td>Session 1</td>
</tr>
<tr>
<td>09:00 – 10:00</td>
<td>Session 2</td>
</tr>
<tr>
<td><strong>10:00 – 10:15</strong></td>
<td><strong>Teabreak</strong></td>
</tr>
<tr>
<td>10:15 – 12:00</td>
<td>Session 3 and Workshop 1</td>
</tr>
<tr>
<td><strong>12:00 – 13:00</strong></td>
<td><strong>Lunch break</strong></td>
</tr>
<tr>
<td>13:00 – 14:00</td>
<td>Session 4</td>
</tr>
<tr>
<td>14:00 – 15:00</td>
<td>HACCP Step 1 and Workshop 2</td>
</tr>
<tr>
<td><strong>15:00 – 15:15</strong></td>
<td><strong>Teabreak</strong></td>
</tr>
<tr>
<td>15:15 – 17:00</td>
<td>HACCP Steps 2 and 3 ; Workshop 3</td>
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</tbody>
</table>

HACCP Step 4
## Day 02

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08:00 – 09:00</td>
<td>Recap of Day 1</td>
</tr>
<tr>
<td>09:00 – 10:00</td>
<td>HACCP Step 5 and Workshop</td>
</tr>
<tr>
<td></td>
<td>HACCP Step 6 and Workshop</td>
</tr>
<tr>
<td>10.00 – 10.15</td>
<td><strong>Tea Break</strong></td>
</tr>
<tr>
<td>10:15 – 12:00</td>
<td>HACCP Step 6 and Workshop</td>
</tr>
<tr>
<td>12.00 – 13.00</td>
<td><strong>Lunch Break</strong></td>
</tr>
<tr>
<td>13:00 – 15:00</td>
<td>HACCP Steps 7 &amp; 8 and Workshop</td>
</tr>
<tr>
<td></td>
<td>HACCP Step 9 and Workshop</td>
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<tr>
<td>15.00 – 17:00</td>
<td><strong>Tea Break</strong></td>
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<tr>
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<td>HACCP Step 10 and Workshop</td>
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## HACCP Training Agenda

### DAY 03

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>08:00 – 09:00</td>
<td>Recap of Day 2</td>
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<td>09:00 – 09:30</td>
<td>HACCP Step 11</td>
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<tr>
<td>09:30 – 10:00</td>
<td>HACCP Step 12</td>
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<tr>
<td>10:00 – 10:15</td>
<td>Tea Break</td>
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<tr>
<td>10:15 – 12:00</td>
<td>HACCP Plan Presentation</td>
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<tr>
<td>12:00 – 13:00</td>
<td>Lunch Break</td>
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<tr>
<td>13:00 – 15:00</td>
<td>Continuation of HACCP Plan Presentation</td>
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<tr>
<td>15:00 – 15:15</td>
<td>Tea Break</td>
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<tr>
<td>15:16 - 15:30</td>
<td>Session 5 ; Submission of Hazard Analysis</td>
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<td></td>
<td>Worksheet and HACCP Plan</td>
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<tr>
<td>15:15 – 15:30</td>
<td>Exam</td>
</tr>
<tr>
<td>15:30 – 17:00</td>
<td>Course Evaluation</td>
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SESSION 01
HACCP: A Must to Food Industry
History of HACCP

- 1959 National Aeronautics and Space Administration (NASA) requested Pillsbury create food for astronauts
- End point check only ? ✗
- Preventative approach to food processing ✔
- The US Army Natick Research, Development, and Engineering Centre used Modes of Failure Analysis as a preventative approach for medical supplies. Such system was modified by Pillsbury and became the prototype of HACCP system.
- 1971 HACCP presented to public
History of HACCP

• 1974 Application of HACCP to Low Acid Canned Foods (USFDA) - further proliferation by the USDA’s NMFS (National Marine Fisheries Service)
• 1985 National Academy of Sciences recommended HACCP for control of microbial hazards
• 1993 Codex Committee developed guidelines
• 1995 SQF 2000 (Safe Quality Food) Quality Code Released
• 1995/97 CODEX Guidelines reviewed and revised
• 2003 Codex Guidelines revised (now in Rev. 4)
What is HACCP?

• HACCP acronym stands for
  H – Hazard
  A – Analysis
  C – Critical
  C – Control
  P – Point
Definition of HACCP Acronym

HACCP focuses on FOOD SAFETY HAZARDS

**H** – Hazard

- **Food Safety Hazard** - a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.
Definition of HACCP acronym

**A** – Analysis

- **Analysis** in HACCP is the identification and assessment of the seriousness and likelihood of occurrence of the hazard that may occur in the raw materials, processing, storage or distribution of the food products.
Definition of HACCP acronym

**CCP** – Critical Control Point

- **A control point**, a step or a procedure which prevents, eliminates, reduces, or minimizes the food safety hazard level to safe acceptable level
What is HACCP?

- HACCP - a system which identifies, evaluates, and controls food safety hazards.
How HACCP Works

• HACCP ensures food safety
  – HACCP identifies, assesses the risk of food safety hazards
  – HACCP establishes Critical Control Points (CCP) on identified hazard per process step
  – Monitoring, validation and verification of identified controls for food safety hazards

Hazard Identification + Control = Prevention
What is HACCP?

• Makes possible a global system of food safety essential in the development of an export business within the NAFTA (North America Free Trade Agreement).
  – Encouraged by the USDA and FDA.
• Compatible with the principles of ISO 9000 (Quality Management Systems)
• Prerequisite program of ISO 22000
• “Heart” of ISO 22000
What is HACCP?

• Identify and assess hazards and risks associated with food production to food preparation
  – From farm to plate approach.
  – From primary producers to consumers
  – From supplier to customer
  – Defines preventive measures for hazard control
  – Product specific, line and site specific

Hazard Identification + Control = Prevention
Session 2
Food Hazards
What are Food Safety Hazards?

• A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.
Examples of Food Safety Hazards

- Biological
  - Bacteria
  - Fungi (molds and yeasts)
  - Viruses
  - Parasites
Examples of Biological Hazards

- Salmonella species
- Clostridium perfringens
- Clostridium botulinum
- Bacillus cereus
- Staphylococcus aureus
- E. coli
- Hepatitis A
- Norwalk
- Vibrio
- Trichinella spiralis
- Giardia lamblia
Examples of Biological Hazards in Food Products

- Milk and processed meat products - *Salmonella* spp., *Listeria monocytogenes*, *enterohemorrhagic E. coli*, *Campylobacter jejuni*
- Sporeforming bacteria such as *Clostridium botulinum* and *Bacillus cereus*
- Levels - $10^6$
- Control – heat treatment 21 CFR 108 and 113
## Common Pathogenic and Spoilage Microorganisms for Food Categories Found in Retail Establishments.

<table>
<thead>
<tr>
<th>Food Category</th>
<th>Pathogens</th>
<th>Spoilage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Produce</td>
<td>Yersinia enterocolitica Bacillus cereus Salmonella Shigella Listeria Enteropathogenic Escherichia coli</td>
<td>Erwinia carotovora Pseudomonas Bacillus Molds (Alternaria, Botrytis, Listeria Penicillium, Phytophthora)</td>
</tr>
<tr>
<td>Hot/ Cold Delicatessen</td>
<td>Staphylococcus aureus Shigella species Clostridium perfringens Listeria monocytogenes</td>
<td>Enterococci Pseudomonas lactic acid bacteria coliforms yeast</td>
</tr>
<tr>
<td>Bakery</td>
<td>Norwalk virus Molds Norwalk-like viruses</td>
<td>Molds Bacillus subtilis</td>
</tr>
</tbody>
</table>
Common Pathogenic and Spoilage Microorganisms for Food Categories Found in Retail Establishments.

<table>
<thead>
<tr>
<th>Food Category</th>
<th>Pathogens</th>
<th>Spoilage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butcher Shop</td>
<td>Salmonella, Campylobacter jejuni, Clostridium perfringens, Escherichia coli, Listeria monocytogenes, Staphylococcus aureus</td>
<td>Pseudomonas, Acinetobacter, Moraxella, Lactobacillus</td>
</tr>
<tr>
<td>Seafood</td>
<td>Vibrio cholerae, Vibrio parahaemolyticus, Clostridium botulinum type E, Norwalk virus</td>
<td>Pseudomonas</td>
</tr>
<tr>
<td>Dairy/Egg</td>
<td>Salmonella, Campylobacter jejuni, Bacillus cereus, Yersinia enterocolitica, Listeria monocytogenes</td>
<td>Pseudomonas, Flavobacterium, Alcaligenes</td>
</tr>
</tbody>
</table>

Eggs

• Cleaning/Washing of Eggs
• Washing removes the bloom from the egg shell making it easier for bacteria to get inside the egg through the pores.
• The temperature of the wash solution must be kept above that of the egg and its contents to ensure that extraneous matter is not ‘sucked’ into the egg.
Common Sources of Foodborne Pathogens

• Animals
• Raw foods, such as
  – meat and poultry
  – fish
  – Eggs
  – fruits and vegetables
• Water
• Air and dust
• People
• Pests
• Dirt, garbage and trash
Viruses

• Contamination of food by viruses, if it occurs, is most likely to be caused by contaminated water or an ill individual.
• Fecal-oral route
• PRP Controls through employee health and hygiene conditions
Chemical Hazards

• Naturally Occurring Chemicals
  – Mycotoxins (e.g., aflatoxin) from mold
  – Scombrototoxin (histamine) from protein decomposition
  – Ciguatoxin from marine dinoflagellates
  – Toxic mushroom species
  – Shellfish toxins (from marine dinoflagellates)
  – Paralytic shellfish poisoning (PSP)
  – Diarrheic shellfish poisoning (DSP)
  – Neurotoxic shellfish poisoning (NSP)
  – Amnesic shellfish poisoning (ASP)
  – Plant toxins
  – Pyrrolizidine alkaloids
  – Phytohemagglutinin
Food Allergens

Allergens and substances that cause food sensitivities added to products as ingredients.

Most food allergens are proteins.

Allergens are not present in all products.
Chemical Hazards Milk

• Undeclared food allergens in dairy products due to cross-contact from shared processing equipment

• Cross-contact is generally the result of environmental exposure during processing or handling

• Poor re-work management

• Ineffective cleaning.
Allergen Control Program

Scheduling product changeovers

Sanitation

The presence of any ingredient must be declared on the label in accordance with the food labeling regulations in 21 CFR Part 101.

Proper labeling – allergen declaration

Ingredient control, formulation
Chemical Hazards

• **Added Chemicals**

• **Agricultural chemicals:**
  – Pesticides, fungicides, fertilizers, insecticides, antibiotics and growth hormones
  – Polychlorinated biphenyls (PCBs)
  – Industrial chemicals
  – Prohibited substances (21 CFR 189)
  – Direct
  – Indirect
Agricultural Chemical Residues

• Pesticide residue from pesticides are used widely to treat (e.g., for insect control) fruits, vegetables, grains and other foods
• U.S. government regulatory programs address aspects of pesticide usage
• Source control
Animal Drug Residues

- Animal drug residues are present at low levels in a very low percentage of raw milk received at milk plants in the U.S.
- These residues are regulated under PMO Appendix N for both the traditional and the HACCP alternative systems.
- Source control
Drug and Antibiotic Residues

- Drug residues in milk - In U.S. - National Drug Residue data base consulted to obtain the latest information on drug residues in milk
- Antibiotic residues – used in disease control in animal raising
- Source control
Common Sources of Chemical Hazards

• Ingredients
• Cleaning products
• Products used in agriculture
• Pest control products
• Equipment
Examples of Food Safety Hazards

• Physical
  o broken glass
  o hair, fingernails,
  o jewelry, hair pins
  o unfrilled toothpick
  o stones, leaves
  o paper, packaging
  o metal shavings
  o pieces of worn equipment
  o peeling paint
Physical Hazards

- cause injury or present a choking hazard.
- part of the hazard analysis when metal fatigue, wear of metal parts, or metal to metal contact can occur in processing equipment.
- See FDA compliance policy guide chapter 5 sub 555 section 555.425 (Adulteration involving hard or sharp objects March 1999)
# Main Materials of Concern as Physical Hazards and Common Sources (FDA)

<table>
<thead>
<tr>
<th>Material</th>
<th>Injury Potential</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass fixtures</td>
<td>Cuts, bleeding; may require surgery to find or remove</td>
<td>Bottles, jars, light, utensils, gauge covers</td>
</tr>
<tr>
<td>Wood</td>
<td>Cuts, infection, choking; may require surgery to remove</td>
<td>Fields, pallets, boxes, buildings</td>
</tr>
<tr>
<td>Stones, metal</td>
<td>Choking, broken teeth, cuts, infection; may require surgery to remove</td>
<td>Fields, buildings, machinery, fields, wire, employees</td>
</tr>
<tr>
<td>fragments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation</td>
<td>Choking; long-term if asbestos</td>
<td>Building materials</td>
</tr>
<tr>
<td>Bone</td>
<td>Choking, trauma</td>
<td>Fields, improper plant processing</td>
</tr>
<tr>
<td>Plastic</td>
<td>Choking, cuts, infection; may require surgery to remove</td>
<td>Fields, plant packaging materials, pallets, employees</td>
</tr>
<tr>
<td>Personal effects</td>
<td>Choking, cuts, broken teeth; may require surgery to remove</td>
<td>Employees</td>
</tr>
</tbody>
</table>
Common Sources of Physical Hazards

- People
- Packaging
- Raw food and the natural environment
- Buildings and equipment
- Pests
Session 3
Prerequisite Programs
Prerequisite Programme (PRP)

• Food safety basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end products and safe food for human consumption

• Aim is to produce safe food

• Depend on the segment of the food chain in which the organization operates and the type of organization
Function of PRP

- Effective pre-requisite programs promote conditions that help to produce safe food. They are essential to support the foundation of a preventive food safety control system.

- Pre-requisite programs include many control measures necessary for producing safe food.

- Implementation of these control measures is encouraged before processing begins.
Documentation of PRP

• Maintaining appropriate documentation and records - provide an indication of whether the control measures are implemented effectively.

• When implemented, should include written policies and/or procedures (SOPs, guidelines).
HACCP Prerequisite Programs (PRP’s)
GMP/SSOP provide the basic foundation for the development of a HACCP system.
Session 4
12 Steps to HACCP Application
12 Steps in HACCP Application

• **Step 1** - Assemble the HACCP Team

• **Step 2** - Describe the food and the method of its distribution

• **Step 3** - Identify intended use and consumers of the food

• **Step 4** - Construct process Flow Diagram and Plant Schematic

• **Step 5** - On-site verification of Flow Diagram and Plant Schematic
12 Steps in HACCP Application

• **Step 6** – List all Potential Hazards, Conduct Hazard Analysis Consider Control Measures (Principle 1)
• **Step 7** – Determine Critical Control Points – CCP (Principle 2)
• **Step 8** – Establish Critical Limits for each CCP (Principle 3)
• **Step 9** – Establish a Monitoring system for each CCP (Principle 4)
• **Step 10** – Establish Corrective Actions (Principle 5)
• **Step 11** – Establish Verification Procedures (Principle 6)
• **Step 12** – Establish Documentation and Record Keeping (Principle 7)
HACCP STEP 1
12 Steps in HACCP Application (Preparation Stage)

Step 1 - Assemble the HACCP Team

• Get cross-functional representatives throughout the food plant or operation
  – Production
  – Engineering
  – Logistics
    • Inbound
    • Outbound
  – Quality Control/Quality Assurance
  – Product Development
  – Sanitation
Collectively the HACCP Team has knowledge and expertise of the product entire life cycle from raw material to finished product.
12 Steps in HACCP Application (Preparation Stage)

Step 1 - Assemble the HACCP Team

• Responsibilities of HACCP Team
  – Develops and drives the organization’s HACCP system
    • Determines the scope of the HACCP system
    • Prepares pertinent HACCP documents
    • Verifies the validity of the HACCP Plan
    • Reports to top management the status of HACCP implementation
  – Assesses the correct balance of technical and industrial experiences
  – Recommends a HACCP Team Leader

Fund and Advised by:

IFT International Finance Corporation
World Bank Group

Consulting Organization
Asia Society for Social Improvement and Sustainable Transformation

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Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

• Qualities of a Good HACCP Team Leader
  – A basic knowledge of Microbiology and Food-borne illness
  – An understanding of good sanitation, GMP’s and industry operations
  – A basic understanding of chemical and physical hazards
Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

• Qualities of a Good HACCP Team Leader
  – Practical experience of working in or with food production and handling operations
  – An understanding of the equipment and means to control or eliminate potential hazards in a food plant
  – Good communication skills
  – Good leadership skills
Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

• Responsibility of HACCP Team Leader
  – Make sure team members understand the HACCP principles and how these are implemented.
  – Initiate in-house training programs
    • Understanding HACCP Principles
    • Good Manufacturing Practices
    • Proper Product Handling
Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

- HACCP team meetings minutes
- Attendance
- Tasks and responsibilities
Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

- Develop a HACCP plan and supporting materials
- Set-up Verification function
- Set-up Auditing functions
Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

• The team follows certain steps in order to build the HACCP Program:

• Planning
  – collect ingredient information
  – test raw materials, packaging materials, finished goods
  – Collect process flow information

• Hazard Analysis
  – fill out product description forms
  – fill out hazard analysis sheets: biological, chemical, physical
  – determine risks
Initial Approach to HACCP

Step 1 - Assemble the HACCP Team

• Critical Control Points:
  – determine critical control points; establish critical limits
  – determine control steps

• Measurement:
  – develop measurement methods
  – implement measurement systems

• Verification:
  – establish verification function

• Auditing:
  – establish auditing function

• Training:
  – share information
List of Required Documents From Suppliers

• Ingredient Specification Sheet
• Nutritional Information
• Continuing Food Guarantee
• Biosecurity Act Compliance
• Declaration of Allergens
Ingredient Specification Sheet

- Lists the name of ingredient and gives general description, the supplier’s ingredient number, the ingredient statement, the packaging and palletizing method, storage conditions, and shelf life at the recommended storage.

- Any specific physical, chemical and microbiological attributes along with the target specification, tolerance or range from the target and the testing method used by the supplier to evaluate the attributes.

- Used as a basis for evaluating possible physical, chemical, microbiological or allergen hazards.
Nutritional Statement

• Lists the nutritional breakdown of the ingredient

• Ask supplier for a proximate analysis or in order to analyze the nutritional breakdown from a database.
Biosecurity Act Compliance

• Each ingredient supplier is required to register its company under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002.
• This act requires manufacturers, processors, packers, distributors, receivers, distributors, holders, and importers of food to keep specific records on their suppliers and customers.
• Allows traceability
Declaration of Allergens

- This statement is a list of the Top 8 or Top 16 food allergens
- The declaration specifies whether the supplied ingredient contains the allergen
- An allergen-containing ingredient is used on the same production line as the ingredient, or
- An allergen-containing ingredient is stored in the same warehouse as the supplied ingredient.
Allergen Declaration - Geographic Difference

- Japan – peach and buckwheat
- EU – lupin, celery, mustard
Top 16 Food Allergens

- Peanuts
- Tree Nuts
- Eggs and Egg Products
- Soy and Soya Products
- Fish and Fish Products
- Wheat and Wheat Products
- Milk and Milk Products
- Crustaceans
- Celery
- Mustard
- Sesame seeds
- Sulfites
- MSG
- F&C Yellow No. 5
- Gelatin
- Hydrolyzed Proteins
Continuing Food Guarantee

- This document guarantees that the ingredient is manufactured in accordance with sanitary guidelines as set forth in the FDA (or by an authority in country of origin).
Food-Grade Certificate, GRAS Certificate

- Food-grade declaration or GRAS (Generally Recognized As Safe) certificate

- 21 CFR Sec 170.30 Title 21 Chapter I Subchapter B
Documents from the Suppliers

• Material Safety Data Sheet ("must" for cleaning chemicals and pesticides) and for other products that could result in hazardous exposure situation. Include products such as flavors with hazardous material carrier such as alcohol, or pose an explosion hazard such as flour.

• Kosher Certificate
• Organic Certificate
• Non-GMO statement
• Vegan Certificate
• Halal Certificate
### Tests and Documents Needed

<table>
<thead>
<tr>
<th>Tests/Documents Needed</th>
<th>Physico-chemical Analysis</th>
<th>Microbiological Analysis</th>
<th>Pesticide residue, afltoxin, dioxin, furan,</th>
<th>Food – grade Certificate</th>
<th>MSDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-milled rice</td>
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<td>Plastic sack – 50 kg</td>
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<td>P E bag – liner</td>
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<td>Jumbo bag</td>
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<td>Lubricant</td>
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<tr>
<td>Water for misting in polishing and hand washing</td>
<td><img src="image" alt="star" /></td>
<td><img src="image" alt="star" /></td>
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<tr>
<td>Air for color sorter</td>
<td><img src="image" alt="star" /></td>
<td><img src="image" alt="star" /></td>
<td><img src="image" alt="star" /></td>
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<tr>
<td>Finished goods – Milled Rice</td>
<td><img src="image" alt="star" /></td>
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<tr>
<td>FG, start and end of shelf life</td>
<td><img src="image" alt="star" /></td>
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</tbody>
</table>
Workshop 1. HACCP TEAM

- Group the participants with 5 members per team
- Each group forms a HACCP team
- List the people who should form the HACCP Team and the reasons (knowledge/skills) why they are selected.
- Use Worksheet No. 1
- Time Limit: 15 minutes
- Sample presentation by 2 groups
# Worksheet 1. HACCP Team

<table>
<thead>
<tr>
<th>Function in the Team</th>
<th>Name</th>
<th>Position with Company</th>
<th>Knowledge/Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Leader</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Team Member</td>
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<tr>
<td>Team Member</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Member</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Team Member</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HACCP STEP 2
12 Steps HACCP Application (Preparation Stage)

Step 2 - Describe the product and the method of its distribution - Documents from the Suppliers

- Product description should include the following
  - Composition or ingredients
  - Shelf life
  - Storage requirements
  - Distribution Method
12 Steps HACCP Application (Preparation Stage)

Step 2 - Describe the product and the method of its distribution - Documents from the Suppliers

• Some questions to be answered by the HACCP Team:
  ✓ Will it be used as an ingredient by another manufacturer?
  ✓ Is it sold as retail product?
  ✓ How it is expected to be used?
  ✓ How it is expected to be stored by the customers?
  ✓ How is it processed?
  ✓ How is it packaged?
  ✓ What kind of packaging is used?
  ✓ How is it stored before shipment?
# Product Description: Copra cake

<table>
<thead>
<tr>
<th>Name of Product</th>
<th>Copra cake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product description</td>
<td>Coconut flesh residue after expelling oil</td>
</tr>
<tr>
<td>Packaging</td>
<td>In bulk load in a ship’s hatch.</td>
</tr>
<tr>
<td>Conditions of Storage</td>
<td>Ambient temperature in the millers’ warehouse at 25 to 35°C.</td>
</tr>
<tr>
<td>Shelf-life</td>
<td>Up to 6 months at a maximum of 12% moisture content.</td>
</tr>
<tr>
<td>Target Consumer</td>
<td>For local or foreign feed compounders or millers.</td>
</tr>
<tr>
<td>Customer Specification</td>
<td>Maximum moisture content of 12%, pelletized, contains less than 20 ppb of Aflatoxin B₁.</td>
</tr>
<tr>
<td>Intended Use</td>
<td>As feed ingredients intended for animal livestock like poultry, hogs, cow and goats.</td>
</tr>
</tbody>
</table>
Sample Worksheet 2. Describe the Product and Intended Use

<table>
<thead>
<tr>
<th>Characteristics of End-Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name (product, product group, line )</td>
</tr>
<tr>
<td>Type ( e.g. raw, cooked, RTE)</td>
</tr>
<tr>
<td>Key Physical and chemical characteristics ( water activity, pH)</td>
</tr>
<tr>
<td>Key processing steps</td>
</tr>
<tr>
<td>Incoming Materials</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>List all raw materials/ ingredients with RM numbers</td>
</tr>
<tr>
<td>High-risk ingredient (e.g. allergen, microbial risk, foreign body source)</td>
</tr>
<tr>
<td>Packaging materials in contact with food</td>
</tr>
<tr>
<td>Rework</td>
</tr>
<tr>
<td>Others (processing aids, preservatives)</td>
</tr>
</tbody>
</table>
# Specifications and Regulatory Requirements (food safety-related)

<table>
<thead>
<tr>
<th>Product Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Product-specific regulatory</td>
<td></td>
</tr>
<tr>
<td>requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Filling and Packing</td>
<td></td>
</tr>
<tr>
<td>Packaging Description (e.g. size)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaging system (e.g. modified</td>
<td></td>
</tr>
<tr>
<td>atmosphere)</td>
<td></td>
</tr>
</tbody>
</table>
# Claims and label Information

## Specifications and Regulatory Requirements (food safety-related)

<table>
<thead>
<tr>
<th>Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Specifications</td>
<td></td>
</tr>
<tr>
<td>Product-specific regulatory requirements</td>
<td></td>
</tr>
<tr>
<td>Filling and Packing</td>
<td></td>
</tr>
<tr>
<td>Packaging Description (e.g. size)</td>
<td></td>
</tr>
<tr>
<td>Packaging system (e.g. modified atmosphere)</td>
<td></td>
</tr>
<tr>
<td>Use by Consumers</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>---</td>
</tr>
<tr>
<td>Intended Use</td>
<td></td>
</tr>
<tr>
<td>Target group of users and special consumer considerations (infants, elderly)</td>
<td></td>
</tr>
<tr>
<td>Reasonable expected mishandling and misuse</td>
<td></td>
</tr>
</tbody>
</table>
HACCP STEP 3
12 Steps HACCP Application (Preparation Stage)

Step 3 – Identify intended use

• Determine how and by whom the food will be used
• Who are users or consumers?
• How will it be used?

5 Sensitive Population (At Risk Population)
– infants and babies
– aged or elderly
– pregnant and lactating women
– immuno-compromised (AIDS victims)
– sick
Workshop 2. Describe the Product and Intended Use

• Group the participants into 5 per team
• Let the group decide on a product to work on
• Using Worksheet No. 2, describe the selected product. Refer to sample worksheet. This will be the template to be used for the workshop.
• Time limit: 15 minutes
• Sample presentation by 2 teams: 10 minutes per presentation
### Sample Worksheet 2. Product Description and Intended Use

<table>
<thead>
<tr>
<th>Characteristics of End-Product</th>
<th>Milled rice of the following varieties: Jasmine rice, Sen Kroub, IR rice, Pra Khaney, Phka Romdoul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name (product, product group, line )</td>
<td>raw</td>
</tr>
<tr>
<td>Type ( e.g. raw, cooked, RTE)</td>
<td>raw</td>
</tr>
</tbody>
</table>
| Key Physical and chemical characteristics ( water activity, pH) | 14% Moisture Content  
Aflatoxin content ______  
Other mycotoxin level (fumonisin, ochratoxin, etc.) ______  
Pesticide (identify pesticide) residue______  
Dioxin level ________ |
| Microbiological Profile | Total Plate count  
Molds and Yeasts  
Coliforms  
E coli  
Salmonella |
<p>| Key processing steps | Pre-cleaning, destoning, polishing, color sorting, magnet packing |</p>
<table>
<thead>
<tr>
<th>Incoming Materials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>List all raw materials/ ingredients</td>
<td>Semi-milled rice</td>
</tr>
<tr>
<td>High-risk ingredient (e.g. allergen, microbial risk, foreign body source)</td>
<td>Water</td>
</tr>
<tr>
<td>Packaging materials in contact with food</td>
<td>Water – should be potable</td>
</tr>
</tbody>
</table>
| Primary packaging | For 1 kg – PE bag thickness: ______ size: ____  
For 20 kg – PE bag thickness: ___ size: ___  
For 50 kg – PE bag thickness: ___ size: ___  
For 1000kg : jumbo plastic bag ( _______ ) |
| Secondary Packaging | For 1 kg – plastic sack: size: ____  
For 20 kg – plastic sack size: ___  
For 50 kg – plastic sack size: ___ |
| Rework | From packing, storage and loading defects |
| Preservatives | None |
## Specifications and Regulatory Requirements (food safety-related)

<table>
<thead>
<tr>
<th>Product Specifications</th>
<th>Variety: 5%, 15%, 100% broken 14% moisture</th>
<th>Yellow kernels:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Damaged:</td>
<td>Underdeveloped and foreign matter:</td>
</tr>
<tr>
<td></td>
<td>Red Kernels:</td>
<td>Stone:</td>
</tr>
<tr>
<td></td>
<td>Sand and earth:</td>
<td></td>
</tr>
</tbody>
</table>

| Product-specific regulatory requirements | 15% Moisture Content ; Fumigated |

<table>
<thead>
<tr>
<th>Filling and Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging Description (e.g. size)</td>
</tr>
<tr>
<td>1 kg, 20kg, 25kg, 50 kg, 1000kg</td>
</tr>
<tr>
<td>Claims and label Information</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Instruction for use by Consumers (incl. use or storage after opening)</td>
</tr>
<tr>
<td>Statements for safe use (e.g. allergen info, special instruction for safe handling)</td>
</tr>
<tr>
<td>Distribution and Storage</td>
</tr>
<tr>
<td>Distribution Instructions (e.g. ambient, chilled, frozen)</td>
</tr>
<tr>
<td>Storage instructions (e.g. ambient, chilled, frozen)</td>
</tr>
<tr>
<td>Shelf life conditions</td>
</tr>
<tr>
<td>Use by Consumers</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Intended Use</td>
</tr>
<tr>
<td>Target group of users and special consumer considerations (infants, elderly)</td>
</tr>
<tr>
<td>Reasonable expected mishandling and misuse</td>
</tr>
<tr>
<td>Use by Consumers</td>
</tr>
<tr>
<td>Intended Use</td>
</tr>
<tr>
<td>Target group of users and special consumer considerations (infants, elderly)</td>
</tr>
</tbody>
</table>
HACCP STEP 4
12 Steps HACCP Application (Preparation Stage)

Step 4 - Construct process flow diagram and plant schematic

• Consider the following information:
  – Identify the start and end of the process, from raw material to finished product
  – Identify the point of entry of other food ingredients, food additives, and packaging materials
12 Steps HACCP Application (Preparation Stage)

Step 4 - Construct process flow diagram and plant schematic

- Consider the following information:
  - Identify processing parameters per process
  - Personnel traffic flow
    - Cleanest to dirtiest
    - From washrooms to the working area
    - From canteen to the working area
    - Location of footbaths and hand-wash station

Note: recommendations for the prerequisite programs to build the foundation for food safety
Workshop 3. Flow Diagram and Plant Schematic

- Using the same grouping and the described product, draw a detailed Process Flow Diagram.
- The process flow diagram will identify the important process steps (from receiving to final shipping) used in the production of the specified product.
- Each process step should be considered in detail and the information expanded to include all relevant process data:
  - all ingredients and packaging used
  - sequence of all process operations (including raw material addition)
  - Time/temperature history of all raw materials and intermediate and final products, including the potential delay.
  - Flow conditions for liquids and solids
- Note: This process flow diagram will be used for the remainder of your course exercises.
- Draw a plant schematic showing traffic flow of employees and materials
- Time limit: 30 minutes
- Group presentation: 10 minutes per team
Workshop 3 Cont.

Plant Schematic
A plant schematic must be developed to show product flow and employee traffic patterns within the plant for the specific product.
- the diagram should include the flow of all ingredients and packaging materials from the moment they are received at the plant, through storage, preparation, processing, packaging, finished product holding and shipping.
- The personnel flow should indicate employee movement through the plant, including changing room, toilets and lunchroom. The location of handwashing facilities and food baths (if applicable) should be noted.

Time: 30 min
Team Presentation: 30 min
HACCP STEP 5
12 Steps HACCP Application
(Preparation Stage)

Step 5 - On-site verification of Process Flow Diagram and Plant Schematic

- Confirm the flow diagram
  - Observe the current practice
  - Compare the written or drawn process flow against the actual operation
  - Validate the consistency of the practice in all production shifts or batches
  - HACCP Team signs the validated process flow.
- Remember the Golden Rule in HACCP:
  
  **Miss a Step, Miss a Hazard.**
HACCP STEP 6
Principle No. 1
List all Potential Hazards, Conduct Hazard Analysis, Consider Control Measures
Objectives of Principle No. 1

- To identify potential food safety hazards that can most likely to occur in the food under consideration
- To evaluate the potential food safety hazards as to its likelihood of occurrence and severity to cause injury or illness.
- To decide what hazards are significant and must be addressed in the HACCP plan
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

• Hazard Analysis
  – is systematic and complete inspection of a product’s manufacturing system to determine where hazards can occur and what preventive measures can be used to deal with these hazards
  – To decide what hazards are significant and must be addressed in the HACCP Plan
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

- **Hazard Analysis**
  - Must be specific for a product
  - Must be specific for a process
  - Should identify all potential food safety hazards from food ingredients, processing aids and packaging materials
  - Should be conducted after all pre-requisite programs are designed and implemented
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

• **List Potential Food Safety Hazards**
  – Food Safety Hazards that can reasonably occur in each of the process steps involve in the production or preparation of the identified food product wherein GMP and SSOP are very well in place.
Food Safety Hazards
Reasonable Occurrence

- It is known to occur
- Historically has occurred
- Based on information, researches, or scientific study it has a high possibility it will occur in the process or product
- Mostly known to occur
  - There is a reasonable possibility that it will occur in a product in the absence of CONTROLS.
Time/temperature Control for Safety (TCS) Foods

- Red meats
- Poultry
- Raw shell eggs
- Fish and shellfish
- Dairy products
- Vegetables such as cooked rice or potatoes
- Refried beans
- Raw seed sprouts
- Cut cantaloupes
- Garlic and oil mixtures that are not modified in a way to inhibit the growth of microorganisms
Potential Food Safety Hazards:

- **Staphylococcus aureus** - contamination through hand contact with product
- **Salmonella** - growth and multiplication in favorable condition
- **E.coli** - Fecal and water borne contaminants

Example: Fried Chicken Process Flow

1. Receiving of Finished Goods
2. Storage of Received Goods
3. Food Preparation
4. Cooking Proper
5. Serving
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

- List Potential Food Safety Hazards
  - The process involves:
    - Name the food safety hazards.
      - Use NAME words or NOUN to identify the food safety hazards
    - Categorize the identified food safety hazards.
      - Biological
      - Chemical
      - Physical
      - Allergens
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

- List Potential Food Safety Hazards
  - The process involves:
    - Identify the source or cause of the food safety hazards
    - Identify control measures per hazard
    - Conduct Hazard Analysis by:
      - Identify the severity and likelihood of occurrence
      - Weigh the risk associated with the hazard. Use the Hazard Significance Matrix for Food Safety
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

• After identification of potential food safety hazards
• Do the HAZARD EVALUATION, based on;
  – Likelihood of occurrence, and
  – Severity of illness or injury to consumers
12 Steps HACCP Application
(Implementation Stage)
Principle 1 - Conduct Hazard Analysis

• **Likelihood of Occurrence**
  – Probability that a condition will lead to a hazard
  – Frequency of Occurrence

• **Severity**
  – Seriousness of the consequences of the results of a hazard
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis

- Likelihood of Occurrence (Frequency)
  A. Common repeating occurrence
  B. Known to occur or “it has happened” (own information)
  C. Could occur or I’ve heard of it happening (published information)
  D. Not expected to occur
  E. Practically Impossible
12 Steps HACCP Application (Implementation Stage)
Principle 1 - Conduct Hazard Analysis - Principle 1

• Severity (Consequences)
  1. Fatality
  2. Serious Sickness
  3. Product Recall
  4. Customer Complaint
  5. Not Significant
## Hazard Significance Matrix

<table>
<thead>
<tr>
<th>Likelihood (Frequency)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Severity (Consequence)</strong></td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>9</td>
<td>13</td>
<td>17</td>
<td>20</td>
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<tr>
<td>4</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>19</td>
<td>22</td>
<td>24</td>
<td>25</td>
</tr>
</tbody>
</table>
12 Steps HACCP Application (Implementation Stage)
Principle No. 1 - Conduct Hazard Analysis

• How to Use the Hazard Significance Matrix for Food Safety

1. Assess the likelihood of occurrence of identified hazard in a process step.
2. Write the rating in the Hazard Analysis Table under the column for “Likelihood”
3. Assess the severity of the hazard if it will occur
4. Write the rating on the Hazard Analysis Table under column for “Severity”
## Hazard Significance Matrix

<table>
<thead>
<tr>
<th>Likelihood (Frequency)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity (Consequence)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>11</td>
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<tr>
<td>2</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>9</td>
<td>13</td>
<td>17</td>
<td>20</td>
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<tr>
<td>4</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>21</td>
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</tr>
<tr>
<td>5</td>
<td>15</td>
<td>19</td>
<td>22</td>
<td>24</td>
<td>25</td>
</tr>
</tbody>
</table>
12 Steps HACCP Application (Implementation Stage)
Principle No. 1 - Conduct Hazard Analysis

• How to Use the Hazard Significance Matrix for Food Safety

Assessment of Hazard Significance:
A significance factor of > 10 is considered an acceptable risk, may be controlled by PRP (GMP, SSOP)

A significance factor of 10 and below, it is essential to have an appropriate control measure to manage the identified hazards. Such control measure may be a CCP.
Workshop 4. Hazard Analysis

• Using the flow diagram of the product selected, list the potential food safety hazards in the production of your chosen product.

• Using the Hazard Analysis Table provided, complete the columns under Principle 1.

• Time Limit: 1 hour

• Group Presentation: 20 min/group
# Hazard Analysis Worksheet

<table>
<thead>
<tr>
<th>Principle 1</th>
<th>Principle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step/Inpu</strong></td>
<td><strong>Risk</strong></td>
</tr>
<tr>
<td><strong>Hazard</strong></td>
<td></td>
</tr>
<tr>
<td><strong>S.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>C.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>M.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>I.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>O.</strong></td>
<td></td>
</tr>
</tbody>
</table>

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[Consulting Organization](https://www.asiainitiative.org)
HACCP STEP 7
Principle No. 2 – Determine Critical Control Points – CCP
Objectives of Principle No. 2

• To identify the point or points in the process where the food safety hazards can best be controlled.

• To identify criticality of control points through the use of a CCP decision tree.
12 Steps HACCP Application (Implementation Stage)
Principle No. 2 – Determine CCP

• **CCP** - The last step where intervention can be done to prevent, control, or eliminate the food safety hazards present before the food will be delivered or served to customers.

CCP are points were food safety hazards can be controlled
**Example: Fried Chicken Process Flow**

**Potential Food Safety Hazards:**

- *Staphylococcus aureus* - contamination through hand contact with product
- *Salmonella* - growth and multiplication in favorable condition
- *E.coli* - Fecal and water borne contaminants

**Flow:**
- Receiving of Finished Goods
- Storage of Received Goods
- Food Preparation
- Cooking Proper
- Serving

**CCP**

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[IFC International Finance Corporation]

[ASSIST Asia Society for Social Improvement and Sustainable Transformation]
12 Steps HACCP Application (Implementation Stage)
Principle No. 2 – Determine CCP

- **Critical Control Point (CCP)** - maybe a raw material, a location, a practice, a procedure or a process stage at which control can be applied to a food safety hazard to prevent, eliminate or reduce the risk.
  - a “kill” step to eliminate potential growth and multiplication of biological hazards like food-borne pathogens
  - a “control” step to prevent or retard physical or chemical food safety hazards
12 Steps HACCP Application (Implementation Stage)
Principle No. 2 – Determine CCP

- Critical Control Point (CCP) should be specifically stated, for example:
  - Receiving of raw materials
  - Pasteurization of milk
  - Cooking of Meat
  - Carcass Chilling
  - Bottle Washing
  - Storing of Finished Products
  - Metal Detecting
12 Steps HACCP Application (Implementation Stage)
Principle 2 – Determine CCP

• Determine the CCP
  – The process involves:
    1. Identification of food safety hazards with a significant value of 10 and below
    2. Subjecting the identified food safety hazards with a value of 10 and below to CCP Decision Tree
Points to Remember in Using a CCP Decision Tree

• Decision Tree is used after Hazard Analysis

• Decision Tree is used at the steps where a “Significant Hazard” has been identified (Step 6 of Principle No.1)

• A subsequent step in the process may be more effective for controlling a hazard.
  – Thus may be the preferred CCP.
Do preventive control measures exist?

- **YES**
  - Is control at this step necessary for safety?
    - **NO**
      - Not a CCP
    - **YES**
      - Modify steps in the process or product

- **NO**
  - Could contamination with identified hazard(s) occur in excess of acceptable level(s) or could these increase to unacceptable levels?
    - **YES**
      - STOP*
    - **NO**
      - Not a CCP

Is the step specifically designed to eliminate or reduce the likely occurrence of a hazard to an acceptable level?**

**Q2**

- **NO**

Could contamination with identified hazard(s) occur in excess of acceptable level(s) or could these increase to unacceptable levels?**

**Q3**

- **YES**

Will a subsequent step eliminate identified hazard(s) or reduce likely occurrence to acceptable levels?**

**Q4**

- **YES**
- **NO**

* Proceed to the next identified hazard in the described process

** Acceptable and unacceptable levels need to be determined within the overall objectives in identifying the CCPs of the HACCP plans
Points to Remember in Using a CCP Decision Tree

• Decision Tree is used after Hazard Analysis

• Decision Tree is used at the steps where a “Significant Hazard” has been identified (Step 6 of Principle No.1)

• A subsequent step in the process may be more effective for controlling a hazard.
  – Thus may be the preferred CCP.
Points to Remember in Using a CCP Decision Tree

• More than one step in a process may be identified as a CCP
  – Example: in processed cheese – filtration, cooking and metal detection can be CCPs

• More than one hazard may be controlled by an identified CCP.
Relationship of CCPs and Hazards

• Single food safety hazard can be controlled by multiple CCPs
  – Example: in purified drinking water, biological hazard can be controlled by chlorination and UV irradiation

• Multiple food safety hazards can be controlled by single CCP
  – Example in flour manufacture, sifting can control different kinds of physical hazards

• A single hazard controlled by a single CCP is usually preferred

CCP is the LAST CHANCE to control a significant food safety hazards
Workshop 5. Determine the CCP

• Using the Hazard Analysis Table, work on the columns under Principle 2.
• Use the Decision Tree as guide in deciding whether a step/input is a CCP or CP.
• Time Limit: 45 minutes
## Hazard Analysis Table

<table>
<thead>
<tr>
<th>Step/Input</th>
<th>Principle 1</th>
<th>Principle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hazard</td>
<td>Cause</td>
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<td>S. F.</td>
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<td>Control Measures</td>
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<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td></td>
<td>CCP/CP</td>
<td>Reason for Decision</td>
</tr>
</tbody>
</table>

---

**Principle 1**

**Principle 2**
HACCP STEP 8
12 Steps HACCP Application
Step 8

Principle No. 3
Establish **Critical Limits** for each CCP
Objective of Principle No. 3

• To apply quantifiable values in controlling identified critical control point or CCP.
12 Steps HACCP Application
(Implementation Stage)
Principle No.3 - Establish Critical Limits for each CCP

- **Critical Limit** - values which separate acceptability from unacceptability. These parameters, if maintained within boundaries, will confirm the safety of the product.

*Set limits for preventive measures!*
12 Steps HACCP Application (Implementation Stage)
Principle No.3 - Establish Critical Limits for each CCP

• **Critical Limit** - Minimum and maximum limits that the CCP must meet in order to prevent, eliminate or reduce a hazard to an acceptable level

**Something measurable!**
Potential Food Safety Hazards:

- *Staphylococcus aureus* - contamination through hand contact with product
- *Salmonella* - growth and multiplication in favorable condition
- *E. coli* - Fecal and water borne contaminants

Fried Chicken Process Flow:

1. Receiving of Finished Goods
2. Storage of Received Goods
3. Serving
4. Cooking Proper
5. Food Preparation
6. CCP: Cook Chicken to a minimum internal temperature of 74°C for 15 seconds

IFC (International Finance Corporation), World Bank Group

Consulting Organization: ASSIST (Asia Society for Social Improvement and Sustainable Transformation)
Critical Limits

• Critical limit is often driven by experience and practicality
• Control of CCP can only be achieved if measured appropriately
• May vary from one plant to another because of equipment or process variations
  – Detection limits of equipment may vary
    • Metal detector
    • pH meter
• Should be supported by science and validated for adequacy in controlling the food safety hazards.
12 Steps HACCP Application (Implementation Stage)
Principle No.3 - Establish Critical Limits for each CCP

- **Examples of Critical limits:**
  - **Pasteurization Time and Temperature**
    - More than 161°C for more than 15 seconds
    - 80 to 85 °C at a minimum of 15 secs.
  - **Carcass Temperature**
    - -3 °C to 7 °C
  - **Product Water Activity**
    - 0.65 to 0.85
  - **Acidification**
    - Soak 100 lbs. pickled vegetables for more than 8.0 hrs. in 3.5% acetic acid to lower the pH below 4.6
Good Choice of Critical Limit

- Practical; controllable during process operation
- Easy
- Rapid Quantification

Processing at a certain temperature for a specific time or flow rate:

- **Hazard:** Presence of E. coli
- **CCP:** Pasteurization
- **Critical limit:** Minimum process temperature of 65°C for at least six seconds
Poor Choice of Critical Limit

• Costly
• Time Consuming
  – Results obtained after operation
• Needs specialized laboratory analysis

Processing at a certain temperature for a specific time or flow rate:

- Hazard: Presence of E. coli
- CCP: Pasteurization
- Critical limit: Negative for E. coli
To prove that the established critical limit will control the food safety hazards

**Validate critical limits**
Why Validate Critical Limits

• **Validation** asks whether the hazard analysis was complete and if the control measures are effective
  – “Are you doing the right thing?”
  – “Are you building the right thing?”
Validate Critical Limits

• What is Validation in HACCP?
  – Validation is done
    • Initially prior to implementation of critical limits
    • Annually, and
    • If there is a change in the process, ingredients or equipment
  – An element of the verification system (Principle No. 6)
  – May involve collecting and evaluating scientific and technical information
Validate Critical Limits

• What does validation involve?
  – Scientific and technical review of the rationale behind each part of the HACCP plan from hazard analysis through each CCP verification strategy

• Validation of the HACCP plan; who does it?
  – HACCP team
  – Individual qualified by training or experience
How to Validate Critical Limits

• Referring the established critical limits to one or more of the following references;
  – Regulatory standards
  – Industry standards
  – Trade associations standards
  – Researches
  – Best practices
Challenge the existing known standards

Verify critical limits

Examples of verification:

• Sampling of feeds for Salmonella before and after conditioning

• Pathogen inoculation before retorting of canned products then conduct microbial assay to detect presence or absence of Clostridium inocula
Critical Limit vs. Operating Limit

- **Operating Limit** is a criterion that is more stringent than a CRITICAL LIMIT
  - It is used by an operator to reduce the risk of deviation.
Critical limit vs. Operating Limit
Critical limit vs. Operating Limit

- **Very safe food**
- **Safe food**
- **Unsafe food**

Diagram: Temperature (Temp) on the y-axis and Time on the x-axis. The diagram shows the relationship between temperature and time, indicating critical and operating limits (CL and OL) for very safe, safe, and unsafe food conditions.
Workshop 6. Validation of Critical Limit

• Using the Critical Limit Validation Record, describe the procedures that you will undertake to validate the critical limit that you have established per CCP.
Worksheet 6: Critical Limit Validation Record

<table>
<thead>
<tr>
<th>Step/Input</th>
<th>Critical Limit</th>
<th>Justification Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
HACCP STEP 9
12 Steps HACCP Application
Step 9

Principle No. 4
Establish a Monitoring System for each CCP
Objectives of Principle No. 4

• To control the identified critical control point through conduct of planned sequence of observations.
• To document the procedures on how to conduct the plan in the control of operation.
• To record monitoring results
12 Steps HACCP Application (Implementation Stage)
Principle No. 4 - Establish CCP Monitoring for each CCP

• **Monitor** - to conduct a planned sequence of observations or measurements to assess whether a CCP is under control
  – It is important to produce an accurate record for future use in verifying results.
Purpose of Monitoring

• Track the operation of the process and enable the identification of trends toward a critical limit that may trigger process adjustments
• Identify when there is a deviation at a CCP
• Provide written documentation of the process control system
12 Steps HACCP Application (Implementation Stage)  
Principle No. 4 - Establish CCP Monitoring for each CCP

• Can be continuous; discontinuous
• Examples of measurements for monitoring:
  – Time
  – Temperature
  – Water Activity
  – pH
  – Concentration
Example: Fried Chicken Process

Monitoring the CCP: The cook uses a calibrated dial thermometer to verify that each chicken portion has reached a minimum internal temperature of 74°C for 15 seconds. Take at least five chicken pieces per cooking batch. Insert the thermometer in the thickest part of each chicken portion. Record the lowest reading.

Cooking Proper

CCP: Cook Chicken to a minimum internal temperature of 74°C for 15 seconds.
Principle No. 4 - Establish CCP Monitoring for each CCP

• Establish procedures for using the results of monitoring to adjust the process and maintain control.
  – Assess whether the CCP is under control!
12 Steps HACCP Application (Implementation Stage)
Principle No. 4 - Establish CCP Monitoring for each CCP

• Should include:
  1) How to monitor the CCP
  2) What to monitor?
      What equipment, materials, or tools needed to monitor the CCP?
  3) When to monitor the CCP?
  4) Where to monitor the CCP?
  5) Who monitors the CCP?
  6) Why monitor the CCP?
Who monitors the CCP?

• Has been trained on how to monitor the CCP
• Has been authorized
  – Has clear defined responsibilities given by authorities
• Follows clearly defined plans and procedures
• Has been given authority to do correction on CCP deviation
• Is responsible to record results of monitoring and other related documentation
12 Steps HACCP Application (Implementation Stage)  
Principle No. 4 - Establish CCP Monitoring for each CCP

• Monitoring Requirements
  – To be done by trained and authorized personnel
  – Needs validation by higher authority
  – Provide calibrated instruments, test and measuring equipment
  – Record results of monitoring. Remember the S.T.A.R.
  – Apply necessary corrective actions for any deviations
12 Steps HACCP Application (Implementation Stage)
Principle No. 4 - Establish CCP Monitoring for each CCP

- When recording the monitoring results, remember the **S.T.A.R.**
  - S = Situation
  - T = Time
  - A = Actual Results
  - R = Record Results of Monitoring and Validation
12 Steps HACCP Application (Implementation Stage)
Principle No. 4 - Establish CCP Monitoring for each CCP

• HACCP records “must have”
  – Actual results of monitoring
  – Signed by the person doing the monitoring
  – erasures or wrong entries countersigned by the inspector
  – Duly validated and signed by an identified authority

Remember RECORDS are objective evidences that the food was processed, inspected and handled properly according to product quality standards
Workshop 7: Monitoring Procedure

- Using the Hazard Analysis Table, work on the columns under Principle 3 & 4.
- Using the established Critical Limit, develop a monitoring procedure per CCP
- Time Limit: 45 minutes
# Worksheet 7: Monitoring Procedure

<table>
<thead>
<tr>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>P5</th>
<th>P6</th>
<th>P7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step/ Input</td>
<td>Hazard</td>
<td>Control Measure</td>
<td>CCP Type</td>
<td>Critical Limit</td>
<td>Monitoring (9)</td>
<td>Corrective Action (10)</td>
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<td>What &amp; Who</td>
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<td>What</td>
<td>Where</td>
<td>How</td>
<td>When</td>
<td>Who</td>
<td>Intermediate</td>
<td>Preventative</td>
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<td>Intermediate</td>
<td>Preventative</td>
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</tbody>
</table>
HACCP STEP 10
Principle No. 5
Establish Corrective Actions
Objectives of Principle No. 5

• To determine appropriate corrective actions to revert the process back to its normal operation
• To determine proper product disposition of non-conforming products
• To control non-conforming products
12 Steps HACCP Application (Implementation Stage)
Principle No. 5 - Establish Corrective Action

• **Corrective Actions**
  – Are actions to be taken when the results of monitoring at a Critical Control Point (CCP) indicate deviation or loss of control
  • Deviation is failure to meet a Critical Limit

  **Are predetermined steps taken when food does not meet a critical limit**
Corrective Actions Components

• To correct and eliminate the cause of the deviation and restore process control
• To identify the product that was produced during the process deviation and determine its disposition

Corrective action: procedures to be followed when a deviation occurs
Example: Fried Chicken Process Flow

**Monitoring the CCP:** The cook uses a calibrated dial thermometer to verify that each chicken portion has reached a minimum internal temperature of 74°C for 15 seconds. Take at least five chicken pieces per cooking batch. Insert the thermometer in the thickest part of each chicken portion. Record the lowest reading.

**Corrective Action:**
Continue cooking the chicken until internal temperature reaches a minimum of 74°C for 15 seconds. Record any corrective actions taken.

**CCP:** Cook Chicken to a minimum internal temperature of 74°C for 15 seconds.
12 Steps HACCP Application
(Implementation Stage)
Principle No. 5 - Establish Corrective Action

• Corrective Actions based on HACCP
  – Immediate Actions or CORRECTION
    • Are done when there is an existing deviation or non-conformance to revert the process to normal operating condition.
  – Corrective Actions
    • Are done to avoid recurrence and possible occurrence of a problem that can lead to deviation or non-conformance of the CCP and other control measures
12 Steps HACCP Application (Implementation Stage)
Principle No. 5 - Establish Corrective Action

• To be taken when monitoring indicates that there is a deviation from an establish critical limit.
  – Correct the cause of non-compliance to assure that the CCP is under control!
Principle No. 5 - Establish Corrective Action

- Determine disposition of non-conforming products
  - What do you do to the non-conforming products or process step to avoid production of unsafe foods or non-complying products?
Example of Corrective Action

• If Deviation: Temperature of milk pasteurizer drops below critical limit.

• Then Corrective Action:
  Immediate (Correction) :
  1. Milk flow is automatically diverted until the temperature recovers.
  2. Diverted product is repasteurized.
  3. Check the operation of the heating/cooling units to determine the reason for temperature deviation that caused the flow diversion.
  4. Repair if necessary, re-establish control and resume production

• Preventive:
  – Review pasteurizer’s preventive maintenance.
  – Look into boiler ‘s performance and preventive maintenance.
12 Steps HACCP Application (Implementation Stage)
Principle No. 5 - Establish Corrective Action

- Record the corrective action taken. Remember S.T.A.R.
  - S = Situation
  - T = Time
  - A = Action Taken
  - R = Record Results of Corrective Actions Taken
Corrective Actions: In summary

1. Determine that the CCP is once again under control.
2. Determine the disposition of any product that is in noncompliance.
3. Correct the cause of the noncompliance to prevent a recurrence.
4. Maintain records of the corrective actions.
Workshop 8. Corrective Action

• Using the HACCP Table, establish Corrective actions if there are deviations in the CCPs
• Write the Corrections or Immediate Actions on process and affected products
• Write the Corrective Actions based on root cause analysis – These are long term actions
• Time Limit: 30 minutes
# Worksheet 8: Corrective Actions

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<td>Intermediate</td>
<td>Preventative</td>
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<td>Intermediate</td>
<td>Preventative</td>
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</table>

<table>
<thead>
<tr>
<th>What</th>
<th>Where</th>
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*International Finance Corporation* 
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**Consulting Organization**

*Asia Society for Social Improvement and Sustainable Transformation*
HACCP STEP 11
12 Steps HACCP Application
Step 11

Principle No. 6
Establish **Verification Procedures**
Objectives of Principle No. 6

- To make practical plans to check how well the HACCP Plan is working in practice.
- To validate the established HACCP Plans control parameters.
- To challenge the effectiveness of the established HACCP system.
- To do continual improvement of the HACCP system.
12 Steps HACCP Application
(Implementation Stage)
Principle No. 6 - Establish Verification Procedures

• Verification - use of methods, procedures or tests in addition to the monitoring procedures used to determine if the HACCP system is in compliance with the HACCP Plan.
**Verification** asks whether the HACCP system is being implemented according to the plan

“Are you doing what you said you would do?”
12 Steps HACCP Application (Implementation Stage)
Principle No. 6 - Establish Verification Procedures

- Verify whether the HACCP system is working correctly in preventing food hazards from occurring, through
  - Physico-Chem Analyses
  - Microbiological Analyses
    - Salmonella Test
    - E.coli and Coliform Test
  - Trend analyses
  - HACCP system audit - continuous improvement, etc…
Validation Frequency

- Initially
- When factors warrant. The following may warrant validation of the plan:
  - changes in raw material
  - changes in product or process
  - adverse audit findings
  - recurring deviations
  - new information on hazards or control measures
  - on line observations
  - new distribution or consumer handling practices
12 Steps HACCP Application (Implementation Stage)

Principle No. 6 - Establish Verification Procedures

• Audit Verification Activities of the HACCP System:
  – check the accuracy of the product description
  – Check that CCPs are maintained as required by the HACCP plan (CCP Verification)
  – Check that processes are operating within established critical limits
  – Check that records are completed accurately and at the time intervals required.
12 Steps HACCP Application (Implementation Stage)
Principle No. 6 - Establish Verification Procedures

- Verification of procedures by an agency include:
  - Review of the HACCP plan and any modifications
  - Review of the CCP monitoring records
  - Review of the corrective action records
  - Review of the verification records
  - Visual inspections of operations to determine if the HACCP plan is followed and records are properly maintained
  - Random sample collection and analysis
12 Steps HACCP Application (Implementation Stage)
Principle No. 6 - Establish Verification Procedures

• Record the results of verification. Remember S.T.A.R.
  – **S** = Situation
  – **T** = Time
  – **A** = Action Taken
  – **R** = Record results of Verification and Corrective Actions Taken
<table>
<thead>
<tr>
<th>Who does it?</th>
<th>MONITORING</th>
<th>VALIDATION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>First party</td>
<td>Process Owner / Operator or Technician / Testman</td>
<td>Immediate superior of the process owner</td>
<td>Next level superior Outside the process group</td>
</tr>
<tr>
<td>Second party</td>
<td>(e.g. Supervisor Team Leader, etc..)</td>
<td></td>
<td>Third party (e.g. QC, QA, Process Assistant, Manager)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When to do?</th>
<th>MONITORING</th>
<th>VALIDATION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>During process operation</td>
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<td>After the operation</td>
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<tr>
<td>More frequent (e.g. every hour, every truck, etc)</td>
<td></td>
<td></td>
<td>Lesser frequency than the validation (e.g. once a week, once a month, once a year, etc..)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What to do?</th>
<th>MONITORING</th>
<th>VALIDATION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified process control parameters (CP) or critical control parameters (CCP)</td>
<td></td>
<td></td>
<td>Supplemental tests and inspection apart from the identified CP or CCP monitoring procedures</td>
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<tr>
<td>Examples:</td>
<td>Temperature monitoring</td>
<td>Same with monitoring procedures</td>
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<td></td>
<td>Residual Chlorine monitoring</td>
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<td>Examples:</td>
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<tr>
<td></td>
<td>Moisture analysis</td>
<td></td>
<td>- Review of Quality Records</td>
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<tr>
<td></td>
<td>Time monitoring</td>
<td></td>
<td>- Trend Analyses</td>
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<td></td>
<td></td>
<td></td>
<td>- Microbiological Testing</td>
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<td></td>
<td></td>
<td>- Physico-Chemico Tests</td>
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<td></td>
<td></td>
<td></td>
<td>- Sensory Evaluation</td>
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<td></td>
<td></td>
<td></td>
<td>- Audit</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Why do it?</th>
<th>MONITORING</th>
<th>VALIDATION</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part of the planned sequence of actions to ensure that the Process or CCP is in control. To prevent occurrence of process deviations</td>
<td></td>
<td></td>
<td>To assess the effectiveness of the established quality system</td>
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<tr>
<td></td>
<td>To check if the planned procedures are implemented in accordance to the established systems. To prevent occurrence of process deviations</td>
<td></td>
<td>To check if the corrective or preventive actions taken are effective to control the CP or CCP</td>
</tr>
</tbody>
</table>
Deming’s Circle

Plan – Make the objectives clear and set up the means to achieve the objective.

Do – Put the plan into practice.

Check – Observe the situation or results to see if they are progressing towards the objective or not.

Act – When they are not progressing towards the objective, adjustment should be made.
HACCP STEP 12
12 Steps HACCP Application
Step 12

Principle No. 7
Establish Documentation and Record Keeping
Objectives of Principle No. 7

• To provide evidence of conformance to requirements
• To provide evidence of the effective operation of the HACCP system
• To formalize a plan on how to control HACCP related documents and other food safety related records
Difference
Document vs. Record

• Document
  – Tells what to do
  – Can be modified or revised
  – Formalized an established system
  – Evidence of the PLAN

• Record
  – Shows what was done
  – Can NOT be modified nor revised
  – Objective evidence of an effective established system
  – Evidence of the DO, CHECK and ACT

Both requires a CONTROL system
12 Steps HACCP Application (Implementation Stage)
Principle No. 7 - Establish Documentation and Record Keeping

• Examples of documents:
  – Guidelines
  – Policies
  – Procedures
  – Instructions
  – Standards and specifications
12 Steps HACCP Application (Implementation Stage)
Principle No. 7 - Establish Documentation and Record Keeping

• HACCP related documents also should be properly kept within reach to all team members
  – HACCP Plan and Manual
  – Food Safety Policies
  – HACCP Team Members and Responsibilities
  – Product Description
  – Product Standards and Specifications
  – Process Flow Diagram with identified CCP
  – Process Standards
  – Work Procedures and Instructions
Document and Record Control System

• Established written procedures to define the controls in:
  – Correction
  – Identification
  – Storage
  – Protection
  – Retrieval
  – Retention time
  – Disposal
12 Steps HACCP Application (Implementation Stage)
Principle No. 7 - Establish Documentation and Record Keeping

- Proper document:
  - Control system is in place
    - Controlled issuance
    - Modified only by authorized personnel
    - Obsolete documents not actively used
12 Steps HACCP Application (Implementation Stage)
Principle No. 7 - Establish Documentation and Record Keeping

• Proper record:
  – Shows trend – statistical tool
    • Information that you need to modify the HACCP plans and program
  – Helps pinpoint cause of problem
  – Supports defense in case of litigation
12 Steps HACCP Application (Implementation Stage)
Principle No. 7 - Establish Documentation and Record Keeping

• Proper record:
  – Control system in place
    • Filed and kept
      – Defined system of records retention
        » Retention period same with the shelf-life of food products
  • Secured
    – Kept away from being tampered
    – Dust free
  • Accessed only by authorized personnel
12 Steps HACCP Application (Implementation Stage)
Principle No. 7 - Establish Documentation and Record Keeping

• HACCP records “must have”
  – complete details of the actual result of the action taken
  – signed by the person doing the monitoring
  – erasures or wrong entries should be initialed by the inspector
  – duly validated, verified or reviewed and signed by an identified authority.

Remember **RECORDS** are evidences that the food was processed, inspected and handled properly according to product quality standards
What is an HACCP Plan?

The written document which is based upon principles of HACCP and which delineates the procedures to be followed to assure the control of a specific process.
Workshop 9: Verification and Record Keeping

• Using the HACCP Table, complete Principles 6 & 7 sections.
• Establish the verification procedures
• Name the specific records used in the monitoring and verification procedures
• Time: 30 min
<table>
<thead>
<tr>
<th>P1</th>
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<th>P4</th>
<th>P5</th>
<th>P6</th>
<th>P7</th>
</tr>
</thead>
</table>

**Worksheet 9: Verification and Record Keeping**

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[Consulting Organization](#)
Workshop No. 10
HACCP Plan and Final Flow Diagram

• Using the completed HACCP Table, prepare a HACCP Plan for the identified CCP in your process flow diagram.
• For each CCP, establish Critical Limit, Monitoring procedure, Corrective Action, Verification procedure and required HACCP records.
• Draw a Flow Diagram indicating the CCP
• Time Limit: 45 minutes
• Group Presentation: From Flow Diagram to HACCP Plan (20 minutes per team)
### HACCP Plan Table

<table>
<thead>
<tr>
<th>P1</th>
<th>P2</th>
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</thead>
<tbody>
<tr>
<td>Step/Input</td>
<td>Hazard</td>
<td>Control Measure</td>
<td>CCP Type</td>
<td>Critical Limit</td>
<td>Monitoring (9)</td>
<td>Corrective Action (10)</td>
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<thead>
<tr>
<th>What</th>
<th>Where</th>
<th>How</th>
<th>When</th>
<th>Who</th>
</tr>
</thead>
</table>

Intermediate

Preventative

Intermediate

Preventative
Session 5:
HACCP POINTERS
Efficacy of HACCP System

• Relies on management and employees with appropriate HACCP knowledge and skills
• Necessary in giving training for all level of employees and managers in the organization
## HACCP Program

<table>
<thead>
<tr>
<th>Activities</th>
<th>Timetable</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Conduct training on GMP and HACCP</td>
<td>Before start of program</td>
<td>Consultant/Service Provider/In-house Trainer/Management</td>
</tr>
<tr>
<td>• Formation of GMP and HACCP Teams</td>
<td>Upon Start of Program</td>
<td>Management/Consultant</td>
</tr>
<tr>
<td>• Gap Analysis</td>
<td>Upon start of program</td>
<td>Management/Team/Consultant</td>
</tr>
<tr>
<td>• Gap Assessment Report</td>
<td>After gap assessment</td>
<td>Consultant/Management/ Team</td>
</tr>
<tr>
<td>• Corrective Action for Gaps</td>
<td>Month 1</td>
<td>Management, Team/Consultant</td>
</tr>
<tr>
<td>• Documentation for GMP</td>
<td>2 months</td>
<td>GMP Team and or HACCP Team</td>
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<tr>
<td>• GMP Procedures and Guidelines</td>
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</tbody>
</table>
## HACCP Program

<table>
<thead>
<tr>
<th>Activities</th>
<th>Timetable</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of GMP for 3 months</td>
<td>Month 2 to 4</td>
<td>Team, Management., Consultant</td>
</tr>
<tr>
<td>GMP Internal Audit</td>
<td>End of Month 2</td>
<td>Team. Consultant</td>
</tr>
<tr>
<td>Corrective Action after Internal audit</td>
<td>Wk 1 of Month 3</td>
<td>Team, Management, Consultant</td>
</tr>
<tr>
<td>HACCP Documentation</td>
<td>Month 2</td>
<td></td>
</tr>
<tr>
<td>Validation studies (critical limit validation, raw mats, packaging testing and FG testing)</td>
<td>Month 2</td>
<td>Team, Process Owners</td>
</tr>
<tr>
<td>Implementation of HACCP</td>
<td>Month 3</td>
<td>Team, Management</td>
</tr>
<tr>
<td>Monitoring of Implementation</td>
<td>Month 4</td>
<td>Team, Consultant, Management</td>
</tr>
</tbody>
</table>
## HACCP Program

<table>
<thead>
<tr>
<th>Activities</th>
<th>Timetable</th>
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</thead>
<tbody>
<tr>
<td>• Verification of CCPs/HACCP Audit</td>
<td>Month 5</td>
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<tr>
<td>• Summary of Findings After verification</td>
<td>After verification</td>
<td>HACCP Team Leader</td>
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<tr>
<td>• Corrective Actions After verification</td>
<td>After verification</td>
<td>Process Owner, Management, Consultant</td>
</tr>
<tr>
<td>• Evaluation, Review and Improvement of the HACCP Program</td>
<td>Month 5</td>
<td>GM, HACCP Team, Consultant</td>
</tr>
<tr>
<td>• Third Party Audit (Certification Body Audit) – Decide on CB and agree on schedule</td>
<td>Month 6 /TBA</td>
<td>GM, HACCP team Leader, Certifying Body(CB)</td>
</tr>
<tr>
<td>• Corrective Action after CB audit</td>
<td>Month 7</td>
<td>HACCP Team, Consultant, Management</td>
</tr>
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</table>
Workshop 11: Challenges and Solutions to HACCP Program

• Group the participants
• What are the challenges and possible solutions to the problems and challenges
• Identify the resource needed to address the challenges
• Identify responsibilities
Worksheet 11: HACCP Program: Challenges and Solutions

<table>
<thead>
<tr>
<th>CHALLENGES</th>
<th>SOLUTIONS</th>
<th>RESOURCE NEEDS</th>
<th>RESPONSIBILITY</th>
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QUESTIONS
PASSING OF HAZARD ANALYSIS AND HACCP PLAN EXAM
& COURSE EVALUATION
THANK YOU.