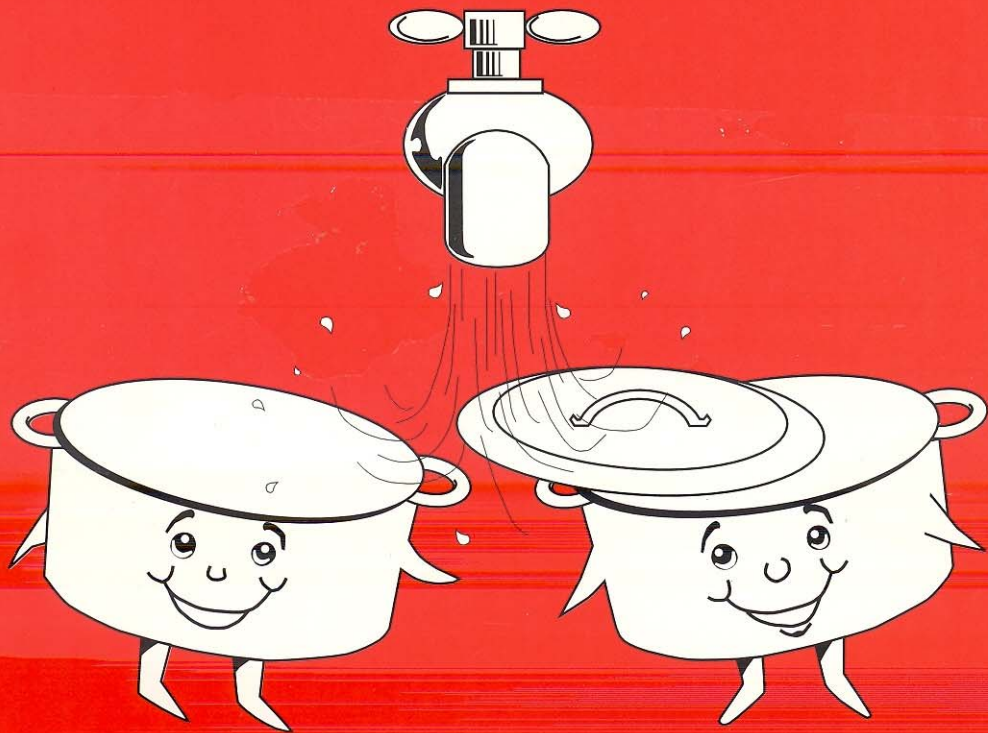


# MAKING SAFE FOOD

*A guide to safe food  
handling and packaging  
for small-scale producers*



by  
*Peter Fellows, Vishaka Hidellage and Emma Judge*

**INTERMEDIATE  
TECHNOLOGY**



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A revised and updated second edition to safe food handling  
and packaging for small-scale producers  
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- Introduction
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## Introduction

Food is one of the few commodities that people actually take into their bodies and so when you produce food for sale you have a special responsibility not to hurt or injure your customers. The main ways in which a producer can harm consumers are by selling food that:

- contains poisonous materials
- contains bacteria or moulds or the poisons they produce
- contains glass or other contaminants that could cause harm if eaten.

Safe food can be produced by careful attention to hygiene and by good quality control during production, storage and distribution.

Good hygiene means careful attention to the cleanliness of:

- the building
- the processing equipment and
- personal hygiene of food handlers.

This will prevent bacteria which are present in the building or on equipment and food handlers, from growing in the food.

Good quality control means careful attention to:

- selection of good quality raw materials and the correct recipe
- correct processing conditions such as the temperature and time of heating
- prevention of contaminating materials such as dirt, metal and stones from becoming mixed with the food
- use of packaging materials to protect the food after processing
- control of storage conditions to stop the food becoming infected after processing.

This will ensure that only wholesome food is produced without contaminants. Any bacteria in the raw materials will be destroyed or controlled at a safe level and prevented from growing during storage.

In most countries the laws on foods are designed to protect customers against poisoning and injury. They are also intended to stop customers from being cheated or confused by incorrect or misleading labels. Typically laws cover hygiene, the amount and type of food in a package and the quality of specific foods, for example, the amount of fruit in jam or meat in a pie.

In general foods such as meat products, fish, seafood and dairy products have a higher risk of food poisoning and need more careful control over hygiene than other foods. These high-risk products usually have laws which are more strict than for other products.

Each country may have a different name for the laws concerned with food hygiene, production and packaging. Readers are advised to contact their local Bureau of Standards, Ministry of Health or other relevant government department to obtain full details of the specific laws of their country.

Whatever the name of the laws, their main content is likely to be similar and in this booklet the significant parts of regulations that cover food hygiene and labelling are interpreted in a series of illustrations. It is intended that these will guide producers to make safer food and accurate labels.

This booklet is not a substitute for the regulations and readers are urged to consult the relevant government department to confirm the national laws that are in force. The authors and publishers of this booklet can accept no responsibility for any legal action taken against producers. Reading this booklet is unlikely to be allowed as a defence against prosecution and it is the responsibility of producers to ensure that their foods comply with national legislation.

Finally, and most importantly, although the food laws may be enforced by Public Health Inspectors or people with similar jobs, it is the customer who must regularly inspect the foods made by producers. If customers become ill from eating a food or think they are being cheated or misled, they will not buy the food again. It is therefore in the producers' own interest to make safe wholesome foods because the customers will return to buy again and the business will grow and succeed. In the end the customer is the most effective food inspector.

In the following pages the regulations relating to aspects of food production are interpreted in illustrations. The areas covered are:

- the building used to produce foods
- the equipment used to process foods
- the personal hygiene of food handlers
- processing methods, packaging and labelling
- storage and distribution of the processed foods.

This booklet is intended for use by extension workers and trainers in food processing. The following pages are suitable for use as training materials or as posters to remind producers of good manufacturing practice.

### **Food poisoning and its causes**

The main cause of food poisoning is the activities of tiny creatures called microbes (or micro-organisms). Microbes live almost everywhere: on animals and plants (hence on all fresh foods in and on humans, in the soil, water, air and on all surfaces. There are many different types but the most important for food hygiene are bacteria, yeasts, moulds and viruses.

One of the reasons why we process food is to eliminate and/or prevent the microbes present in the foodstuffs from multiplying and spoiling food and potentially causing disease. Microbes attack food tissue and break down its structure causing it to taste or smell 'off' and in some cases making it poisonous.

Processing also aims to prevent food spoilage by de-activating enzymes and preventing oxidation. Enzymes are natural biological agents which break down proteins, fats and carbohydrates. If left uncontrolled, enzymes would continue to break down the food itself. Fats in food have to be prevented from reacting with oxygen in the air which can make them go rancid.

Agents that cause disease (pathogens) can be transmitted to humans by a number of routes - soil, air, water, direct person to person contact and food. Some can be transmitted to food by animals or by on item of equipment. Cross contamination occurs when contaminants are transferred from one food to another via a non food surface, for example, utensils, equipment or human hands.

Harmful micro-organisms that must be guarded against include bacteria like salmonella (in poultry meat and eggs); E coli (found in animal products, faeces and soil); listeria (carried by humans and animals); campylobacter (in poultry meat, milk and dairy products); and viruses like hepatitis A which are spread by dirty water, shellfish from polluted areas, fruits and vegetables contaminated by faeces or salad prepared in unhygienic conditions.

To limit the spread of micro-organisms in their animals, farmers must observe good hygiene practices on the farm, during transportation and at slaughter. Food processors must also observe good hygiene practices and correct processing techniques to prevent the spread of micro-organisms in processed food.

Illness is caused by eating food containing a significant amount of harmful (pathogenic) bacteria. Poisoning bacteria can cause illness either by producing poison in food before it is eaten or by

continuing to multiply inside the body after eating. The symptoms of an attack of food poisoning can include stomach pains, diarrhoea, vomiting, headache, fever and aching limbs. Sometimes the illness lasts for days, weeks or months and in some cases, it can kill.

## The buildings

The condition of the building, the materials of construction and its position must be suitable for food production otherwise, legally, it is not allowed.

Walls, floors, doors, windows, ceilings and other parts of the room, should be kept clean and in good repair.

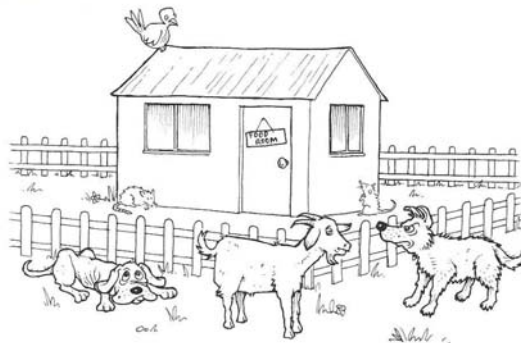
Animals should not be allowed in or near the buildings.

Toilets should not open directly into the food room or store room, or be located in a place where the odours can reach these rooms.

Toilets, drains and sinks etc should be kept clean and in good repair.

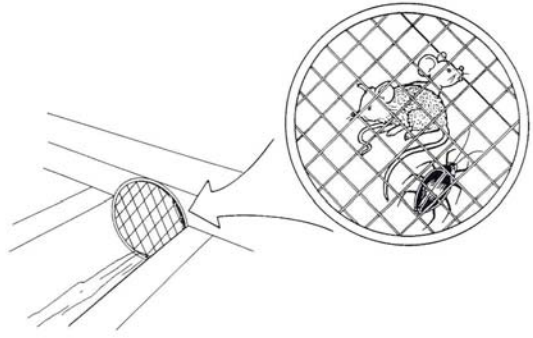
Food rooms and store rooms should not be used for sleeping in and should not join directly onto a sleeping place.

**1**



Protect the food room against flies, cockroaches, ants, birds, rats and other animals including pets. They will contaminate the room and may spread disease to the food if they enter it. Make sure that they cannot get in through the doors, windows, drains or under the roof. Do not keep animals near the building.

**2**



Protect the drains with wire mesh where they leave the food room to stop rats, cockroaches and other insects from entering the building. Be sure to clean the mesh often. Make sure that there is good lighting and ventilation in the food room to help stop accidents, reduce steam condensation and make working easier and safer.

**3**



Make sure that there is good lighting and ventilation in the food room to help stop accidents, reduce steam condensation and make working easier and safer.

**4**



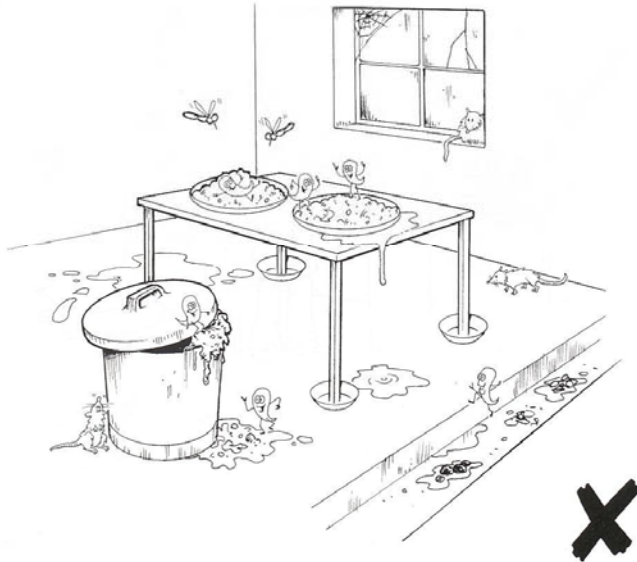
Make sure that the food room has a supply of clean water for washing equipment and for use in food processing. If the water is not clean, it will contaminate the food. If the only water available comes from a stagnant pool or dirty source, it should be boiled for at least ten minutes to remove bacteria before it is used for washing food or utensils. It should not be used for food processing.

**5**



Keep the food room clean before work, during production and after you have finished. Hang brushes and cloths up to dry after use. Store the cleaning equipment in a separate cupboard to the food and processing equipment. Keep all chemicals, pesticides, poisons and detergents away from food in a separate storage area.

6



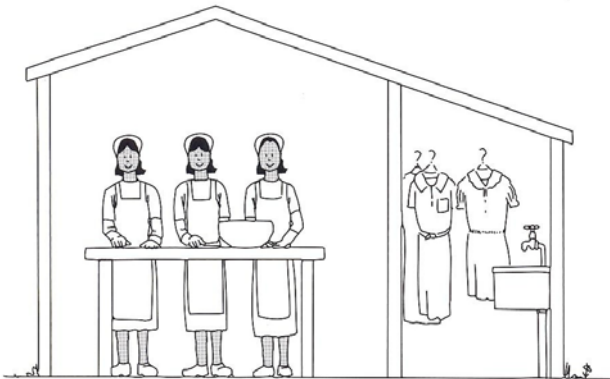
Do not let dirt gather on window sills, around table legs, work surfaces' or equipment.

Kitchen work surfaces, such as floors and sinks, quickly build up a layer of grease and food debris rich in bacteria. Bacteria can easily be transferred to food from dirty work surfaces, knives and other kitchen implements. All work surfaces need to be washed regularly with hot water and detergent.

Keep all food in the food room covered. Clear up any spills as you work and do not leave wastes on floors, in drains or on work surfaces. Keep all wastes in covered bins and take them outside at regular intervals, disposing of them away from the food rooms. Lids should be kept firmly on bins and waste sacks should be securely fastened before putting them out for collection.

Put table legs in pots of water or kerosene to stop ants crawling up them. .

7



Make sure that there is a separate room for food handlers to change their clothes and wash their hands before work.



## The Equipment

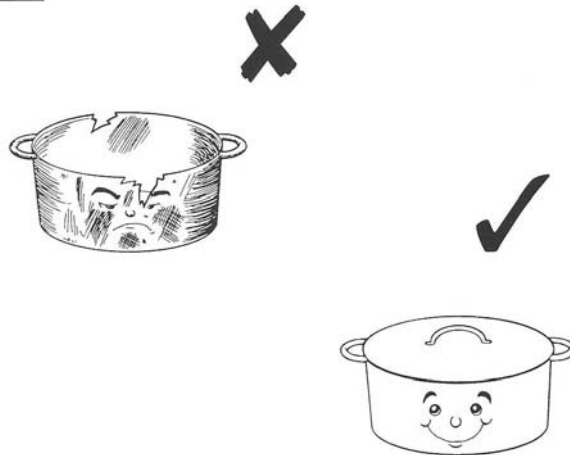
Equipment is in contact with the food during processing and is therefore a potential source of contamination and food spoilage.

Ensure that all equipment is suitable for use with food and will not react with any of the food ingredients. Painted equipment should not be used as there is a danger of the paint chipping and contaminating the food.

Use separate pieces of equipment to process meats and non-meat products.

Never use the same equipment for raw and processed foods.

**8**



Make sure that all equipment is in good condition and is properly repaired. Do not use rusty, dirty or broken equipment to process foods as these can cause accidents as well as contaminate the food.

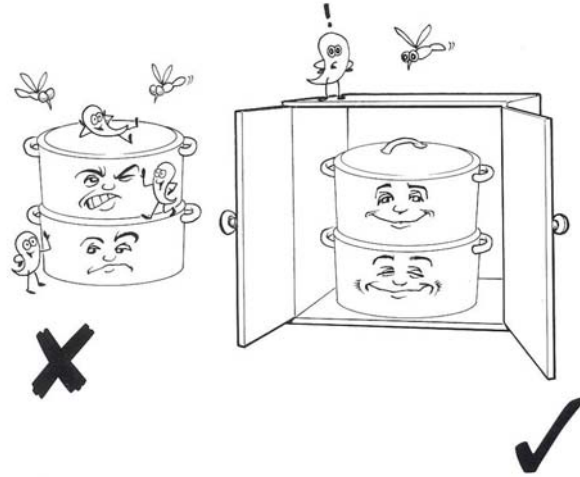
**9**



Wash all equipment as soon as it has been used in clean water. Boil rinsing water for ten minutes if it is likely to be contaminated.



**10**



Store equipment and utensils where they can be kept clean when not in use.

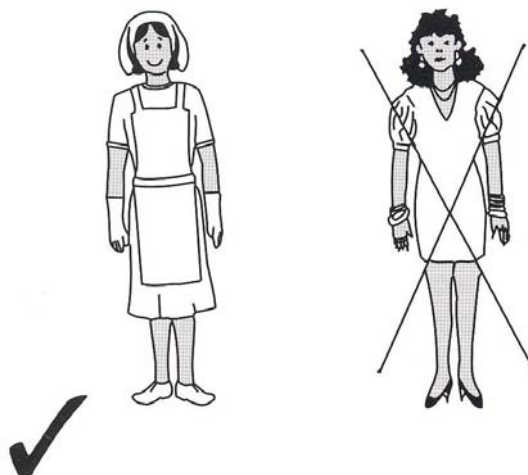
## Personal Hygiene

The main problems arise from contaminating food while preparing it, with microbes from your own hands or mouth, from dirty tools, work surfaces or from other food.

All persons handling food should pay strict attention to good hygiene. This includes wearing clean, suitable clothing and footwear, and covering the hair.

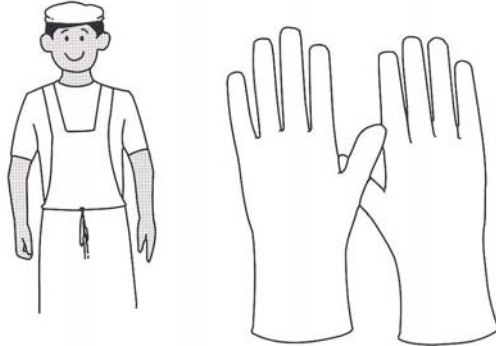
People who are ill should not handle foods.

**11**



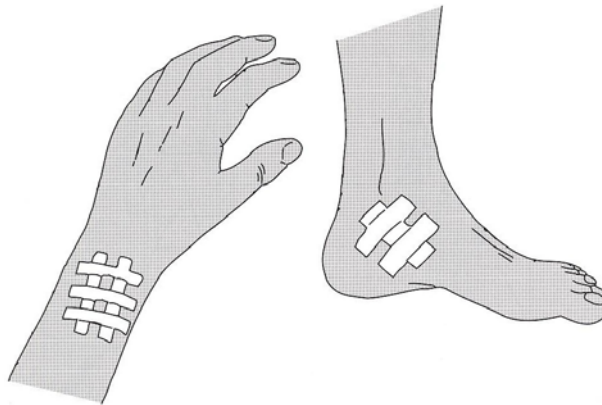
Wear suitable clothing for handling foods including aprons and gloves. Keep hair tied up and covered to prevent contamination of foods.

**12**



Aprons, gloves or any other clothing that could touch the food should be thoroughly cleaned, everyday if necessary.

**13**



All cuts or wounds should be covered by a waterproof dressing and kept clean, even if they are not on the hands. Do not handle foods if you have a stomach upset or a skin disease, or even if you are looking after someone else with these illnesses.

**14**



Make sure that anyone who touches food always washes their hands properly using soap and clean water, especially after every visit to the toilet and between handling raw meat or poultry and any other food stuff, to avoid cross contamination.

**15**



Do not smoke in the food room and do not eat or chew anything at all.

**16**



Never spit in a food room, or even near it. Do not cough or sneeze over foods as this spreads bacteria and may contaminate the food.

### Processing Methods

Take extra care over hygiene when preparing dairy, meat or fish products. They can cause dangerous food poisoning if special attention is not given to hygiene. All raw meat and poultry is more likely to carry bacteria which can poison if they are encouraged to multiply. Knives and any other implements used on these foods should be washed straight after use and before they are used on other foods. The same applies to chopping boards and work surfaces on which they have been prepared.

Hands, dish and kitchen cloths should be washed frequently, and kitchen surfaces should be kept clean to prevent cross contamination between meat and poultry and other types of food. Preparation surfaces and utensils should be washed between uses for different foods.

**17**



Never share utensils with someone preparing different foods.

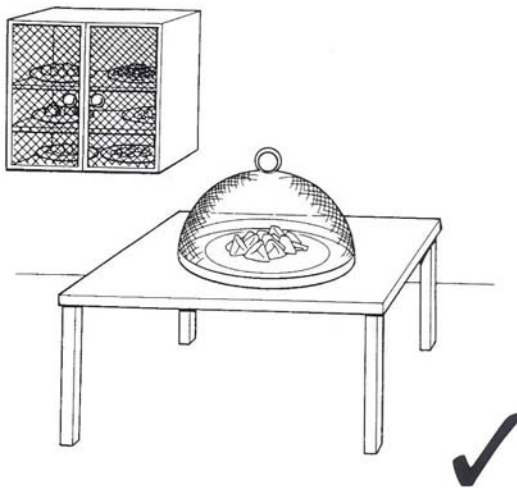
## Storage and Packaging

Always keep raw materials away from processed foods.

Flies, bluebottles, rats, mice and other vermin contaminate food with bacteria from their droppings or their bodies. Flies and bluebottles can breed in rotting meat and lay eggs in it. They also feed on excrement of all kinds and transfer the infection to food either by vomiting on it or by walking over it with infected feet. No food should be left uncovered for them to land on.

All cupboard doors and lids of tins and jars should fit tightly.

**18**



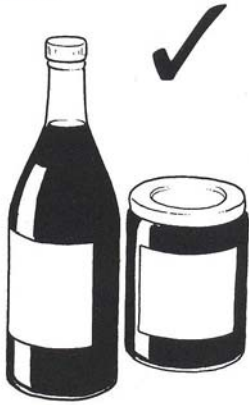
Always keep unpackaged food covered and on shelves or tables in the store room to protect it from contamination by insects, rodents and birds and the bacteria they carry.

Packaging plays an important role in ensuring that food reaches the consumer in peak condition. It increases the shelf life of products by acting as a barrier against water vapour, air and microbes while preserving the freshness of products.

Labels identify a product and should include your name, address, the weight of food in the pack, the name of the product and the list of ingredients (with the biggest amount first and the smallest last). Other information which is optional in some countries but may be compulsory includes the date of production, the expiry date of the food, the producer's registration number and special instructions to help customers prepare the food.

Producers must ensure that the type and amount of food contained in a package are the same as written on the label.

**19**



Make sure that you use the correct packaging for the food you are processing. Recycle bottles and glass jars but clean them properly before using again. The packaging should be clean, well sealed and attractive to the customer. Use packaging that is compatible with the food.

**20**



Food poisoning bacteria multiply, very quickly in moderate temperatures (between 20-40°C) so all foods should be stored in cool, dry rooms with shade and out of the sunlight. Storage areas and surfaces should be kept dry so microbes do not have the moist environment they need to breed.

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The following selected text books contain further information on the safe handling and processing of foods.

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D.A.Shapton & N.F.Shapton, Principles and Practices for the Safe Processing of Foods, Cambridge, Woodhead Publications.



## Summary

Transferring bacteria from outside sources

- Using dirty implements
- Cutting food up on a dirty board or surface
- Infecting cooked food with bacteria from raw food
- Preparing food with unwashed hands
- Using food that has fallen onto the floor
- Biting fingernails and licking fingers
- Serving food on dirty plates
- Washing up with dirty cloths

Creating ideal growth conditions for microbes

- Not heating food to a high enough temperature
- Cooking food too soon and letting it cool for too long too slowly before serving
- Leaving perishable foods around at room temperature
- Reheating food slowly or insufficiently
- Storing flour in a damp cupboard
- Forgetting to defrost the fridge regularly

## Glossary

**Microbes/micro-organisms:** very small organisms (animals, plants and fungi) which can only be seen under a microscope.

**Bacteria:** the chief microbial danger to food safety comes from poisoning bacteria. They can multiply very quickly, doubling their numbers every fifteen minutes. This means that one cell can produce a million others in four to five hours. When conditions do not favour normal growth, certain bacteria develop "resting stages" called spores. These become active when the conditions favour growth, for example, water, levels of acidity, oxygen and temperature.

**Fungi and moulds:** are also micro-organisms. They are most common on foods stored in damp conditions and may produce toxic by-products.

**Yeasts:** cause food spoilage but do not cause food poisoning. They are most commonly found on fruits and in the air.

**Viruses:** are parasites of living cells of other organisms and cannot multiply outside them. Similarly, they can survive but cannot multiply in food. They can cause food poisoning.

**Condensation:** the conversion of a substance from the state of a gas or vapour to a liquid. For example, steam created by cooking turns into water drops when it touches cooler surfaces such as windows and walls.

**Contamination:** making a substance impure or polluted by contact or mixture with another food or non-food substance.

**Enzymes:** natural organic substances in foods that can cause both desirable and unpleasant changes to the flavour, colour and texture of food.

**Oxidation:** the reaction of oxygen with food which makes the food rancid or taste unpleasant.

**Pathogens:** poisoning bacteria or viruses.

**Stagnant Water:** water that is without motion or current that does not flow and is still.

**Utensils:** appliances and implements for use in a kitchen.

**Ventilation:** the admission of a proper supply of fresh air to a room to allow good circulation.

## Acknowledgements

The authors would like to express sincere thanks to the many people and organisations that have assisted in the preparation of this booklet. In particular, our thanks to Matt Whitton for the illustrations.

The authors gratefully acknowledge financial support from the National Lottery Charities Board (NLCB). In addition, financial support from the ACPEEC and the Technical Centre for Agricultural and Rural Cooperation (CTA) and the Overseas Development Administration (now Department for International Development - DFID) for the first edition is acknowledged.

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