

*a guide to*  
**Healthy**  
*food*  
**Markets**



**World Health  
Organization**

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## WHO Library Cataloguing-in-Publication Data

A GUIDE TO HEALTHY FOOD MARKETS.

1. FOOD CONTAMINATION - PREVENTION AND CONTROL.
2. FOOD HANDLING.
3. FOOD SUPPLY.
4. ENVIRONMENTAL HEALTH.
5. INFLUENZA, HUMAN - PREVENTION AND CONTROL.
6. GUIDELINES. I. WORLD HEALTH ORGANIZATION.

ISBN 92 4 159393 8

(NLM CLASSIFICATION: WA 695)

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### Acknowledgements

WHO would like to acknowledge the dedication and commitment of the many market stakeholders who have worked to make their pilot projects successful. WHO would also like to acknowledge the contributions of the food safety experts as well as institutions who have advised on pilot projects, especially the School of Architecture, Lund University, Lund, Sweden. The generous support provided by various development agencies that have made much of this work possible, including Swiss Disaster Relief, German Gesellschaft für Technische Zusammenarbeit (GTZ), United Kingdom Department for International Development (DFID) and the Aga Khan Foundation, is gratefully acknowledged.

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# SUMMARY

With over half of the world's population now living in urban areas, food markets have become important sources of affordable food for many millions of people. At the same time, however, such markets have been associated with major outbreaks of diseases, including cholera, SARS and avian influenza. Food markets vary greatly from country to country and even from province to province, depending on the local culture, socioeconomic conditions, food varieties and dietary preferences. However, all food markets should have one major thing in common – they should provide the community with safe and nutritious food. This essential function is at the centre of the World Health Organization's Healthy Food Markets initiative. Given the differences among markets, the implementation of Healthy Food Markets pilot projects will also differ greatly in various regions of the world. Therefore, this guide is intended as a basic orientation and reference point for developing a Healthy Food Market pilot project. While the principles in this guide do indeed apply to all markets, some markets may require flexibility for achieving their goals. Successful Healthy Food Market pilot projects are ones where the community comes together to work for a common vision of a safe and healthy market. Regardless of whether specific improvements can be achieved in one month, one year or ten years, working towards their vision of a Healthy Food Market will ultimately mean better health and nutritional status for everyone in the community. This guide is meant as a tool to help foster the Healthy Food Market vision among those who have truly come to understand that we are what we eat.





# INTRODUCTION

A majority of the world's population now live in urban areas. This is the result of rapid growth of cities and peri-urban areas over the past few decades, particularly in developing countries. Health problems in many cities are aggravated because urban growth is often unplanned, uncontrolled, and under-financed. This has overwhelmed the capacity of many municipal authorities to provide basic health and environmental services and infrastructure, which are minimum prerequisites for a healthy population. A growing number of people in cities, particularly the poor, are experiencing stresses and exposures that result in health problems ranging from communicable diseases to chronic malnutrition. In view of the projected trends of increasing urbanization and deteriorating physical and social environments, WHO developed the concept of Healthy Cities in 1986 as a vital tool for assuring that health is explicitly considered in urban management and development planning through community empowerment. The objective of the Healthy Cities initiative is to improve the health of urban dwellers, especially those with low incomes, through improved environmental conditions and better public health services. The initiative operates by raising awareness of unsatisfactory environmental and health conditions and by mobilizing community participation through partnerships with local (usually municipal) agencies and institutions.

In addition to schools and workplaces, one of the most important settings in cities is the food market. Access to safe and nutritious food is essential for life and is indeed the foundation for health. The food market often serves as the commercial and social centre of communities, reflecting local culture and traditions of the people. Unfortunately, markets in some cases have also become associated with the spread of a number of emerging diseases. With this in mind, WHO began the promotion of Healthy Food Markets as an approach for promoting food safety and related environmental health issues.<sup>1</sup> Interest in Healthy Food Markets has been substantial in recent years, with pilot projects being planned or implemented in all WHO Regions (see Map). This guide has been prepared to advocate Healthy Food Markets as valuable settings that can effectively improve food safety, nutritional status and environmental health in even the least developed countries. For those considering a Healthy Food Market pilot project, this guide also provides basic principles and practical advice on how to proceed. It has drawn on experiences from a number of ongoing projects and studies set within communities that have undertaken steps to improve their food markets. A case study of one such pilot project is provided in Annex 1.

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<sup>1</sup>Moy, G.G. Healthy Food Markets: an approach for ensuring food safety and environmental health, *Food Control*, 12 (2001) 499–504.

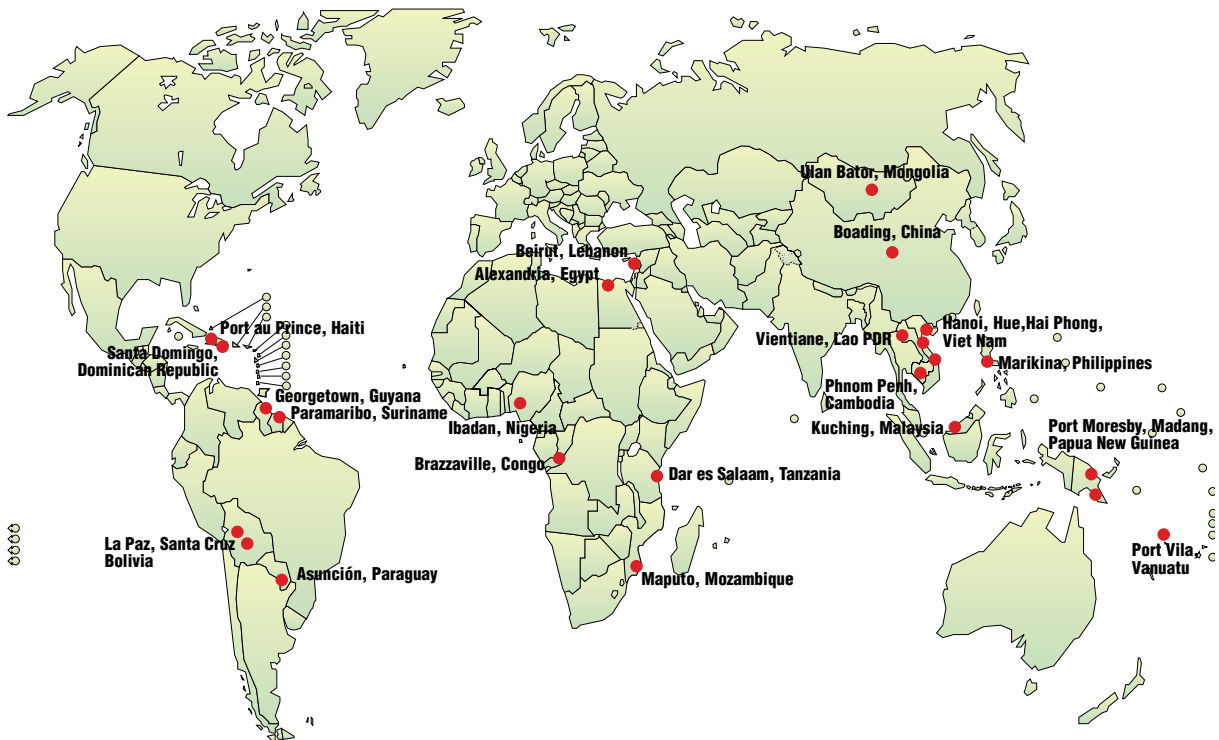




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It is expected that this guide will be used by all persons involved in Healthy Food Market projects, including local community leaders, food safety experts, health authorities, market vendors, and other stakeholders. Previous exposure to the concept of Healthy Cities, while useful, is not required. However, it may be helpful to become familiar with some of the Healthy Cities concepts in order to gain a broader perspective of urban environmental health problems. This guide can also be used by national authorities aiming to introduce the concept of Healthy Food Markets to local authorities and communities. It should be noted that while this guide has an urban focus, the approach can also be applied to food markets in rural areas.

## **CITIES WITH WHO HEALTHY FOOD MARKET PROJECTS**





# WHY HEALTHY FOOD MARKETS?

The home, the school, the workplace and the food market are all examples of settings where people carry out their daily activities. The health status of the population is determined to a great extent by the conditions in these settings as well as by the availability of health care services. Different holistic concepts have been developed in recent years that are aimed to make the environment supportive for health – not merely identifying the hazards, but supporting and improving the settings in such a way that health is maintained and promoted. The WHO Healthy Cities initiative, first conceived in the WHO Region of Europe, has now evolved to its present global form, emphasizing environmental health issues.

A Healthy Food Market is a setting in which all stakeholders collaborate to provide safe and nutritious food for the community. At the same time, food markets can be a major channel for spreading of disease as has been the case for cholera in Latin America and SARS in Asia. All stakeholders, including local authorities, market managers, suppliers, vendors, other food market workers and consumers themselves must share a common vision of a health-promoting food market that continuously seeks to better serve the health and well-being of the community. Combining their resources, all stakeholders will work together to implement incremental changes to improve the market. Thus a Healthy Food Market is not an end in itself, but a mutually beneficial process serving the interests of all stakeholders, especially food vendors and consumers.

While authorities are likely to be more supportive in cities that have already fully embraced Healthy Cities, it is not an essential prerequisite. For instance, in some cities, groups of vendors have mobilized to improve their food markets using their own ideas and resources. While such efforts should be commended for their contribution to public health and service to the community, vendors may not always have the knowledge, skills and resources to properly address all of the major food safety problems that exist. In addition, it should be noted that a bottom-up approach is best facilitated by top-down support from local authorities, especially those responsible for market management. A Healthy Cities framework can offer the political context that can contribute to greater attention and support being paid to the market.

## NEED FOR A FOOD SAFETY APPROACH

A number of recent disease outbreaks are commonly transmitted through food and live animals in markets. The outbreaks represent both food safety and occupational health issues that must be addressed by improving the conditions in food markets. Cholera, SARS, *Streptococcus suis* and avian influenza have all been associated with food markets. Prevention and control of foodborne diseases and zoonoses in markets have become major public health concerns requiring immediate attention.



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Major outbreaks of foodborne disease periodically occur on virtually every continent and illustrate that unsafe food is a worldwide public health problem. As a result, food is included under the revised International Health Regulations. More than 200 diseases transmitted through food are known. The agents causing foodborne disease include viruses, bacteria, parasites, toxins, pesticides, industrial chemicals, metals and, more recently, prions. The adverse health effects of foodborne diseases range from gastroenteritis to life-threatening conditions including cancer, birth defects, and neurological, hepatic and renal syndromes.

Foodborne diarrhoeal disease is one of the most common illnesses worldwide. In developing countries, 1.8 million children under the age of five die each year because of diarrhoeal diseases. Up to 70% of these cases may be caused by foodborne pathogens. Even in developed countries, the true incidence of foodborne disease is difficult to estimate because many episodes are not treated and therefore not reported. The US Centers for Disease Control and Prevention estimated that about one in three persons in the USA falls ill each year due to a foodborne disease. Similar estimates have been made for the Australian population. Children, pregnant women, the immunocompromised and the elderly are at greatest risk of both contracting foodborne diseases and suffering more serious adverse health effects. Other health complications related to foodborne disease are common. For example, 2-3% of all cases of salmonellosis lead to long-term health problems caused by reactive arthritis.

Foodborne diseases can have major economic impacts on individuals, food businesses and even countries. Large proportions of income may be lost by individuals due to reduced productivity and expenditures on medical care. Analysis of the economic impact of a *Staphylococcus aureus* outbreak in India showed that about 40% of the total cost of the outbreak was borne by the affected persons. In some cases, costs for investigating and controlling outbreaks can be significant. Large quantities of food may need to be recalled and at times, destroyed. In addition, enormous international trade in food raises the risk that food contaminated in one country will cause an outbreak in another. Food exports that are rejected or condemned can result in significant economic losses of foreign exchange, especially important to developing countries. In regard to tourism, unhygienic food service practices may reduce revenues and damage a country's reputation as a tourist destination. In markets, loss of business from both local consumers and tourists will result from unclean and poorly managed facilities and unhygienic food handling practices. All these losses are more regrettable because they are preventable with basic investments in training and infrastructure.





## *why* **Healthy food** Markets?

### **SPECIAL CHARACTER OF FOOD MARKETS**

Soon after humans first domesticated plants and animals around 8000 BC, simple food markets would have arisen spontaneously to provide newly settled populations with their food needs. Today food markets have evolved to become one of the defining characteristics of a community – reflecting the local culture and traditions of the people and often serving as its commercial and social centre. A common feature of most food markets is the wide array of foodstuffs from fruits and vegetables to grains and tubers, and from meats, poultry and fish to eggs and dairy products, as well as processed and semi-processed foods. These foods are often sold fresh by local producers at reasonable prices. In addition, many markets offer live animals, such as chickens and ducks, which are often slaughtered and dressed in the market. Food markets also offer an array of street-vended foods, which are an important source of ready-to-eat foods that are accessible and affordable for even the lowest income members of the community. Therefore, food markets are essential settings for maintaining the health and nutritional status of urban populations, especially in developing countries. In addition, food markets have a great attraction for tourists who find markets to be reflections of the cultures they have come to discover and enjoy.

The development of food markets is often fostered by the government, at times assisted by infrastructure investments. In instances of natural disasters, the reconstruction of the marketplace is one of the most important steps in returning the community to normalcy. Unfortunately, many food markets have been built with little consideration for food safety and environmental health. From an economic perspective, the food markets offer the possibility of creating a positive dynamic between development and health. If resources generated in the food market are used to improve health as well as to create a demand for safe products among consumers, business in the market will improve, thus generating even more resources for further improvements. This can lead to sustainable long-term improvement in the health status of the local community. In addition, the mutually beneficial relationship will contribute to a business culture that is in harmony with health and other needs of society. Because food markets have a social role in the exchange of ideas and knowledge, they offer a good opportunity for practical education of both vendors and consumers about a range of health issues.

### **WHAT ARE THE MAJOR FOODBORNE HAZARDS?**

As colourful as they may be, some traditional attitudes and practices in markets may be at odds with modern understanding of food safety. In general, potential hazards can be categorized as biological, chemical or physical. Biological hazards such as bacteria, viruses, prions and parasites may also be introduced from a diversity of sources, including the natural environment, polluted water used to irrigate plants or wash food, improper slaughtering practices, and poor harvesting, storage and transport to the market. In addition, the marketing of live animals can lead to the spread of disease not only between animals and humans, but also among animals themselves, as in the case of avian influenza. Chemical hazards present in food may arise from a diversity of sources, including industrial pollution of the environment (e.g., lead, mercury, cadmium, arsenic,



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polychlorinated biphenyls and radionuclides), improper use of agrochemicals (e.g., pesticides, fertilizers and drugs used in animal husbandry), and natural biological sources (e.g., plant toxins, marine and shellfish toxins and mycotoxins). Physical hazards consist of glass, metal and wood fragments or other objects that may cause physical injury to the consumer. In addition, occasionally food is intentionally adulterated with substances leading to possible health, nutritional or economic problems for the consumer.

Food contamination may occur before food comes to the market. Food hazards associated with raw food are most often introduced during production, harvest and storage as well as during transport to the market.

Food may also become unsafe after it leaves the market. Individual responsibility for the safe handling of food in the home and for choosing safe food at the community food markets is crucial in reducing the incidence of foodborne diseases. Because markets occupy a pivotal position in the supply of food, they can influence not only primary producers, but also consumers. Because most food passes through the market, it affords the most cost-effective location for monitoring food for safety and if necessary, for intervening. This is particularly important in situations where food control capacities are otherwise limited. Consequently, a Healthy Food Market is one that serves to improve the safety of the entire farm-to-table continuum.

### **WHO BENEFITS FROM A HEALTHY FOOD MARKET?**

Once local authorities and the market community become committed to the concept of Healthy Food Markets, the long-term prosperity and growth of the market is strengthened. These are, of course, enormous benefits for vendors. However, benefits extend beyond the market. In particular, consumers in the adjacent community benefit by having access to safe and nutritious food. The advantages of a Healthy Food Market for specific groups are described below.

For primary food producers, it would result in:

- Improved production practices;
- Improved product quality and price;
- Greater market access; and
- Reduced costs due to recall/wastage of food.

For food market vendors, it would result in:

- Improved business and sales;
- Improved product quality;
- Reduced costs due to recall/wastage of food;
- Safer working environment;
- Greater empowerment;
- Increased job satisfaction; and
- Preserved customs and traditions, in contrast to the increasing trend towards supermarkets.



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For the adjacent community, the ongoing improvements in the food market will mean:

- Improved source of safe and nutritious food;
- Increased community health and safety;
- Reduced community health care costs;
- Increased knowledge levels (mainly but not restricted to food safety, general hygiene, health and management); and
- Improved involvement of women in community issues.

For the food market manager, it means:

- Improved food market business;
- Improved relations with vendors, contractors and consumers;
- Better understanding of health protection issues – understanding what is applicable both within and outside the market environs;
- More attention to responsibility for safety and health;
- More effective systems in place; and
- Less risk of fines and litigation.

For the health authorities, the result will be:

- Reduced incidence of foodborne disease;
- Improved nutritional status;
- Reduced community health care costs; and
- Effective access to a broad range of community members for health promotion and protection activities.

City and community leaders will benefit because of:

- Greater community awareness of leadership's commitment to community health and well-being;
- Increased health and nutritional status of community population;
- Reduced community health care costs;
- Enhanced economy through better business and greater tourism; and
- New income activities and improvement of socioeconomic and environmental standards.

And finally, for consumers patronizing the food market, it would result in:

- Access to safer and more nutritious food;
- Better understanding of how to select safe and nutritious food;
- Improved knowledge of food safety practices in the home;
- A safe and healthy shopping environment;
- Access to adequate hygiene facilities while shopping;
- Exposure to other health promotion messages; and
- Better health and nutritional status for themselves and their families.





# GUIDING PRINCIPLES FOR A HEALTHY FOOD MARKET

A Healthy Food Market is a health-promoting setting in which all stakeholders should participate. These stakeholders, as described in the previous section, work together to implement incremental improvements in behaviour and practices as well as in infrastructure and services. This serves to continually improve the safety and nutritional quality of the foods being offered in the market. In this regard, there is no one “Healthy Food Market”, but rather it is a health-promoting paradigm that offers benefits for the entire community. Three basic principles underpin the concept of a Healthy Food Market: the provision of safe and nutritious food; the promotion of food safety from production to consumption; and, the fostering of partnerships between suppliers, government and consumer.

## ENSURE THE MARKET PROVIDES SAFE AND NUTRITIOUS FOOD TO THE COMMUNITY

As stated by the FAO/WHO World Declaration on Nutrition, access to safe and nutritious food is a basic individual right. For many urban populations, this access is provided by food markets. Consequently, food markets have the essential function of providing consumers with safe and nutritious food. This is the most important underlying principle of a Healthy Food Market. In addition, environmental and occupational health issues are addressed under Healthy Food Markets not only because they often contribute to safer food, but also because they are public health matters in their own right. However, recognizing the need for safe and nutritious food also requires an understanding of how this can be achieved.

Food safety is founded on a scientific understanding of linkages between adverse health effects and chemical and biological agents in food. Traditional practices and beliefs about food safety offered some protection from certain hazards, but this approach was more often wrong than right. One of the pioneers in this area was Louis Pasteur of France who in the mid-1800’s discovered the process that now bears his name. Because food safety requires a multidisciplinary approach, it is not a coincidence that he made basic discoveries in chemistry, microbiology and food science. Consequently, a science-based approach to food safety is essential if a Healthy Food Market pilot project is to be successful. In addition to these three disciplines, improving the market may require expertise in nutrition, epidemiology, toxicology, civil engineering, architecture, urban planning, health promotion, waste management systems, consumer affairs, and perhaps others. Consequently, a Healthy Food Market must rely in the first instance on technical



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advisers who understand the nature of hazards in food, the risks they pose and means for their control. Without this foundation, interventions may fail to properly address the hazards that pose the greatest risks to health.

### **SEEK TO IMPROVE FOOD SAFETY FROM PRODUCTION TO CONSUMPTION**

While the main effort of Healthy Food Markets focuses on the safety of food sold in the market, a holistic approach should be developed, which encompasses all levels of the farm-to-table continuum. For example, food may be unsafe before it enters the market; on the other hand, safe food may become unsafe after it leaves the food market. Since hazards in food can arise at many different points in the food-chain, coordinated efforts are essential for assuring the safety of the food supply. On a political scale this requires comprehensive food regulations and coordinated enforcement. On the local scale it needs the provision of appropriate training, infrastructure and services. The active players in the food-chain need the necessary information and assistance to ensure food safety. The consumer should be aware of basic food safety concepts in order to handle food properly at home, as well as be educated to appreciate healthy food. The different components of a Healthy Food Market project should address all these areas.

For food production, the basic principles of Good Agricultural Practices (GAP) and other applicable codes of the Codex Alimentarius Commission should be consulted. The general hygienic requirements for food production, including food markets, should be based on the recommendations contained in the Codex General Principles for Food Hygiene, and on applicable Good Manufacturing Practices (GMP) for specific foods. These GAPs and GMPs encompass many aspects of basic hygienic operations. The awareness of food safety matters should be raised for all who produce, handle and prepare food (farmers, fisherpersons, transporters, distributors, vendors, and food service personnel) and specifically in relation to the foods they handle. Where appropriate, their behaviour should be modified to be consistent with food safety principles.

The introduction of the Hazard Analysis Critical Control Point (HACCP) system into food markets has been used in several Healthy Food Market projects. The formulation of an HACCP plan for the market will require a multidisciplinary, multisectoral team. While the full implementation of HACCP as defined by Codex is too complicated to be implemented in the food market setting, the system is useful in raising awareness of foodborne hazards and of possible risk management measures that might be adopted.

In many countries, improper handling of food by consumers in the home is a major cause of foodborne illness. The three main reasons for improper food handling are: i) a lack of knowledge concerning foodborne diseases, their causes, symptoms and implications; ii) a lack of perception of the extent of the threat or risk; and iii) a lack of knowledge about how to change behaviour. All these impediments can be addressed by providing education about foodborne diseases, their causes, health effects and impact on human and societal development and measures to avoid them.





## *guiding principles for a* **Healthy food Market**

Behavioural change is facilitated by limiting the number of food safety messages. A practical list of food safety messages for consumers can be found in the “Five Keys to Safer Food”.<sup>1</sup> Based on these messages the “Five Keys to Safer Food in Healthy Food Markets” have been developed and is presented later. The rationale for using this approach is that common educational messages in the Healthy Food Market pilot project can be used not only for consumers, but also for vendors and other stakeholders.

### **FOSTER PARTNERSHIPS AMONG FOOD SUPPLIERS, GOVERNMENT AND CONSUMERS**

Interest and motivation of stakeholders are important to a pilot project, since they determine its chances of success. Therefore, partnership among all stakeholders should be encouraged and, where possible, active involvement in the Healthy Food Market project should be sought. If all stakeholders are properly involved, their views and concerns can be integrated, resources can be shared and problems can be more easily resolved. Common interests should be identified and agreeable approaches should be developed as a normal part of the planning process rather than on an ad hoc basis. Therefore, a Healthy Food Market pilot project is best guided by a multisectoral team or task force that should meet periodically to oversee and monitor progress.

The multisectoral team should involve persons from vendor’s associations, government, and consumer organizations as well as academia. Representatives from agriculture, fisheries and animal husbandry may be involved to address problems that could arise during production. Municipal authorities should be included to ensure that essential services and support are provided to the market. Government and academic experts in food safety are essential advisers. Public health authorities with knowledge of community and occupational health should also be included. In the implementation of the project, all stakeholders and resource persons should gain a basic understanding of food safety, which is the basis of the project. As necessary, the Healthy Food Market team should also invite the participation of persons with special expertise.

In the implementation of a Healthy Food Market pilot project, participation in decision-making by vendors is extremely important, since the sense of ownership is a major motivational factor in behaviour change. In addition, certain changes in the market may not only require their cooperation, but also their resources. Therefore, vendors should be made full partners in any Healthy Food Market project and communication with their representatives and the vendors themselves should be given high priority.

Ideally, a Healthy Food Market project should be carried out in a participatory mode. It should act to mobilize and empower the market and its community to create a Healthy Food Market, which serves its needs and is sustainable. This can be achieved by orientating the project to the objectives and needs of the people who are directly involved and whose actions and behaviour will determine the success of the project.

<sup>1</sup>See WHO Food Safety Web site <http://www.who.int/foodsafety/consumer/5keys/en/index.html>.



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Problems are likely to occur if changes to the physical layout of a food market are made without involvement of the food market community. Some attempts by a government to improve infrastructures of food markets were not accepted by vendors. In other cases, after relocating the market, vendors returned to the previous unauthorized and unsuitable location. In large part, this problem was due to the fact that vendors were not consulted in regard to selection of the new location.

Gender equality is not always present in communities, and the danger exists that women, and thus their interests, are not reflected proportionally in the setting of goals for projects. It has been shown that women contribute greatly to improvement in health and development. Women tend to place emphasis on health and environmental issues. They are usually the food managers at home. Women and children are often motivated to take action, and their social role allows them to reach out to their neighbours, the community and schools more easily. Therefore all means should be used to involve women and to strengthen their views and position in the community. A Healthy Food Market project offers the chance to achieve this in many aspects. Women can be encouraged to be involved representing consumers or vendors; they can also be educated to become teachers in their own direct environment. With the assistance of a micro-credit system, they could become vendors themselves and create their own income.



# BASIC COMPONENTS OF A PILOT PROJECT

In the following sections, the components that are considered important for the planning, management and evaluation of a Healthy Food Market pilot project are described. The sections do not go into the actual technical content of a Healthy Food Market project as these are discussed later.

## PREPARATORY ACTIVITIES

**ADVOCACY AND COMMITMENT:** In order to assure political consensus, an advocacy campaign should be considered, aiming at appropriate national, provincial and local authorities, not only informing but also involving them in the Healthy Food Market pilot project. National development authorities are potential advocates as they are key persons with the capacity to bring about change. Other possible advocates can be national food safety authorities and public health officials. A motivated consumer organization or vendor association can also contribute to this goal as well. Having a Healthy Cities programme can facilitate the project, but is not necessarily a prerequisite.

Once commitment is secured, national or provincial authorities should develop an education and training strategy supporting the Healthy Food Market concept. National or provincial authority leadership should actively support the local authority action with appropriate resources, and possibly establish a supportive network of local officials. City and other responsible authorities will need to demonstrate commitment by both assigning priority and allocating the necessary resources for the pilot project.<sup>1</sup>

**PRELIMINARY ANALYSIS:** In order to get an overview of market conditions, a preliminary assessment of various markets should be performed by the project initiators. All relevant background data on the actual situation, on possible partners, on the areas of responsibility, the health and safety concerns of the resident population, and the needs of the market community, including vendors, employees, contractors and consumers, should be described. This preliminary assessment will then lead to the next step of taking the decision to select a market to implement a Healthy Food Market pilot project.

**SELECTION OF A PILOT MARKET:** Based on the preliminary analysis, the decision to select a market to be the site for a Healthy Food Market pilot project should be taken weighing all relevant pros and cons. Criteria for selecting the market may include the following considerations: manageable size, location within a defined community, types of food sold, including ready-to-eat food, available budget and the interest and support of the vendors and local community.

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<sup>1</sup>A brochure that can assist advocacy efforts has been developed by WHO and is available on the WHO Food Safety Web site.





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### **PLANNING AND IMPLEMENTATION**

The pilot project will require thorough planning in order to assure sustainability and prevent delays in implementation. For this purpose, the establishment of a Healthy Food Market Task Force is recommended. Among its more important functions, the Task Force should be responsible for detailing research needs, prioritizing activities, developing a workplan, and mobilizing resources.

**ESTABLISHING A HEALTHY FOOD MARKET TASK FORCE:** Once the selection of a market for the pilot project has been made, one of the first activities is the formation of a Healthy Food Market Task Force. Annex 2 provides model Terms of Reference for such a Task Force, which is the central body for planning, implementing and monitoring the project. Representatives of all relevant stakeholders should be members. The Healthy Food Market Task Force should form a core group of 4 to 6 persons for day-to-day oversight. The work of the Task Force and the core group can be supported by special ad hoc working groups, which may consist of members from the Task Force as well as external experts, such as food chemists, microbiologists, food technologists, medical professionals, veterinarians, urban planners, architects, economists and experts from international organizations, such as WHO.

The qualities describing a well-functioning Task Force include coordination, transparency, frequent communication, flexibility and adequate representation. These will contribute to an open and cooperative atmosphere and a sense of ownership by all stakeholders. Furthermore, frequent and transparent communication will assure understanding and thus further improve commitment of all parties involved in the Healthy Food Market pilot project. The Task Force should establish working structures by identifying persons for leadership positions who will carry out various tasks, including reporting on progress to the Task Force. Due to its multidisciplinary, multisectoral nature, the Task Force will require effective leadership to bring about action and change. Leaders should take a participatory approach with the food market community and be effective agents for change by being good communicators with all stakeholders.

**RESEARCHING NEEDS:** In order to be able to plan activities in the Healthy Food Market pilot project, a detailed assessment should be conducted to identify the needs of the market partners. The Task Force should conduct a survey among community members, including vendor groups, to identify health and safety concerns and possible solutions from their respective points of view. Techniques for performing the initial needs assessment are, for instance, brainstorming sessions, or more systematic approaches using tools such as a SWOT-analysis.<sup>1</sup> As part of the needs assessment, a thorough analysis must be performed into the prevailing practices and hazards within the existing food market, the risks associated with the market environment, and the practices currently employed. This information can be obtained through various techniques, such as interviews, direct observation, questionnaires, consultation with persons in key positions, focus groups,

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<sup>1</sup>Strengths, Weaknesses, Opportunities, Threats (SWOT).



## *basic components of a* **Pilot Project**

and case studies. The needs assessment should be conducted in close cooperation with health authorities and food safety experts. The Healthy Food Market Task Force should review the outcome to assure that the fundamental needs of the market are met. The resulting analysis will be the basis for the workplan.

**PRIORITIZING ACTIONS AND DEVELOPING A WORKPLAN:** Based on the above, the Task Force should set priorities to be addressed under the Healthy Food Market pilot project and develop a workplan, which should include:

- Tasks;
- Priorities, goals and objectives of tasks;
- Time schedules for tasks (short-, medium- and longer-term actions);
- Indicators by which progress can be monitored and evaluated;
- Responsibilities for implementation and monitoring; and
- Resource requirements.

The workplan should clearly indicate what can be done by the market community (vendors, etc.) versus what has to be done by external agents (government and donors).

**BUDGETING:** Because food markets are a centre for business activities, most markets have some capacity to support improvements in terms of funds, materials, labour or other in-kind contributions. Funding of the project could include income generating activities in the food market, such as small fees to use the toilet facilities or production and sale of ice or bleach. Improvements of market facilities like refrigerators, cold displays and storage equipment could be supported by vendors themselves. Basic infrastructure improvements, like safe water supply, toilets and hand-washing facilities, waste disposal, and health services may require outside funding in the form of grants or loans.

In a Healthy Food Market project, a revolving fund could provide micro-credits for improvements and might be a useful financing option. Aspiring entrepreneurs, particularly women, could start small businesses with micro-financing provided by an NGO, such as Opportunity International. The broader market community could undertake simple infrastructure improvements. Other options to provide financial resources could be 'market fees'. Provision of major infrastructure and services by city and other responsible authorities should be considered as part of urban development planning.

## **MONITORING AND EVALUATION**

One of the most important lessons learned from various healthy settings initiatives has been the need to monitor and evaluate progress. Each food market community must set its own short-, medium- and long-term objectives and indicators of success at the outset. Indicators should not only be set for the continuous self-monitoring of the food market, but also to indicate that the Healthy Food Market project has reached certain milestones. Appropriate and measurable indicators should be incorporated into the workplan, and not be added as an afterthought.



## *a guide to* **Healthy food Markets**

Monitoring should be considered for the different components of the Healthy Food Market pilot project. For example, hygienic behaviour in food handling by every participant in the food-chain could be monitored by observation, photo checklists, questionnaires (structured or semi-structured interviews) or other means. Another example is the monitoring of the socioeconomic standard of vendors by assessing the change in income of individual vendors.

Healthy Food Markets should be evaluated in terms of their meeting the basic objective of providing safe and nutritious food for the community. Markets represent logical points to establish cost-effective control points for a range of potential foodborne problems, both chemical and biological, as well as for protection against adulteration and fraud. Consequently monitoring food as it comes into the market, during its time in the market and when it leaves the market can provide an indicator of how well the market is meeting its primary objective.

The provision of safe and nutritious food can be monitored by inspecting food vendors in the market to determine compliance with existing hygienic requirements and testing of samples for contaminants; inspecting and testing of food coming into the market for compliance with limits for pesticides and other chemicals and for general hygienic condition, including those of the conveyance; investigating foodborne outbreaks and conducting surveillance of foodborne diseases in the community served by the market; and tracking consumer complaints and opinions to identify persistent problems.

One of the features of a successful Healthy Food Market is that it be an efficient self-sustaining system that evolves to meet the changing needs and expectations of the market community. In this regard, empowerment and self-sufficiency are essential for the development of a Healthy Food Market pilot project. Therefore, it is important to communicate independence and self-sufficiency when starting the project. This can be achieved by encouraging an effective self-monitoring system for the food market.



# IMPROVING MARKET ENVIRONMENTS

A common approach for improving food markets has been the upgrading of environments. The construction of buildings and roads and the provision of water supplies and improved drainage, while expensive, are often attractive because they are tangible and easy to implement. Other approaches include improving the operational environment and reducing the impact of the market on the adjacent community. Options for possible improvements are suggested in the International Code of Practice – General Principles of Food Hygiene adopted by the Codex Alimentarius Commission.<sup>1</sup>

## INFRASTRUCTURE

Improvements in the physical infrastructure of the food market contribute to the promotion of food safety as well as occupational health. For example, sufficient and appropriately placed toilets for both men and women with hand-washing facilities are important for both food safety and the well-being of market participants. An adequate water supply (safety, quantity and pressure) should be available for cleaning and food preparation needs. At a minimum, potable water should be available for drinking. Drainage should be appropriately designed to meet the various needs across the food market. Solid and liquid waste should be removed on a regular basis from vending units and stored in suitably closed containers. A market maintenance programme should be in place and be adequately monitored. Amenities like rest areas, changing rooms and designated eating areas can also serve a dual purpose of promoting food safety and occupational health.

The materials used in the construction of the market should be easy to maintain and clean. The market walls should be designed and constructed so that adequate light and ventilation is provided, while maintaining adequate security. In designing, constructing and maintaining the physical environment (buildings, floor plans, equipment, ventilation, fire control etc), market management should respect basic health and safety rules and comply with all local building codes. Particular attention should be given to wet markets, which can be a source of microbial contamination in the market and pose a direct health hazard to market workers as well as customers.

## OPERATIONAL ENVIRONMENT

Market operations should be conducted in a manner that protects and promotes health. The food market should have a functioning administrative system, including food inspection and access to analytical services. Ideally, the market operations should be zoned in order to more effectively protect selected commodities from cross-contamination. For example, live animals and raw foods of animal origin should be separated from

<sup>1</sup>Codex Alimentarius, 3rd revised edition, Joint FAO/WHO Food Standards Programme, FAO, Rome, 2003





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ready-to-eat foods. Solid and liquid waste should be handled and stored in manner so as to not contaminate food.

Motor vehicle access should be planned to enable ease of vendor, supplier and service personnel movement while limiting the possibility of the vehicles contaminating products or harming market participants and customers. Similarly, the movement of consumers should be facilitated by assuring sufficient access and flow and prohibiting vendors from encroaching on pedestrian walkways. Ideally, the entry of people and food into the market should be well separated from waste storage and removal routes.

Market security should be provided to assure protection of persons and property. The perimeter of the market should be secure after market hours and each vendor should have the means to protect their property from pilfering. Illegal activity should not be tolerated in the market and a continuous police presence in the market may be necessary to deter criminal activity.

### **HEALTH SERVICES**

Local health services should collaborate with the Healthy Food Market project to provide greater accessibility for vendors and employees to basic health services. In cases where a vendor may be suffering from a disease that is transmitted through food or is suffering from symptoms of foodborne disease, medical attention should be provided. If warranted, such as the case with cholera, hepatitis A, typhoid fever or diarrhoea within the previous 24 hours, the vendor should not handle ready-to-eat food. Health services personnel should be able to recognize possible foodborne diseases and take specimens for laboratory analysis. In instances where a foodborne outbreak is suspected, health personnel should undertake investigations to identify the agent, food and reasons that may have led to the outbreak.

Local health services should also establish the capacity to measure the incidence of foodborne diseases, including laboratory confirmation of the disease agent. This can be used to assess the effectiveness of the Healthy Food Market project in actually improving the health of the community.



## *improving* **Market** *environments*

### **ENVIRONMENTAL HEALTH**

Public health measures should include pest control programmes that are monitored and evaluated. If applicable, noise control programmes should be considered. The local authority and market management should develop an environmental management strategy to minimize the negative impacts of the market on the external environment.

Solid and liquid waste from the market should be regularly removed. Attention might be given to the possibility of implementing practices such as composting and recycling of materials into animal feed. Sewage and other effluent should be treated in such a manner as to minimize the contamination of the environment.

Water is one of the most important raw materials in a market. Local authorities should implement a programme of monitoring of quality and quantity of water provided to the food market.

Veterinary public health authorities should provide appropriate monitoring and control of live animals, including poultry in the market. If slaughtering and dressing of animals occurs in the market, the potential spread of disease-causing agents, including avian influenza, becomes a major environmental concern. In such markets, areas for the holding and slaughtering of animals should be as far away from ready-to-eat food and the public as possible. Animal handlers may need to take protective measures to avoid zoonotic infections, such as avian influenza. Measures for reducing transmission of avian influenza in wet markets in developing countries are provided in Annex 3.

As a workplace, a Healthy Food Market should also comply with basic occupational health requirements with regard to space, light, ventilation, accident prevention, heating/cooling and use of personal protection equipment.



# PROMOTING SAFE FOOD HANDLING

Proper handling of food along the entire food supply can help to ensure the safety of food. In order to promote safe food behaviour, a number of approaches have been identified. Many food safety problems of the market, such as smoking, blowing the nose when handling food, uncovered cuts or sores, touching food with unclean utensils and tools, coughing or sneezing over food, handling of ready-to-eat food while ill and not disposing of waste materials can not be addressed solely with controls but require hygiene training in order to instill awareness and change behaviour.

## EDUCATION AND TRAINING

The purpose of health education in Healthy Food Markets is to communicate the principles of food safety and personal hygiene, to achieve appropriate behaviour change in all participants in the food-chain (farmers, fisherpersons, transporters, vendors, consumers). Education strategies and materials for food handlers and consumers should be developed consistent with the existing levels of awareness, and the opportunities for inducing behaviour change for the different target groups. Personal hygiene can be coupled with healthy lifestyle issues, e.g. tobacco use, especially among vendors, to provide a more holistic approach to Healthy Food Markets.

## KEY MESSAGES IN HEALTHY FOOD MARKETS

Five key messages listed below have been developed for use by Healthy Food Markets based on similar food safety messages for consumers contained in the WHO 'Five Keys to Safer Food'.<sup>1</sup> Each key message is followed by a number of possible specific measures that need to be tailored to the conditions in the market, the food commodities being sold and the intended target group.

### Five Keys to Safer Food in Healthy Food Markets

#### Key 1. Keep clean

- Provide basic infrastructure to promote sanitation, such as toilet and hand washing facilities, safe water supplies, cleanable walls and floors, and drainage;
- Ensure sanitation of stalls and equipment;
- Ensure that all waste materials, including solid and liquid waste, are collected and disposed of regularly from the market, ideally at least once daily; and,
- Protect market areas and food from environmental hazards, including rain, sun, dust, insects, rodents and other animals.

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<sup>1</sup><http://www.who.int/foodsafety/consumer/en/>





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**Why?** While most microorganisms do not cause health problems, disease causing microorganisms are widely found in soil, water, animals and people. These microorganisms are carried on hands, wiping cloths and utensils, especially cutting boards, and the slightest contact can transfer them to food and cause foodborne diseases. Waste, including liquid waste, may contain a multitude of disease causing organisms, and therefore has to be stored adequately and removed in a timely and regular manner. Daily cleaning of the market area is strongly recommended. The responsibility for keeping the market clean lies with all those that use it, not only the appointed cleaning crews.

### **Key 2. Avoid contamination**

- Separate clean and contaminated food areas as much as possible. For example, cooked and ready-to-eat foods, dry foods, dairy products, fruits and vegetables, raw meat, raw fish, raw poultry, live animals and food waste represent a “hygiene gradient” from clean food to contaminated food and the market should be organized to reflect this order;
- Separate ready-to-eat food from food that is likely to be contaminated, such as raw meat, fish and poultry;
- Use separate equipment and utensils, such as knives and cutting boards, for handling raw and cooked foods;
- Promote proper personal hygiene by vendors, such as hand washing with soap after visiting the toilet; and,
- Assure that displayed and stored raw and cooked foods are separated to avoid cross-contamination.

**Why?** Raw food, especially meat, poultry and seafood, and their juices, as well as live animals and food waste, usually contain disease causing microorganisms, which may be transferred onto other foods during food handling, preparation and storage. Proper hygiene behaviour is essential to avoid contamination of food by vendors.

### **Key 3. Destroy hazards when possible**

- Cook food thoroughly, especially meat, poultry, eggs and seafood, to at least 70°C;
- Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer; and,
- Reheat cooked food thoroughly.

**Why?** Proper cooking kills almost all dangerous microorganisms, and destroys certain toxins. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption.



## Promoting *safe food* Handling

### Key 4. Minimize growth of microorganisms in food

- Promote cooling of all raw meats, fish and poultry through refrigeration, storage on ice or at least protection from sunlight and heat;
- Do not leave cooked food at room temperature for more than 2 hours, or rather refrigerate promptly all cooked and perishable food (preferably below 5°C);
- Keep cooked food steaming hot (more than 60°C) prior to serving for immediate consumption; and,
- Do not store food too long even in the refrigerator, and do not thaw frozen food at room temperature.

**Why?** Microorganisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of microorganisms is slowed down or stopped. Note that some dangerous microorganisms, like *Listeria monocytogenes*, can still grow below 5°C on certain foods.

### Key 5. Use safe water and raw materials

- Use safe water, or treat it to make it safe;
- Ensure that supplied food is from safe and reliable sources;
- Select sound and undamaged fresh foods, as well as foods processed for safety, such as pasteurized milk;
- Wash (and peel if applicable) fruits and vegetables, especially if eaten raw; and,
- Do not sell, buy or use perishable food beyond its expiry date.

**Why?** Raw materials, including water and ice made with unsafe water, may be contaminated with dangerous microorganisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Care in selection of raw materials and simple measures such as washing and peeling may reduce these risks.

## OTHER RELEVANT MATERIALS

This guide has not provided detailed advice on improving the safety and nutritional quality of specific food commodities. Readers are referred to the Codex Alimentarius, which has standards, guidelines and other recommendations for further guidance. In addition, the WHO publication “Essential safety requirements for street-vended food”<sup>1</sup> offers specific advice for improving food safety in developing countries. Finally a list of further reading and useful Websites, including Healthy Cities background material, is provided in Annex 4.

<sup>1</sup>Revised edition – WHO/FNU/FOS/96.7, World Health Organization, Geneva, 1997.  
[http://www.who.int/foodsafety/publications/fs\\_management/street\\_vend/en/index.html](http://www.who.int/foodsafety/publications/fs_management/street_vend/en/index.html)





# ANNEX 1: BUGURUNI MARKET, DAR ES SALAAM, TANZANIA – A CASE STUDY

Health problems in Dar es Salaam have been aggravated by rapid urban growth and environmental degradation. At the request of the Ministry of Health the United Republic of Tanzania, WHO was invited to collaborate with municipal authorities in Dar es Salaam in the promotion of Healthy Marketplaces as a component of the Dar es Salaam Healthy City Project. The WHO Mission was organized by the WHO Food Safety Programme in cooperation with the Swiss Disaster Relief Unit and supported, in part, by the United Nations Development Programme's LIFE (Local Initiative Facility for Urban Environment) Project and was complementary to the United Nations Commission for Human Settlements' Sustainable Dar es Salaam Project which is working in the area of solid waste management.

The mission, which visited Dar es Salaam in January 1997, held extensive meetings with representatives of different organizations in Dar es Salaam including national, regional and municipal government authorities as well as international, bilateral and non-governmental agencies, private sector and community groups, and other interested parties in order to explain the roles of the various stakeholders in the initiative. A seminar was organized to raise awareness among decision-makers on the importance of food safety in the markets in Dar es Salaam. As a result of these meetings, broad-based support for the *Dar es Salaam Healthy Marketplaces Project* was established, which provided the necessary consensus for such an intersectoral undertaking.

In consultation with the government, the Buguruni Market was chosen to serve as a pilot project for Dar es Salaam. The selection of Buguruni Market was based on its size, types of food sold, potential for collaboration among agencies and, most importantly, the enthusiasm of market participants. Buguruni Market serves about 100,000 customers a day and sells a wide variety of foods, including fresh fruits and vegetables, meat and fish, and street-vended food. Live chickens are also available with slaughtering and cleaning performed on-site. Other non-food products, like housewares and clothing, are also sold in the market. The market had a single pit latrine and one water standpipe





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for the entire market. Interruption of water service was common and no large water storage facility existed. The market lacked central administration and maintenance and no pest control programme was in operation. Food inspections were infrequent. Much of the market has been constructed in an ad hoc manner by vendors themselves using scavenged materials. About 80% of the vendors were women from the Wauza Mazao Buguruni Cooperative Society (WAMBUCO Society). The land is owned and taxed by the Dar es Salaam City Commission.

A workshop on the *Health Food Market* concept and on foodborne hazards and means for their prevention and control was held with participants from various governmental and non-governmental organizations as well as with vendors from the market. The group was subsequently formally established as the Buguruni Healthy Marketplaces Task Force (BHMTF) by the Dar es Salaam City Commission with the following terms of reference:

- (i) Liaise with municipal health authorities in the overall development of a Healthy Food Market, including: market administration (including food inspection and analytical service); water, sanitation and drainage (including toilets and hand-washing facilities); environmental sanitation (including solid and liquid waste management and pest and noise control); training and education of food vendors; and education of consumers;
- (ii) Conduct Hazard Analysis Critical Control Point (HACCP) studies, under the supervision of a food safety adviser, and recommend appropriate intervention options for preventing or reducing identified hazards, including:
  - good practices and norms in the food market; and
  - infrastructure design considerations;
- (iii) Provide training and implementation of HACCP-based food safety interventions in the food market, including those that may arise at other stages of the food-chain;
- (iv) Prepare a draft physical layout of the food market that assures sub-systems supporting food safety work together harmoniously and serve their respective functions. The physical layout should provide the best conditions possible for preventing contamination and for promoting adherence to good hygienic practices;
- (v) Prepare and implement an annual plan of activities, including regular supervision; and,
- (vi) Evaluate, at agreed upon intervals, the progress and results of the Task Force.



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In May 1997, the Buguruni Healthy Market Strategy and Plan of Action was prepared by the BHMTF. The Strategy envisions a long-term comprehensive approach to promote food safety based on application of the HACCP system. The BHMTF Plan of Action was implemented by the WAMBUCO Society, Ministry of Health and National Food Control Commission as well as other partners, including WHO, the Japanese International Cooperation Agency (JICA) and Plan International.

The BHMTF Plan of Action resulted in a number of successful outcomes, including:

- improvement in road access (Plan International);
- construction of a solid waste storage bay (JICA);
- construction of toilet and hand washing facilities (WHO); and
- development of a system for the collection and sorting of solid waste for subsequent disposal.

As evidenced by improved handling of solid waste, activities within and outside the market have produced a synergism which has contributed significantly to the hygienic conditions in the market. Local resources have been mobilized for an education programme for market participants, consumers and other stakeholders to promote awareness that safe and nutritionally adequate food is the foundation of good health. Efforts are under way to promote direct community involvement and consultation to strengthen and sustain the Healthy Buguruni Market initiative.

The Healthy Food Market concept has now been introduced into several other markets in Dar es Salaam and other cities in Tanzania.



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# ANNEX 2: TERMS OF REFERENCE FOR A HEALTHY FOOD MARKET TASK FORCE

The Task Force for a Healthy Food Market is established to promote the health and nutritional status of the people in the local community through assuring the safety and wholesomeness food sold in the market. The Task Force will consist of representatives of primary producers, market vendors, contractors, government officials, consumers, personnel of technical institutes and universities, and other market stakeholders, including international and partner agencies, such as WHO and the Food and Agriculture Organization of the United Nations (FAO).

The Task Force will serve to coordinate inter-sectoral cooperation and collaboration in Healthy Food Markets in (insert name of city), initially through the development of a Master Plan for a Healthy Food Market in (insert name of market).

The functions of the Task Force include:

- a. to continuously assess potential hazards and hazardous conditions associated with food sold in the market;
- b. to consider various preventive measures and actions which can be taken to eliminate or reduce to an acceptable level, identified hazards and hazardous conditions;
- c. to prepare a comprehensive Master Plan for a Healthy Food Market based on selected preventive measures and actions, including identification and involvement of sectors responsible for their implementation;
- d. to review and monitor implementation of Plans of Action prepared by responsible sectors in response to specific items on the Master Plan;
- e. to prepare periodic progress reports to all stakeholders;
- f. to update and revise the Master Plan for a Healthy Food Market as necessary; and,
- g. to promote the concept of Healthy Food Markets among government, private sector, non-governmental organizations and consumers.



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# ANNEX 3: MEASURES TO REDUCE TRANSMISSION OF AVIAN INFLUENZA IN WET MARKETS IN DEVELOPING COUNTRIES

Avian influenza is thought to be transmitted to humans through close contact with infected poultry, including both live and slaughtered birds, or indirectly by contact with surfaces and objects contaminated by their faeces, blood, feathers and/or meat. In infected poultry, the virus can be present in all organs and parts of the bird, but no field tests are currently available to detect the virus. Visual inspection of incoming live animals is only partially effective because some birds may not show any symptoms. Consequently, if an outbreak of avian influenza has been reported in a country, implementation of measures to reduce transmission of avian influenza in wet markets should be considered.

Measures to reduce the risk of avian influenza transmission are categorized as high, medium and low priority, but it should be emphasized that these measures will not eliminate the virus from wet markets. Once the virus infects a significant part of the poultry population, the highest priority is the protection of people (food handlers and consumers) in the market. The following measures<sup>1</sup> can help reduce the transmission of avian influenza. These measures are intended for, but not necessarily limited to, wet markets in developing countries.

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<sup>1</sup>These controls have been developed following the HACCP methodology. The associated HACCP based worksheets are available from WPRO at [bishopj@wpro.who.int](mailto:bishopj@wpro.who.int).





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### **EDUCATION AND AWARENESS (HIGH PRIORITY)**

People first need to understand how avian influenza is transmitted so they can undertake actions to prevent transmission from animals to humans.

An awareness campaign should be implemented on avian influenza, its transmission, and its symptoms in animals and humans. This should target market managers and all people working in wet markets as well as those working in other areas of the market.

Each of the measures outlined below should include an educational component on why the measure is necessary, how to undertake the measure effectively and how to make sure the implemented measure does not create new hazards. For example, incorrect use of personal protective equipment (PPE) can be dangerous to the user.

Consumers should be educated on the Five Keys to Safer Food which can help prevent the transmission of avian influenza and other diseases during poultry preparation in the home (see: <http://www.who.int/foodsafety/consumer/5keys/en/index.htm>).

### **MONITORING (HIGH PRIORITY)**

It is important that conditions and practices are monitored to ensure that recommended measures are being implemented.

The marketplace manager should monitor the implementation of all measures and have corrective actions in place in case the measure is not followed correctly.

Ideally, the source of poultry for the market should be monitored by agricultural extension agents to ensure that the animals are free of avian influenza before they enter the market.

### **VISUAL INSPECTION (HIGH PRIORITY)**

Transporters, stall owners and wet market managers should be educated to undertake visual checks on the health status of birds to look for signs of infection (i.e., swollen combs, overly ruffled feathers and major secretions from eyes and beak). They should be advised of proper actions to be taken in cases where infection is suspected. Transporters should refuse to transport any unhealthy birds. Stall owners should not accept any unhealthy birds. Visual checks should continue throughout the bird's presence in the wet market. Unhealthy looking birds and dead birds should be removed immediately and associated details should be recorded and reported. Obviously sick birds and dead birds should be reported to the local veterinary authorities. As dead birds are relatively frequent, a system for holding, reporting and tracing back to the source of the birds should be put in place at each market.



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Market stall vendors of processed poultry should be trained to undertake visual checks on organs and meat to look for signs of avian influenza infection (see <http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian.html> for examples). Agreed actions for what to do when the signs are identified should be developed in consultation with local authorities. Such actions may include safe holding/disposal, notification and trace-back.

Visual inspection is only partially effective since in some countries, certain birds, in particular ducks but also sometimes vaccinated chickens, can be infected but show no symptoms. However, it is still an important measure – as some infected birds can be stopped from entering the market in this way.

Because of the possibility of infected birds not showing symptoms and also because of other foodborne diseases, birds entering the market should be from reputable and trusted suppliers and those who comply with local regulations. It is important to ensure that each batch of birds come from recognized supplier(s) and that information on the compliance with local regulations, such as vaccination information (i.e. date of vaccination), farm location (if movement bans are in place) and the status of biosecurity controls in place, is provided.

## PERSONAL PROTECTIVE EQUIPMENT (HIGH PRIORITY)

Personal protective equipment (PPE), such as masks, gloves, goggles, protective clothing (disposable aprons) and footwear coverings, should be worn when undertaking the following tasks where exposure to birds and their products is likely:

- While transporting birds and cleaning of equipment used for transportation;
- Visual checking of birds during delivery;
- Cleaning of cages and premises where poultry have been held, slaughtered or processed;
- Slaughtering, including de-feathering, evisceration and removal of skin;
- Processing of meat, carcass, intestines and other raw poultry products;
- Removing feathers and other matter from work areas and drains; and
- Disposing feathers, faecal matter and dead birds.

These tasks have been identified as tasks that could result in high risk of avian influenza transmission if an infected bird enters the market. Due to the nature of the processing in many wet markets, creation of aerosols containing faeces, blood, feathers and/or meat is a serious potential hazard.

This group of measures will require major behavioural changes and implementation is expected to be difficult. However, since visual inspection to determine a bird's health status is not reliable (see visual inspection below), there is no other effective method to protect the poultry processors against avian influenza transmission. Therefore this group of measures is of a high priority to implement.



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Certain protective clothing can be omitted if areas for showering, changing, storing of clean clothes and washing clothes are available. Similarly, gloves can be omitted if hand-washing (see section below) occurs immediately after completing high-risk tasks.

Workers should not walk outside of the zones established for these high-risk tasks until they have removed any contaminated clothing or PPE. As large amounts of PPE would be needed over time, careful planning and selection of workers to be supplied with PPE is needed.

### **MARKET ZONING (HIGH PRIORITY)**

Separate areas, ideally with physical barriers, should be identified in the market to prevent general public access to areas where the following function are conducted:

- Delivering of poultry to market;
- Holding of live birds stored in cages;
- Slaughtering, including de-feathering, evisceration and removal of skin;
- Processing of meat, carcass, intestines and other raw poultry products;
- Cleaning of cages; and
- Disposing of poultry waste materials.

In general, the public should not walk through potentially contaminated areas to access other parts of the market. If a consumer insists on inspecting the live poultry prior to slaughtering, such access should be given only on the basis of their decision to take personal responsibility for entering the animal holding area.

Zones in the marketplace should be established to prevent cross contamination between foods. As part of this approach, consumers also need to be educated on the prevention of cross contamination in the market (i.e., handling of raw poultry and then ready to eat fruits or vegetables).

This is also a high priority group of measures because of the high-risk nature of the processes (as discussed above) and the large numbers of people passing through the market.

### **POTABLE WATER AND HAND-WASHING (HIGH PRIORITY)**

Potable water should be available for cleaning and hand-washing purposes. Marketplace managers should check with their local authorities for assurance that the water supply is potable. If not, then on-site treatments should be considered (i.e., installation of a chlorination unit or regular chlorination of water tanks supplying the markets).

Soap, potable water, disposable towels and correct procedure reminders should be provided for the transporters, stall owners, persons slaughtering and processing and customers handling live birds. Hand-washing should occur straight after handling the birds to prevent transmission to the person and surfaces as well as equipment that



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might be handled. Hand-washing, when done correctly will reduce the likelihood of transmission between hands and the face, and therefore it is a high priority measure.

### **CAGES AND HOLDING PRACTICES (MEDIUM PRIORITY)**

Cages in market stalls should be designed and used in a manner that prevents the spread of faecal matter (i.e., use trays underneath cages to collect faecal matter). This will prevent the spread of avian influenza between the birds as well as aiding easier cleaning of cages and holding areas. Design and use of plastic or metal cages should allow more effective cleaning. Although inexpensive, bamboo cages are difficult or impossible to clean and, therefore, should be used for single-use only.

Poultry as well as other animal species should be held in separate cages and cages should be stored separately to prevent transfer of faecal matter from one species to another (ducks to chicken, wild birds to chickens, chickens to monkeys etc). Animals, such as cats, should be prevented from eating dead chickens.

This group of measures are of medium priority since the PPE, market zoning and hand-washing serve as the primary set of preventive measures and are more effective than these preventative measures. Also because most animals are only staying in the markets for a very short period of time, they will probably not have time to develop the infection.

### **CLEANING (MEDIUM PRIORITY)**

A 24-hour period (ideally once a week or at another regular appropriate interval) should be designated when no poultry and poultry product processing or selling is allowed to take place. All areas in the market associated with poultry and poultry products should be cleaned (washed with hot soapy water, rinsed with potable water and sanitized with a disinfectant). This measure will require financial resources, but the cost is expected to be much less that associated with an outbreak of avian influenza in the marketplace.

Transportation vehicles and facilities, including main surface areas (i.e., floor and loading dock), should be cleaned (swept, washed and sanitized) periodically. While it is difficult to effectively clean trucks and motorcycles, the main surface areas should be cleaned. Note that the practice of spraying disinfectant on a surface that is 'dirty' (i.e., dirt, faecal matter, etc.) is generally ineffective.

All food contact surfaces should be cleaned adequately (washed with hot soapy water, rinsed with potable water and sanitized with a disinfectant). In this regard, all food contact surfaces should be impervious and smooth to allow adequate cleaning. Maintenance checks on the surfaces are also part of this measure.

This group of measures is of medium priority since the PPE, market zoning and hand-washing serve as the primary set of controls and are more effective than these preventive measures.





## *a guide to* **Healthy food Markets**

### **UTILITIES (MEDIUM PRIORITY)**

Drainage systems should be appropriately sloped to prevent drainage leading to other areas of the market and be designed to allow easy removal of feathers and other debris and prevent the release of aerosols. Drainage system should be periodically cleaned to prevent the risk of clogging. The formation of aerosols during cleaning should be avoided.

Avian influenza can survive in water; therefore any water that comes into contact with birds may become contaminated. Contact with this water or contact between surfaces and this water could allow direct or indirect transmission. Solid and liquid waste containing potentially infectious materials, such as feathers and faeces, should be disposed of daily.

These groups of measures are considered to be of medium priority since the avian influenza concentration in the water will be less when compared to the concentration in blood, meat, feathers and faeces. However, managing and disposing of waste safely is important in terms of preventing the spread of the virus in the environment and perpetuating the infection in the animal reservoir.

### **BATCH PROCESSING (LOW PRIORITY)**

Trucks and motorcycles should only transport live birds from one farm at a time (or arrange for a separation of animals, if at all possible). Batches of birds should be held in separate cages. During slaughter and dressing, processing by batches should be used with cleaning between batches. Hot water used in the de-feathering process should be boiled between each batch. Ideally, the water should be changed between each batch. During display, meat and other poultry products should be separated by batch.

This group of measures has been developed to help prevent cross contamination from one infected batch of birds or poultry to another. 'Batch' means one group of birds from one farm bred together or a group of birds that are processed together. These measures also help allow trace-back in the event an infected bird is identified. These measures will require major changes to the current process and since they do not directly prevent transmission to human, they are of lesser priority than the other measures outlined above.



## Annexes

# ANNEX 4: FURTHER READING AND USEFUL LINKS

- Avian influenza: food safety issues. Department of Food Safety, Zoonoses and Foodborne Diseases. WHO, <http://www.who.int/foodsafety/micro/avian/en/index.html>.
- Public health interventions for prevention and control of avian influenza: a manual for improving biosecurity in the food supply chain. WHO/SEARO, 2006, [http://w3.whoosea.org/en/section23/section1001/section1110\\_11528.htm](http://w3.whoosea.org/en/section23/section1001/section1110_11528.htm).
- Baseline study of hazards and critical control points of street-vended foods in Bodija Market, Ibadan, Nigeria, WHO/AFRO, 1999.
- Basic food safety for health workers, <http://www.who.int/foodsafety/publications/capacity/healthworkers/en/index.html>.
- Building a Healthy City: A Practitioners' Guide, WHO/EOS/95.10, WHO, Geneva, 1995.
- Five keys to safer food, <http://www.who.int/foodsafety/consumer/en/>.
- Food safety – An essential public health issue for the new millennium, WHO/SDE/PHE/FOS/99.4, WHO, Geneva, 1999.
- Guidelines for strengthening national food control systems, FAO/WHO, [http://www.who.int/foodsafety/publications/fs\\_management/guidelines\\_foodcontrol/en/index.html](http://www.who.int/foodsafety/publications/fs_management/guidelines_foodcontrol/en/index.html).
- Healthy Cities – Guidelines for the Development of Healthy Cities Projects and Activities, WHO-EM/PEH/501/E/L, WHO Geneva, 1997.
- Healthy Marketplaces in Paramaribo, Suriname, Report of a PAHO/WHO Mission, 1999.
- Strategies for Implementing HACCP in Small and/or Less Developed Businesses, [http://www.who.int/foodsafety/publications/fs\\_management/haccp\\_smallbus/en/index.html](http://www.who.int/foodsafety/publications/fs_management/haccp_smallbus/en/index.html).
- Design of Control Measures for Street-Vended Foods in Africa, [http://www.codexalimentarius.net/web/standard\\_list.do](http://www.codexalimentarius.net/web/standard_list.do).
- Preparation and Sale of Street Foods (Latin America and the Caribbean) [http://www.codexalimentarius.net/web/standard\\_list.do](http://www.codexalimentarius.net/web/standard_list.do).

ISBN 92 4 159393 8



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