

Appendices for the Manual

1. **The Temple of Food Safety**
2. **The Road Map**
3. **Course Timing**
4. **Morning vitamins**
 - - rules
 - - list of morning vitamins (these will be WHO publications)
5. **Glossary of terms**
6. **Exercises**
 - Kitchen exercise
 - Street food exercise
 - HACCP exercise
 - Diagram
 - Temperature chart
 - Answer (HACCP datasheet)
 - HACCP worksheets for study purposes
 - fermented foods
 - Dried milk exercise
 - Foodborne diseases, table for country problems
7. **Course evaluation**
8. **Checklist for planning**
9. **Roll-out of the Food Safety Course to new centres**
10. **Food poisoning contamination incident summaries**
11. **Foodborne disease profiles**
12. **List of suggested readings**

Food legislation and enforcement	Educated and knowledgeable public	Good practices by primary producers and distributors
Advice for industry / trade	Discriminating and selective consumers	Quality assurance and control of processed food
Consumer education	Safe food practices in the home	Appropriate processes and technology
Information gathering and research	Community participation	Trained managers and food handlers
Provision of related health services	Active consumer groups	Informative labelling and consumer education

Government	Consumer	Industry/trade
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National commitment to food safety

WHO leadership for international consensus on food safety issues, policies, and actions

Source: Food Safety Issues: Guidelines for strengthening a National Food Safety Programme, Food Safety Unit WHO, 1996

THE ROAD MAP

THE HAZARDS CHAIN

Microbiological

Chemical

Background knowledge

- Basic microbiology
- Foodborne pathogens
- Epidemiology
- Why outbreaks occur

THE FOOD

CONTROL SYSTEM

Approved suppliers

HACCP (& GMPs)

Control

Monitoring

Background knowledge

- Preservation
- Fate of pathogens

MORNING VITAMINS EXPLANATION

"Morning Vitamins" is an activity carried out as part of a course. It is best to schedule this first thing in the morning, twice a week. The course coordinator selects reading materials related to the previous or upcoming lecture; the participants read and discuss it.

The aim of this activity is to teach the participants how to read critically a text on a given subject. This involves:

reading an article selectively (what are the most important points or arguments)

probing beyond the face value (what are weak points, biased conclusions etc)

discussing the topic with fellow participants to arrive at a conclusion.

The course coordinator should give a copy of the reading materials to each participant at the beginning of the course with the schedule for discussion.

Here are some suggestions for organising the Morning Vitamins session:

1. Ask participants to identify the key messages and the strengths and weaknesses of the article, and assess its usefulness for health professionals, governments and others involved with food production. Distribute a set of written questions and divide participants into small discussion groups. At the end of the discussion, each group presents its conclusions to the group.
2. In addition to the general questions, the course co-ordinator can also give one additional different question related to the content of the article to each group in the morning before the group discussion. Each group can first discuss the answer, then present it to the others.
3. One group presents the content of the article the other groups prepare questions to ask the presenter.

Documents given to the Trainers:

- ✓ Health surveillance & management procedure for food handling personnel, WHO, 1989, Technical report, series 785
- ✓ The role of food safety in health development, WHO, 1989, Technical report 705
- ✓ Safe Food Handling: A training guide for managers of food service establishments, WHO, 1989
- ✓ Food, Environment & Health. A guide for primary school teachers, WHO 1990
- ✓ A simple guide to understanding & applying the HACCP concept, ILSI Press 1993
- ✓ Essential safety requirement for street vendors. Food safety issues. Food safety unit WHO. WHO/FNU/FOS
- ✓ Food allergy and other adverse reactions to food. ILSI Press 1994
- ✓ Food technologies and public health. Food Safety Issues. Food safety unit WHO. WHO/FNU/FOS.95.12
- ✓ Basic Food Safety for Health workers. WHO/SDE/PHE/FOS 99 1, WHO 1999

Brochures:

- ✓ Understanding food Allergy. IFIC Foundation
- ✓ WHO Publications. Food Safety.

Kitchen Exercise

In

Out

Kitchen

Out In

Dining Area

You have to locate:

1. Serving area
2. Dish washing area
3. Raw food preparation
4. Cooked food preparation
5. Cooking range
6. Deep fat fryer
7. Refuse store
8. Dry goods store
10. Handwashing basins (4)



X = Handwashing basins

Field observations of food handling

Purpose

The purpose of the field work is to expose you to local food handling practices, primarily in street vending situations. You are asked to carry out observations based on a questionnaire that we provide. Your objective is to identify practices and situations that might lead to food contamination and pathogen survival and growth.

Instructions

In sections B, C, D the questions are presented as tables. Use one row for each food. Each column corresponds to a question. These questions, and the codes for the responses, are printed below the table. The question number is indicated at the bottom of each column.

In sections E and F, circle the appropriate response(s) for each question.

For section G (personal hygiene of the vendor) engage the vendor in conversation about hygiene in general and his own perceptions. Some questions that you may ask are suggested. Use these, and your observations, as a basis for scoring the vendor on the three questions at the end of the section.

Fill in the forms by observing carefully what you see. Think of other questions and make careful notes of your observations. Be polite and understand that the vendors are earning their living. Do not get in their way!

If you wish to make observations at other times please feel free to copy the questionnaire or ask for additional copies.

Report

At the end of the field work, you will be asked to make a report to the group. You should cover the following points in your presentation:

Background information

Possibility of contamination/hazards (chemical, microbial, physical)

Critical Control Points

Personal hygiene and food handling practices

Recommendation for improving the safety of food

Questionnaire

Food Handling Practices

A. General Information

Evaluator

Name	
Date	
Start of observation:	am/pm
End of observation.	am/pm

Vendor

Name of vendor:	
Location:	
Type of food	
Normal start of selling day	am/pm
Normal end of selling day	am/pm

B. Storage / handling of leftover foods

No	Type of food	Place	Cover			Leftover foods	
			Material	Condition	Frequency	Treatment	Usage
1							
2							
3							
4							
5							
6							
		I	II	I	III	IV	V

I. Condition of place, covered / open-air:

- a. Clean and well kept
- b. Dusty, mouldy, dirty
- c. Stained with food remains
- d. Wet, rusty
- e. Other

II. Material used to cover stored food:

- a. Cloth
- b. Plastic
- c. Paper
- d. Other
- e. None

III. Frequency of use of cover:

- a. Often used
- b. During selling, open partly
- c. Rarely used

IV: What is done with food left-overs?

- a. Not used anymore
- b. No leftovers
- c. Used again with heating
- d. Used again with no heating

V. If there are leftovers how long are they stored?

- a. 1 day
- b. 2 days
- c. 3 days
- d. Longer

Additional comments:

C. Handling of equipment and utensils

Type of equipment and utensils

No.	Equipment / utensils	Condition	Usage	Washing	
				Frequency	Method
1					
2					
3					
4					
5					
6					
		I	II	III	IV

I. Condition of serving and preparation utensils:

- a. Clean and shiny
- b. Dusty, mouldy, stained
- c. Stained with food, greasy
- d. Wet, rusty
- e. Other

II. How are the utensils used?

- a. For one food only
- b. For cooked and raw food
- c. For cooked and raw food but washed in between

III. Frequency of use of cover:

- a. Several times per day
- b. Once a day
- c. 3-4 times per week
- d. 1-2 time per week
- e. Never

IV. How is the utensil washed?

- a. With soap and hot water
- b. With hot water
- c. With soap and fresh water
- d. Fresh water only

Additional comments:

D. Food handling

Serving

No.	Type of food	Serving	Contact	Handling
1				
2				
3				
4				
5				
6				
		I	II	III

Is food served with a utensil reserved for the purpose?

- a. yes
- b. no

Does the food contact the server's hands directly?

- a. yes
- b. no

Is the food held at an appropriate temperature?

- a. yes
- b. no

D. Food handling (cont.)

Use of cloths, sponges, brushes etc.

No.	Usage	Condition	Washing
1			
2			
3			
4			
	I	II	III

I. Used for:

- a. Utensils
- b. Table(s)
- c. Hands

II. Condition of cloths, sponges etc.

- a. Clean and dry
- b. Dry but dirty or mouldy
- c. Wet and dirty

III. Are the cloths washed/changed?

- a. 2-3 times / day or more
- b. 1x /day
- c. Not washed or changed

If cloths not used, ask the vendor why

Additional comments:

E. Water sources, availability and use

1. Source

- a. Tap water
- b. Well water
- c. Water vendor
- d. Other

2. Water container

- a. Shiny and clean
- b. Dirty, dusty, stained
- c. Stained with food, greasy
- d. Rusty
- e. Other

3. Is dish washing water also used for washing foods?

- a. yes
- b. no

4. How many times is the dishwater changed?

- a. Never
- b. 1x a day
- c. 2 – 3 x day

If water from a stream or river is used, describe the area and the other uses of the source. Are there communal washing areas? Ask the vendors as many questions as possible concerning water supplies.

Additional comments:

F. Selling location

Waste disposal (circle all that apply)

- a. Waste disposal near to selling area
- b. Waste scattered around serving area
- c. Dirty utensils / plates etc. left to accumulate
- d. Proximity of river or stream
- e. WC available
- f. WC unsuitable situated
- g. Vendor has trash can
- h. Vendor has no trash can
- i. Trash cans orderly and kept closed
- j. Trash can open / lids available / unavailable
- k. Animals / birds / insects present around the selling location

List the activities going on around the area:

Additional comments:

G. Personal hygiene

Before asking these questions observe the vendor for some time.

- ♦ Do you know what germs, bacteria, viruses are?
- ♦ Is this surface / utensil clean or dirty?
- ♦ When you are ill do you still sell?
- ♦ What do you do when your hand is infected?
- ♦ If your hand were infected would you still serve food?
- ♦ How often do you wash your hands?
- ♦ When do you wash your hands?
- ♦ Do you understand what hygiene means?
- ♦ Do you consider your stand to be hygienic?
- ♦ Have you ever received any lessons in food handling?
- ♦ Who taught you to prepare food?

How would you assess:

the level of personal hygiene of the vendor?

1 2 3 4 5

his appreciation of hygiene?

1 2 3 4 5

his willingness to improve?

1 2 3 4 5

NOTE: (1=bad, 5=excellent)

Additional comments:

DIAGRAM FLOW OF FLOUR FRIED CHICKEN

Pepper

Salt

Water

Flour

Mixing

Holding

Garlic

Chopping

Covering

Deep Frying

Holding

Serve

Egg

Whisk

Holding

Rolling

Chicken

Washing

Cutting

Holding

Cooking Oil

HACCP Data Sheet

Microbiological study

Point of control (raw material or process step)	Hazards	Control measures	CCP parameters	Critical limit	Target values	Monitoring procedures	Corrective action
Deep frying	Survival of or recontamination with microbial pathogen (<i>E. coli</i> , <i>C. jejuni</i> , <i>Salmonella</i> spp)	Correct design and operation of deep frying	Temperature and time	70 °C all parts of chicken meat within 2 minutes	175 °C 15 minutes and 150 °C 15 minutes	Record the temperature and time at centre of meat	Adjust the temperature
Holding (or as GMP, can be avoided if it is consumed immediately)	Growth of and recontamination with microbial pathogen	Time of holding Storage condition	Time of storage Storage condition of cooked chicken	less than 4 hours No flies, cooked food should be covered	Eat immediately while still hot/warm No flies, cooked food should be covered		Reheating Reheating

HACCP Data Sheet

Chemical study

Point of control (raw material or process step)	Hazards	Control measures	CCP parameters	Critical limit	Target values	Monitoring procedures	Corrective action
Pepper and onion (can be ignored since they are used in small amount only)	Presence of Pesticide	Supplier's quality assurance	Absence of pesticide	0.1 mg/kg (Aldrin & Dieldrin in onion) 0.5 mg/kg (Chlorpyrifos in onion) 1 mg/kg (Dimethoate in onion & peppers) (Codex Vol 2,93)	No target value	Inspection, chemical testing	Rejection of suspected lots
Chicken meat	Presence of hormone and antibiotic	Supplier's quality assurance	Absence of hormone or antibiotic	Oxycytetracycline MRL 100 ppb or 0.3ppb/kg body weight	No target value	Supplier record inspection, chemical testing	Reject

APPLICATION OF THE HACCP SYSTEM TO *UJI*^{1,2,3}

a. *Product description*

Preparation of *uji* varies depending on the region. Here we describe *uji* preparation as practised in Kenya.

The basic cereal in *uji* production is maize, but at times a mixture of maize, sorghum and millet is used. The raw cereal is finely ground and mixed with water in a concentration of about 30% solids. The dough, without inoculation, is fermented for 2-5 days at ambient temperature, and it is then diluted to about 4-5% solids in boiling water, and sweetened with crystallised sugar.

b. *Intended use*

Uji is consumed by adults as well as children. It is also sometimes used as a weaning food.

c. *Hazards of concern*

We will consider biological (e.g. bacteria, viruses, parasites), chemical (e.g. contaminants, mycotoxins) and physical agents.

d. *Identification of hazards, control measures and Critical Control Points*

The table below shows hazards associated with each step in the preparation of *uji*, and some possible measures for their control.

1) **Raw material:** Major hazards in maize, millet and sorghum are toxins (e.g. aflatoxin produced by moulds) and agro-chemicals. To prevent growth of toxigenic moulds during storage, the raw material should be stored under appropriate ambient conditions. When the ambient temperature and humidity are high, storage time should be limited. There is little that can be done to prevent contamination by agro-chemicals except to get assurance from suppliers about the safety of the products. The possibility of accidental contamination of grains during storage with agro-chemicals should be considered and appropriate measures taken if necessary. The grains may also contain foreign matter such as stones and insect fragments. These will not be eliminated or controlled at a later step, so it is important that households thoroughly clean the raw material.

¹ This study has been carried out by the Joint FAO/WHO Workshop Secretariat.

² Application of the HACCP system has been simplified and adapted to household conditions. Although the same approach can be used for production on a cottage and industrial scale, the requirements in terms of Critical Control Points, critical limits, and monitoring procedures may be different and more severe.

³ Model HACCP plans are not appropriate for use until validated for a specific food and food process.

Cereals may also be contaminated with pathogens. These will be eliminated at subsequent steps of preparation, i.e. fermentation and boiling.

Water may be contaminated with pathogens. As part of a good hygienic practice, safe water should be used, particularly for washing hands and utensils. As the fermented dough is subsequently boiled, the quality of water used for its preparation is not considered as a Critical Control Point with regard to pathogens. However, with respect to chemical contaminants, the quality of water is a Critical Control Point as chemical contaminants will not be removed during later stages of preparation.

Crystalline sugar may contain foreign matter. Some foreign matter, e.g. glass, is a health risk.

- 2) **Grinding:** This step may introduce dirt and foreign matter. As part of a good hygienic practice, use clean and properly maintained equipment. However, it is unlikely that this step will introduce any major health hazard.
- 3) **Dough preparation:** Except for the quality of water (see step 1), this step does not present a specific hazard. As a part of a good hygienic practice, use safe water.
- 4) **Fermentation:** This step is important for preventing the growth of undesirable bacteria and moulds. However, microorganisms (vegetative form) surviving this step will be eliminated during the subsequent boiling step. The major hazards associated with this step are microorganisms producing thermostable toxins, (e.g. *Staphylococcus aureus*) or moulds, as the toxins will not be destroyed later by boiling. Fermentation is therefore a Critical Control Point for these hazards. The fermentation process should be rapid, i.e. characteristic odours and smell of fermentation should appear within 24 hours.
- 5) **Boiling water:** All pathogens (vegetative form) are killed during this step.
- 6) **Dilution in continuously boiling water:** This step is a critical point for ensuring the biological safety of *uji*, as pathogens existing in the raw material or introduced during previous steps will be killed at this step. It should, however, be noted that spores of bacteria, e.g. *Bacillus cereus*, might survive.
- 7) **Sweetening:** If sugar and utensils used for sweetening are clean, no major hazard is associated with this step.
- 8) **Serving:** Hands and utensils should be washed carefully with safe water to ensure that pathogens are not reintroduced into the prepared *uji*. This is particularly important with regard to pathogens of a low-infective dose (e.g. *Shigella*). The prepared *uji* should be consumed as soon as possible. Although the acidity of the product discourages spore germination, a significant delay in serving may allow bacterial spores which have survived previous steps (e.g. spores of *Bacillus cereus*), or microorganisms that have been introduced by dirty hands or utensils, to grow.

Application of the HACCP system to preparation of *uji* in households

Step	Hazards	Control Measures	CCP	Critical Limit	Monitoring	Corrective Actions
1. Raw material i) Maize Sorghum Millet	a. Mycotoxins	i) Get supplier's assurance that grains have been handled properly ii) Store in dry, cool area, limit storage time	Yes	i) No mouldiness, good smell ii) Adequate temperature, humidity of storage area	i) Observation, smelling ii) Measure temperature and humidity	i) Discard the raw material and change supplier ii) Use grains quickly if temperature / humidity not appropriate
	b. Agro-chemicals	Get supplier's assurance that grains have been properly handled	No			
	c. Pathogens: <i>Bacillus cereus</i> , <i>Salmonella</i> , <i>E. coli</i>	Heat treatment, correct fermentation	No			
	d. Physical: insects, stones	Manual cleaning	Yes	No visible insect fragments or stones	Observation	Re-clean
1. Raw material ii) Water	a. Chemical contaminants	Obtain assurance about water source or use only safe water	Yes	Clear, free of odour and off-taste	Observation, smelling, tasting	Use another source of water
	b. Pathogens, e.g. <i>E. coli</i> <i>Campylobacter</i> , <i>V. cholerae</i> <i>Salmonella</i> <i>Cryptosporidium</i> <i>Giardia lamblia</i> <i>Entamoeba histolytica</i> Rotavirus	Use safe water (filtered and disinfected) or boil the water	No			
1. Raw material iii) Crystallised sugar	Filth, dirt, insect, glass	Use clean sugar	Yes	No visible foreign matter	Observation	Clean the sugar (e.g. with a sieve) or discard it

2. Grinding	Introduction of filth, dirt, foreign matter	Use clean and properly maintained equipment	No			
3. Dough preparation	Contamination with water	Use safe water	No			
4. Fermentation	a. Growth and formation of toxin by <i>Staphylococcus aureus</i>	Rapid fermentation	Yes	Acid taste and characteristic odour within 24 hours	Observation	Discard the material
	b. Growth of toxigenic moulds	Remove surface mould growths	Yes	No visible moulds	Observation	Remove more of the top layer
5. Boiling water	Survival of pathogens	Thorough boiling	Yes	Bubbles	Observation	Continue boiling
6. Dilution	Survival of non-spore forming pathogens	Continuous boiling	Yes	Gelatinisation, well cooked	Observation	Keep boiling
7. Sweetening (in hot <i>uji</i>)	No hazard (for hazards associated with sugar see step 1(iii))					
8. Serving	a. Recontamination by hands, utensils, environment	Wash hands and use clean utensils	Yes	Washing with soap and thorough rinsing with clean water	Observation	Thorough reheating (steam, bubbles)
	b. Growth of pathogens and spores of <i>Bacillus cereus</i> , if consumption delayed for more than four hours	Consumption without delay	Yes	Use within four hours	Time keeping	

COUNTRY PROBLEMS FOODBORNE DISEASE

PRODUCT :	
TIME :	
PLACE/AREA :	
NATURE OF INCIDENT :	
ILLNESS/SYMPTOMS:	
PEOPLE AFFECTED:	
CAUSE:	
ACTION TAKEN:	
BODIES INVOLVED:	
LESSONS TO BE LEARNED:	

This table is helping the participants to describe outbreaks of foodborne illness in their own countries.

EVALUATION FOR PARTICIPANTS

Educational Background :

Professional Background :

Week

Rate each lecture or activity from 1(bad) to 5(excellent):

Lecture or Activity	Lecturer or person responsible	Presentation of subject matter	Increase of knowledge	Relevance to the training program objectives	Degree of difficulty	Time allotment
Mod 1 lect. 2, 3						
Mod 1 lect. 4						
Mod 2 lect. 1, 2						
Mod 3 lect. 1, 2						
Mod 4 lect. 1						
Mod 4 lect. 2						
Mod 5 lect. 1, 2						
Mod 6 lect. 1, 2						
Mod 6 lect. 3						
Mod 7						
Mod 8 lect. 1- 3						
Mod 9 lect. 1- 3						
Mod 10						
Mod 11 lect. 1- 3						
Kitchen Exercises						
Morning Vitamin MV1:						
MV2:.						

Comment:



EVALUATION FOR PARTICIPANTS

Educational Background :

Professional Background : **Week**.....

Rate each lecture or activity from 1(bad) to 5(excellent):

Lecture or Activity	Lecturer or person responsible	Presentation of subject matter	Increase of knowledge	Relevance to the training program objectives	Degree of difficulty	Time allotment
Temple of Food Safety						
Guest lecture:						
Guest lecture:						
Discussion : Country Problem & Incidence Summary						
Street food presentation						
Field visit evaluation						
Morning Vitamin MV3:						
FBD in (local country)						
Field Visit						

Comment:

—

FOOD SAFETY FOR NUTRITIONISTS AND OTHER HEALTH PROFESSIONALS ACTION CHECKLIST

Timing	Action	Planned date	Actual date
BEFORE			
4-6 mos	Decision to organise a food safety course Define general objective and aims Find source of funds Have draft budget approved Set dates of the course Choose the place Book room/accommodation Define criteria for selecting participants Appoint committee of sponsors Request books from WHO Choose assistant organiser or collaboration with government institution Contact external consultants Invite guest lecturers/speakers and send them copy of module Request permission for field visit Invite participants and send course outline and objectives		
3-4 mos	Decide agenda/schedule Find other needed documents		
2 mos	Select participants		
6 weeks	Inform selected participants, send documentation Check materials to be given out (paper, pens) Add supplementary material to the training package		

1 mo	<p>Have documents reproduced</p> <p>Prepare equipment checklist</p> <p>Prepare literature list</p> <p>Prepare questionnaire (for visits, evaluation)</p> <p>Prepare documents (to be presented, discussed)</p>		
2 weeks	<p>Confirm with guest speakers, ask for advance copy of materials</p> <p>Confirm arrangements for visits, accommodations</p>		
1 week	<p>Review list of participants</p> <p>Administrative matters for invited speakers</p>		
2 days	<p>Arrange room, equipment check</p> <p>Call a meeting with the organiser, review program</p> <p>Prepare administration matters for invited speakers</p>		
1 day	<p>Welcoming drink</p>		
DURING			
	<p>Background course information</p> <p>Group photograph</p> <p>Immediate evaluation</p> <p>Start writing report (if possible)</p> <p>Do follow-up evaluation with participants</p> <p>Inform participants about on-going evaluation</p>		
AFTER			
1 - 7 days	<p>Do evaluation/grade exam</p> <p>Prepare report</p> <p>Send report to ICD/SEAMEO, Jakarta & other responsible authorities</p> <p>Send appreciation letters to organisers, guest lecturers</p> <p>Send report to participants</p> <p>Write summary of course and send it to the newsletter</p>		

According to the set up and the need, for group discussion, the following equipment may be required in each classroom:

- U-shaped table & chairs
- Side seating
- Papers, pens, pencils
- Transparencies & coloured pens
- Whiteboard & marker
- Stick pointer
- Overhead projector
- Adhesive tape, stapler
- Pin board & pins
- Waste paper basket
- Photocopying machine

