The role of street foods in the diet of low-income urban residents, the case of Nairobi

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Proefschrift
Ter verkrijging van de graad van doctor
op gezag van de Rector Magnificus
van Wageningen *Universiteit*,
Professor dr ir L Speelman,
in het openbaar te verdedigen
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The role of street foods in the diet of low-income urban residents, the case of Nairobi.
Thesis Wageningen University – With references – With summary in Dutch and Swahili

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STELLINGEN

1. Street foods moeten gelegaliseerd worden.
   Dit proefschrift

2. Street foods en andere niet-thuisbereide voedingsmiddelen vormen belangrijke bronnen van vet en daardoor tevens van energie voor de armen in de steden in ontwikkelingslanden en leveren zo een bijdrage aan hun voedselzekerheid.
   Dit proefschrift

3. Voeding kan een belangrijke bijdrage leveren aan de kwaliteit van leven van mensen in ontwikkelingslanden die lijden aan HIV/AIDS. De relatie tussen voeding en HIV/AIDS verdient dan ook meer aandacht.

4. Versnippering van natuurgebieden heeft niet alleen een negatieve invloed op het overleven van de leuk uitziende zeldzame plantensoorten, maar ook op algemene vegetatievormende soorten. De gevolgen van versnippering zijn dan ook erger dan tot nu toe wordt aangenomen.
   N.a.v. D.A.P. Hooftman, 2001

5. Welvaart is de doorgangsfase tussen armoede en ontevredenheid.
   Helmar Nahr, Duitse economische wetenschapper, 1931–1990

6. Het is onterecht dat de rector en de (co-)promotoren ervan uitgezonderd zijn zich tijdens de promotieplechtigheid aan het promotiereglement te houden.
   N.a.v. Promotiereglement Wageningen Universiteit 2001, voorschriften bij artikel 8.5

7. Het doden van mensen die doden om te laten zien dat het doden van mensen verkeerd is, werkt contraproductief.

8. Tijdens een safari in Afrika is het dier met de grootste fenotypische variatie dat te observeren is de *homo sapiens*.

Stellingen behorend bij het proefschrift 'The role of street foods in the diet of low-income urban residents, the case of Nairobi'.

Hilda van 't Riet

Wageningen, 5 Maart 2002

PROPOSITIONS

1. Street foods should be legalised.
   This thesis

2. Street foods and other non-home prepared foods are important sources of fat and consequently of energy to poor people living in cities in developing countries and thus contribute to their food security.
   This thesis

3. Nutrition can provide a significant contribution to the quality of life of people in developing countries living with HIV/AIDS. Hence, the relation between nutrition and HIV/AIDS deserves more attention.

4. Fragmentation of nature areas does not only negatively impact the survival of the pretty rare plant species but also of the common habitat-specific ones. Therefore, the effects of fragmentation are more severe than previously acknowledged.
   Based on D.A.P. Hooftman, 2001

5. Wealth is the stadium between poverty and discontentness.
   Helmar Nahr, German economic scientist, 1931–1990

6. It is unjustified that the rector and the (co-)promotors are excluded from complying with the promotion rules during the promotion ceremony.
   Based on Promotiereglement Wageningen University, article 8.5 (Dutch version)

7. Killing people who are killing people to show that killing people is wrong is counterproductive.

8. During a safari trip in Africa the animal with the largest phenotypic variation that can be observed is *homo sapiens*.

Propositions pertaining to the thesis 'The role of street foods in the diet of low-income urban residents, the case of Nairobi'.

Hilda van 't Riet

Wageningen, 5 March 2002

Abstract

The role of street foods in the diet of low-income urban residents, the case of Nairobi

PhD-thesis by Hilda van 't Riet, Division of Human Nutrition and Epidemiology, Wageningen University, The Netherlands, 5 March 2002.

Urbanisation and lack of economic growth have resulted in increasing urban poverty in developing countries. As urban residents rely on purchasing their foods, food security of the urban poor is predominantly determined by their purchasing power. Street foods provide many urban residents with employment and income and consumers with a fast and inexpensive source of food. The street food trade lacks official recognition in many developing countries, despite the general assumption that many poor urban families would be worse off without the availability of street foods. However, little is known to which extent street foods and other non-home prepared foods actually contribute to the diet of the urban poor.

A cross-sectional survey among 1011 households from a slum and a low-middle-income area of Nairobi revealed that the majority of poor urban households consume street foods at least once a week. To assess the actual contribution of street foods and other non-home prepared foods to the diet, a subsample of 302 households was randomly selected. Within the households individual food intakes of men, women and children aged 9–14 years were assessed with three 24-hour recalls for each person. Although the level of energy and nutrient intake was higher in the low-middle-income than in the slum area, total energy intake was below recommended daily intakes in all groups.

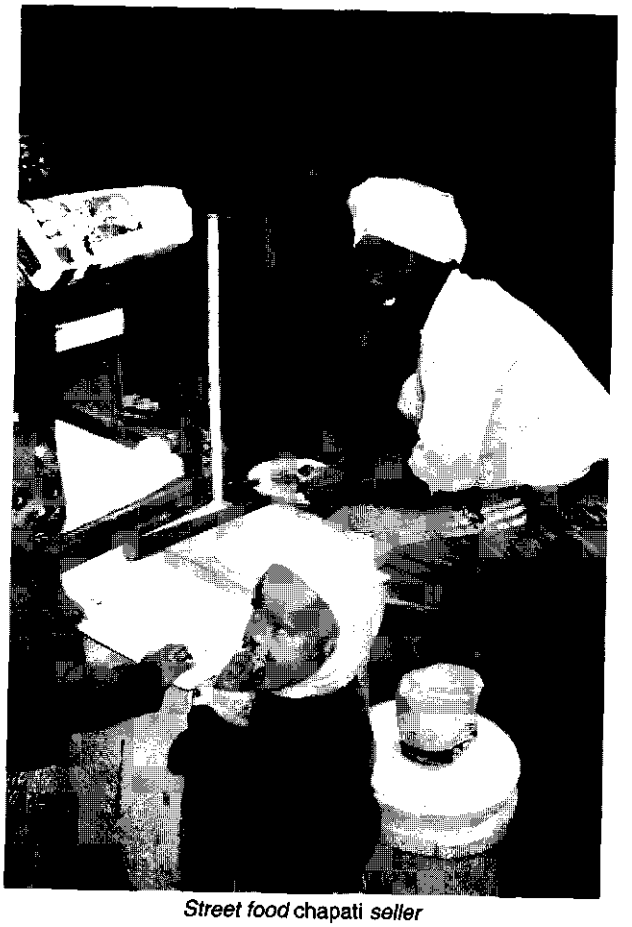
The contribution of non-home prepared foods to daily energy intake ranged from 13% for the children in the slum to 36% for the men in the low-middle-income area. The contribution of non-home prepared foods to fat and protein intake was relatively high, while to micronutrient intake it was relatively low. Adequacy of energy and nutrient intakes was similar in consumers and non-consumers from the same area. Street foods were the major source of non-home prepared foods for men, women and children in the slum area. Kiosk foods were the main source of non-home prepared foods for the men in the low-middle-income area, while street and kiosk foods were equally important sources for the women and street foods were the main source for the children from the low-middle-income area. In combination with an observed relation of increasing socio-economic levels within the areas and more complicated determinants of non-home prepared food consumption, it is concluded that non-home prepared foods are an important source of food for all low-income residents and that especially street foods are the most important source for the poorest among them.

In view of the growing number of urban residents and the increasing number of poor among them and the role street foods have in providing food and income to the urban poor, the street food trade deserves recognition by local and national authorities and the attention of urban policy makers, in order to improve the opportunities of vendors to ensure their livelihood and to ensure the availability of cheap, safe and nutritious food for low-income consumers.

Contents

1

Introduction



Street food chapati *seller*

URBANISATION AND URBAN POVERTY IN SUB-SAHARAN AFRICA

The absolute numbers of the poor are growing worldwide and an increasing proportion of the poor is living in urban areas (Haddad *et al.*, 1999; Popkin & Bisgrove, 1988). The world population continues to grow, and so does the number of people living in urban areas. The population growth in urban areas is the combined result of migration to the cities and natural growth (Hussain, 1990; Solomons & Gross, 1995).

Where the world population increased with 15% from 1990 to 2000, the urban population increased 24% in the same period. Especially in developing countries, the proportion of the population living in cities is still growing fast. In Sub-Saharan Africa the total population increased 31% in the same decade, with a spectacular 64% increase of the urban population. The proportion of the Sub-Saharan population living in urban areas increased from 26.5 to 33.3% (United Nations, 2001a).

In many Sub-Saharan African countries the economic growth does not keep up with the population growth and in several countries the economy is even stagnating. Combined with high rates of inflation, this results in diminished employment opportunities and increased cost of living, and consequently in poverty (Bibangambah, 1992; Braun *et al.*, 1993). In developing countries the majority of the urban poor live in informal settlements at the periphery of the cities, where the provision of basic services lags behind the fast growing demands. These so-called slums are characterised by overpopulation, bad housing, limited or no access to safe water supplies and proper sanitation (Popkin & Bisgrove, 1988).

Because not enough jobs can be found in the public or private sector, the urban poor utilise several strategies to obtain food and earn an income. Most of these strategies take place within the informal sector of the economy (Drakakis-Smith, 1992; Holm, 1992; House *et al.*, 1993): people create jobs for themselves, by starting small businesses such as a bicycle repair shop or a hair salon, get involved in petty trading such as vending food or second hand cloths, or even start small-scale manufacturing, e.g. brewing local beer. In addition, urban agriculture is used by some people to grow foods for their own use and to sell (Mlozi *et al.*, 1992).

URBAN FOOD PATTERNS

In rural areas households mostly rely on cultivating their own food, while in urban areas, people depend on purchasing most of their food (Popkin & Bisgrove, 1988; Ruel *et al.*, 1999). The types of products consumed in urban areas also differ from the rural areas. Rural populations in Sub-Saharan Africa consume coarse grains, such as sorghum and millet, and roots and tubers as their main foods. Conversely, urban populations rely more on (imported) rice and wheat and more frequently consume processed foods such as dairy products, bread and sugar, resulting in a more varied and balanced diet (Braun *et al.*, 1993; Kennedy & Reardon, 1994; Ruel *et al.*, 1999).

Time constraints in urban life increase the demand for foods that do not need a long preparation time, resulting in a tendency by urban residents to prepare less food at the household level. Consequently, purchases of ready-to-eat foods increase (Popkin & Bisgrove, 1988; Hussain, 1990; Drenowski & Popkin, 1997). Those ready-to-eat or non-home prepared foods save time from shopping and cooking, which is very convenient in

urban settings, where more women are joining the labour force and many people are working away from home. In addition, housing and cooking facilities are not always available to poor urban dwellers and procuring fuel becomes more costly and difficult (FAO, 1990; Braun *et al.*, 1993).

FOOD SECURITY AND MALNUTRITION

On average, the nutritional status of children in urban areas is often found to be better than in rural areas. However, intra-urban differences are large (Hussain, 1990; Atkinson, 1993). When the urban poor are compared to the rural communities, results on nutritional status are inconclusive. In some countries, e.g. Peru, Brazil, Nigeria and Zimbabwe, the rural population is found to have a lower nutritional status, while in other countries, e.g. Indonesia, India and Thailand, the urban poor have lower nutritional status (Atkinson, 1993). In a review, Haddad *et al.* (1999) found that in most countries both the absolute number of urban underweight children and the proportion of total underweight children living in urban areas are increasing.

The food security of the urban poor is mainly determined by their purchasing power, because of their dependence on bought food. Poverty, fluctuations in employment availability, wage levels and commodity prices strongly influence their purchasing power and consequently the food security of their families. In addition, social networks appear to be weaker in urban than in rural areas, diminishing the options of the urban poor to cope with changes in income or prices (Braun *et al.*, 1993; Ruel *et al.*, 1999).

Although enough food may be present in the cities, this food is not affordable and accessible to all its inhabitants, especially the urban poor. The urban poor earn low incomes, often on a daily basis and without any certainty of having an income the following day. Moreover, they usually do not have the opportunity to store large amounts of foods in their houses. Consequently, foods are bought on a daily basis. Those small quantities are more expensive per unit than a bulk amount for a whole week would be. The urban poor do not have the option to buy large amounts in cheap supermarkets, as those are located in more well-to-do areas of the city, but instead rely on micro-enterprises in the neighbourhood (Braun *et al.*, 1993; Hartog *et al.*, 1995).

NON-HOME PREPARED FOODS

As mentioned before, in urban settings it is common for people to consume foods that were not prepared at home. These foods can be described as 'non-home prepared foods', which we define as "ready-to-eat foods and beverages, processed or fresh, which are acquired outside the consumer's own place of living".

Thus, non-home prepared foods include all foods that can be bought or acquired outside the house, and that can be consumed at the location of purchase but also be taken home and shared with the family. Examples of non-home prepared foods are foods bought at kiosks, in restaurants or in the streets and foods consumed at the house of a relative or friend. Kiosks and restaurants are licensed establishments, while the street food trade is part of the informal sector of the economy and in many developing countries not a recognised type of business.

For the urban poor, especially the foods sold on the streets are seen as the kind of non-home prepared foods that are an important source of fast and inexpensive food (FAO, 1990; Tinker, 1999). Consequently, research so far has focused on these street foods, while studies on other sources of non-home prepared foods are not available.

STREET FOODS

In this thesis, street foods are defined as "ready-to-eat foods and beverages, processed or fresh, which are sold on the streets as opposed to stores and licensed establishments, and which are sold at a stationary location or by mobile vendors". Important aspects of street foods to be distinguished are the role of street foods in the economy, the vendors, the hygiene of the foods and the consumers. These aspects will be described in this paragraph.

Street foods' role in the economy

A lot of money is involved in the street food trade, adding up to millions of dollars a year (Dawson & Canet, 1991; Winarno & Allain, 1991). Street foods create direct employment for vendors and indirectly in provision of supplies and transport for many urban dwellers that would otherwise be unemployed (Jayasuriya, 1994; Bhat & Waghray, 2000a). Because many ingredients of street foods are bought locally, agriculture is also stimulated (FAO, 1990; FAO, 1997; Bhat & Waghray, 2000a).

Vendors

Vending street foods is an important strategy used by the urban poor to provide themselves with an income. Starting a street food vending business requires little education and low capital investment. The vendors mostly earn a very reasonable income from selling street foods, often several times the local minimum wage (Winarno & Allain, 1991; Tinker, 1997).

Most street food vendors are women, and even in operations where men are selling, women are often involved in procurement and preparation of the street food products. In fact, street food enterprises often involve entire families in procuring raw materials, preparing and cooking the products and finally selling it to the customers (FAO, 1990; Winarno & Allain, 1991; Tinker, 1997).

Although street food vending may sound as a homogenic type of business, in fact many aspects of the vendors and their trade differ between countries and between vendors within one city. The age of the majority of vendors lies between 20 and 50 years, but younger and older vendors are not uncommon. Although illiteracy is often associated with vendors and probably true for the majority of the women in most countries, in many countries large shares of the vendors have finished primary or even secondary education. The vending trade can take place from a fixed stall or be done by mobile vendors. Some vendors sell one food only, while others sell a variety of products. The time of the day the vendors are to be found is mostly related to the products they sell; in some countries most vendors can be found selling breakfast, while in other countries more vendors sell during lunch or dinnertime. Most vendors work very long hours for six or seven days a week and the whole year round (Tinker, 1997).

Street food vending is not always tolerated, with the result that vendors are sometimes wiped of the street and their equipment and wares confiscated. The future of the business is therefore unsure and may keep vendors from investing in better selling facilities. In addition, competition is fierce and profit margins are low, making it hard for newcomers in the trade to make their business profitable and sustainable (Tinker, 1997). Data on failure rates of street food businesses are scarce, as ex-vendors are hard to find and thus data are mainly deduced from vendors disappearing between surveys and new entrants to the trade. Tinker (1997) reports that in Iloilo, Philippines 9% of the vendors had disappeared by the time of the next survey six months later, and in Manikganj, Bangladesh 11% of the vendors had been in business less than a year and a business failure rate of 9% was calculated. On the other hand, despite the difficulties faced by the vendors, 8% of the vendors in Ife, Nigeria had been in business for over 26 years.

Hygiene of street food products

Authorities often see street foods as a nuisance and a problem. Street foods stalls may block the roads and the presence of street food vendors hampers the modern, western outlook authorities prefer. But foremost, street foods are considered to be a health hazard for the urban population (Winarno & Allain, 1991; Arámbulo *et al.*, 1994; Jayasuriya, 1994; Ekanem, 1998).

The hygiene of street foods has often been investigated. Various studies indicate that street foods indeed have high microbial loads (reviewed by Dawson & Canet, 1991; Chakravarty & Canet, 1996; Freese *et al.*, 1998; Umoh & Odoba, 1999), while other studies suggest that the microbial quality of foods is acceptable (Mosupye & Holy, 1999; Kampen *et al.*, 1998). When foods are consumed hot immediately after preparation, there is usually no danger of food infection.

The hygiene and safety problems of the street food products are mainly due to food handling by the vendors because they either lack the knowledge or the facilities to ensure the products are safe up to the moment of consumption. In several cities, such as Calcutta, India and Bangkok, Thailand, the importance of street food vending has been recognised and programmes developed and implemented, in co-operation with the vendors, to educate vendors and provide them with facilities to enable them to sell safe street food products (Chakravarty & Canet, 1996; Dawson *et al.*, 1996; Tinker, 1997).

Consumers

The variety of street food products sold and consumed is enormous. In every country typical products can be found, ranging from simple snacks to complicated dishes, including cereals, fruits, vegetables, meat, fish, biscuits and beverages (Tinker, 1997; Bhat & Waghray, 2000a; Muñoz de Chávez *et al.*, 2000). Street foods are available at the places where they are required, e.g. around factories and offices, schools and universities, market places and transit areas (FAO, 1990; Dawson & Canet, 1991).

Consumers are of all ages and different socio-economic strata (Akinyele, 1987; Nasinyama, 1992; Tinker, 1997). However, research on street food consumption has mainly focused on schoolchildren (Webb & Hyatt, 1988; Oguntona & Kanye, 1995) and urban

workers (Sujatha *et al.*, 1997; Oguntona & Tella, 1999). Street foods are found to provide up to 60% of daily energy and nutrient intake for these various groups (Oguntona & Tella, 1999). The nutritional value changes with the type of food and depends on the quality of the ingredients used. Literature agrees that nutritious street foods are being sold, but the nutritional value of street foods needs to be related to total food intake of consumers.

Street foods are considered to provide the urban consumers with cheap and nutritious foods, and especially poor urban families are thought to be worse off without the availability of street foods (FAO, 1990; Tinker, 1997).

RATIONALE AND OBJECTIVES

Urbanisation, combined with limited economic growth and high inflation has led to diminishing employment opportunities, resulting in fast growing numbers of the urban poor in developing countries. Urban inhabitants with a low purchasing power are thought to be worse off without the availability of cheap and nutritious street foods. However, little is known to which extent street foods actually contribute to the nutritional well-being of the poor urban residents and even less is known about contributions of other non-home prepared foods.

A research project was set up with the overall aim to provide a comprehensive insight into the street food phenomenon. Nairobi, one of the major cities of Sub-Saharan Africa, with its high level of urbanisation and commonly available street foods was taken as an example. The project was carried out at the Division of Human Nutrition and Epidemiology, Wageningen University, The Netherlands in co-operation with the Unit of Applied Nutrition, University of Nairobi, Kenya.

The purpose of the study described in this thesis is to determine the relevance of street food and other non-home prepared food consumption as part of the total dietary pattern and their contribution to nutritional intake of residents of different low-income urban areas. In a complementary thesis entitled 'Nutritional, hygienic and socio-economic dimensions of street foods in urban areas: the case of Nairobi', Alice Mwangi (2002) concentrated on the vendors and their street foods. The findings of this thesis give insight in the nutritional and socio-economic dimensions of street foods consumption and urban food habits. Together with the findings from Alice Mwangi, the results provide insights that may be used in urban policy and programming on food security and public health.

The purpose of this thesis is divided into four related objectives:

1. To describe who, how often and why street foods are consumed in two low-income areas;
2. To assess the nutritional contribution of street foods and other non-home prepared foods to the daily diet of different members of the household;
3. To identify determinants of non-home prepared food consumption;
4. To compare the cost of home-prepared and street food products for consumers.

KENYA AND NAIROBI

Kenya is an East African country, with a population of 30.7 million people in 2000. In 1990 24% of the population lived in urban areas, which increased to 33% in 2000, reflecting a 79% increase in the number of urban residents (United Nations, 2001a). Nairobi is the capital city of Kenya, harbouring 2.3 million residents in 2000 (United Nations, 2001b) (Fig 1.1).

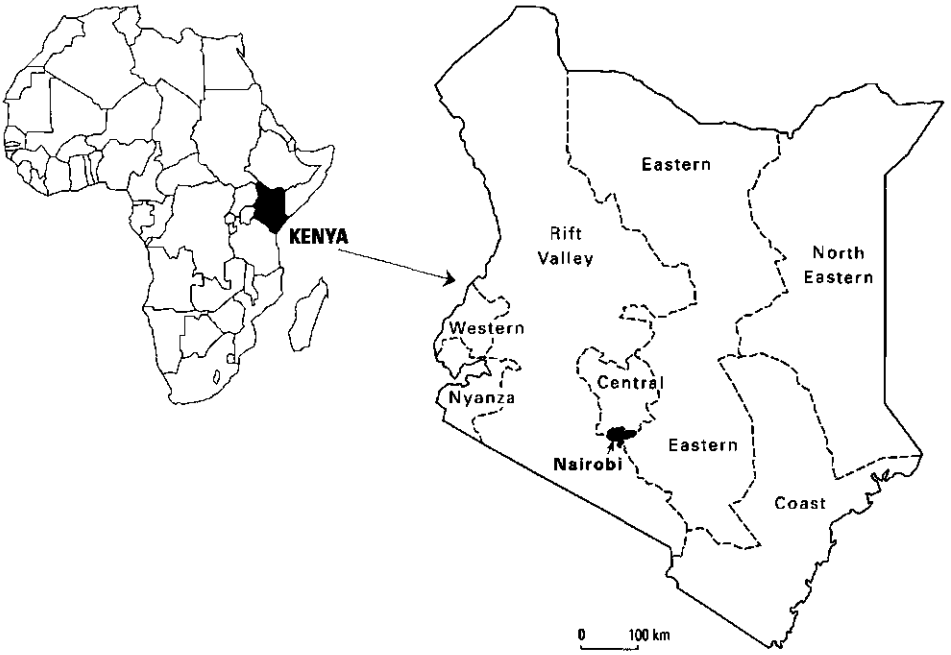


Figure 1.1 Location of Kenya within Africa and Nairobi within Kenya.

Over the last decade, average annual growth of the Kenyan GDP reduced, but because the growth of the population was higher than the GDP, annual growth of GDP per capita was negative (World Bank, 2000). This economic decline has increased unemployment and in combination with continuing inflation has reduced the purchasing power of many households. A majority of households in Nairobi have a low purchasing power (Obudho, 1997). In 1994 absolute poverty among residents of Nairobi was found to be 22%. According to the latest report on poverty in Kenya, this has more than doubled in three years time to 50% absolute poverty among the residents of Nairobi in 1997, which means they earn less than the minimum requirement to satisfy basic human needs (GoK, 2001).

The prevalence of stunting in children under five was 30.2% in Nairobi in 1994. Iron deficiency anaemia and vitamin A deficiency are thought to be prevalent in Kenya. However, surveys are only rural and small and in addition not recent, therefore the magnitude and distribution of the problems are unclear (GoK/Unicef, 1998).

Street food vending is a common phenomenon in Nairobi. Korir *et al.* (1998) investigated the nutrient composition of street foods sold to construction workers and the theoretical

contribution these foods could make to their recommended intake. They found that the meals investigated could provide up to 37% of daily energy and most meals provided more than 50% of recommended daily protein.

Officially, street food vending is not a legal activity in Nairobi. Especially in the central business district vendors are removed frequently, while they are tolerated more in the industrial and low-income residential areas.

RESEARCH AREAS

The study described in this thesis was carried out in two residential areas of Nairobi, both situated on the eastern side of the city (Fig 1.2).

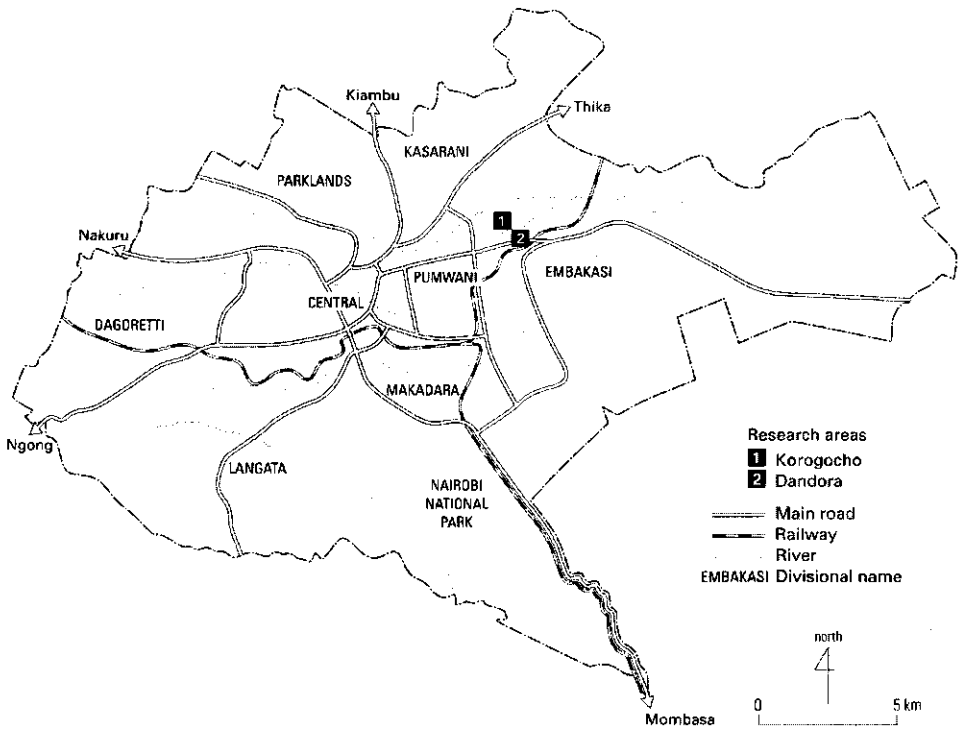


Figure 1.2 Location of the research areas within Nairobi.

Korogocho is a slum area. The people are living in houses mainly made of mud and iron sheets, situated along dirt roads and paths with open sewerage. Electricity and running water are hardly available. More than 40,000 people are living on approximately 1 km^2 (CBS, 1994). In this congested area many people have started a small business of their own, selling foods, second hand cloths or plastic kitchenware, running a hairdressing shop, repairing bicycles, and many other possible activities. Other people leave early every morning to go to their jobs elsewhere in the city or just to try and find one.

Dandora is a low-middle-income area. Most houses here are four-story buildings made of stone or cement. On each floor several families share the kitchen and bathroom facilities.

Usually, running water and electricity are available and the price included in the rent. Several tarmac roads are running into the residential area, but between the houses most roads are dirt roads and during the time of the study, most pieces of tarmac had to be found between the potholes. Over 70,000 people are living in this residential area of approximately 4 km^2 (CBS, 1994). Almost all families have at least one person earning an income, because to live here, the rent has to be paid every month.

DESIGN OF THE STUDY

Data were collected by means of four surveys, of which the results are combined in this thesis.

In November and December 1997, a first survey was carried out. The aim was to get a first indication of the frequency of street food consumption in the two study areas. We used a short structured questionnaire, knocking on almost two thousand doors and interviewing more than one thousand households. In addition, in March and April 1998 an in-depth questionnaire was administered to a subsample of 73 households from the first survey to gain more knowledge on Kenyan food habits and to investigate the reasons why people consume street foods or not.

The next step was to assess the actual food intake and the contribution of non-home prepared foods therein for different members of the households. After comprehensive preparation and pretesting in the second half of 1998 and early 1999, the main survey was carried out from April to July 1999 in a large random subsample from the first survey. Using 24-hour recalls, extensive information was collected on the food intake of men, women and children, besides household and individual characteristics. Special attention was given to the sources of all the foods consumed, including street foods and other non-home prepared foods. Furthermore, several women were asked to prepare some dishes that are also available as street foods and to record everything involved, enabling us to compare the prices.

Finally, in October and November 2000 a fourth survey was done to determine the street food intake of young children in Korogocho, the slum area. The relevance of street foods in the diet of 5–7 year-old children in the slum area and the street food intake of school-going and non-school-going children at that age were investigated.

OUTLINE OF THE THESIS

Chapter 2 gives a description of the frequency of street food consumption, the main consumers and their reasons for consuming them. *Chapter 3* depicts the relevance of street foods in the diet of 5–7 year-old children in the slum area and compares the street food intake of school-going and non-school-going children at that age. *Chapter 4* illustrates the nutritional importance of non-home prepared foods by providing a detailed description of their contribution to the daily diet of adults and children. *Chapter 5* subsequently explores determinants of non-home prepared food consumption. *Chapter 6* tries to answer the question whether street foods are cheaper than foods prepared at home. *Chapter 7* discusses the findings of this thesis and describes policy implications, based on the results of this study and the study by Alice Mwangi.

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2

The role of street foods in the dietary pattern of two low-income groups in Nairobi

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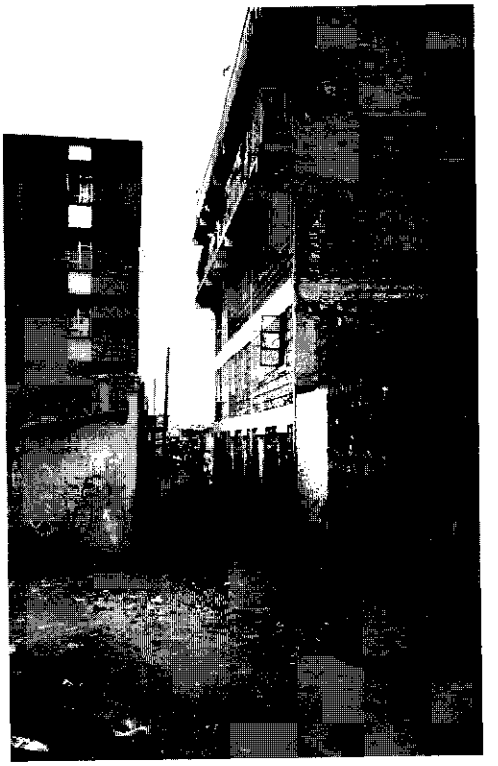
Korogocho: slum area



Dandora: low-middle-income area

ABSTRACT

Objectives: To examine the frequency of street food consumption of people living in low-income settlements in Nairobi and the role of street foods in their daily diet and to reveal why people consume street foods rather than home-prepared foods.

Setting, subjects and methods: A cross-sectional descriptive study was done with 1011 households and in-depth interviews with a subsample of 73 households in two selected areas in Nairobi: Korogocho, a low-income slum area and Dandora, a low-middle-income area.

Results: The frequency of street food consumption was higher in Korogocho than in Dandora (3.6 *vs* 2.0 days per week; $P<0.001$). Street food consumption did not differ between different types of households, with the exception of household size. Employment status of the household head and street food consumption were related ($P<0.001$): consumption frequency of 3.7 days per week when irregularly or unemployed, 2.9 days/week when self-employed and 2.1 days/week when regularly employed. Furthermore, where an adult woman with primarily a domestic role was present, street food consumption was less (2.55 days per week when present *vs* 2.95 when not present; $P<0.05$).

Conclusions: Street foods play an important role in the diet of poor households in Nairobi, in particular for breakfast and snacks, because they are cheap and convenient. The frequency of street food consumption is determined by a combination of at least four factors: level of household income; regularity of income; household size; and time available to prepare meals.

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Descriptors: street food consumption, Nairobi, urban poor

INTRODUCTION

Urbanisation rates in Sub-Saharan Africa are high. While the annual population growth rate was estimated to be 2.8% between 1980 and 1997, the proportion of the population living in urban areas in Sub-Saharan Africa increased from 19% in 1970 to 32% in 1997 (Braun *et al.*, 1993; World Bank, 1999). In Kenya, the population growth between 1980 and 1997 was 3.4%, while the proportion of the population living in urban areas increased from 10% in 1970 to 30% in 1997 (World Bank, 1999).

Stagnating or declining economies and high rates of inflation have increased the cost of living and diminished the employment opportunities. These developments have resulted in a reduced standard of living and intensified food insecurity in urban areas (Braun *et al.*, 1993). Several reports indicate that the urban poor utilise a variety of initiatives, which enable them to obtain food and to survive (Bibangambah, 1992; Drakakis-Smith, 1992). Most of these strategies take place within the informal sector of the economy. Street food vending is one of these strategies and constitutes an important aspect of the informal sector in many developing countries (FAO 1990, 1991, 1992, 1997).

In this study we defined street foods as 'ready-to-eat foods and beverages, processed or fresh, which are sold on the streets as opposed to stores and licensed establishments (such as kiosks), and which are sold at a stationary location or by mobile vendors'.

In Nairobi the vending of street foods has increased substantially during the 1980s and 1990s, particularly in the lower-income areas and in the Industrial Area (Mwangi *et al.*, 2001). Mwangi *et al.* describe the kinds of food sold in different parts of Nairobi and provide some details about the vendors. In the areas of the present study *mandazi* (a Kenyan kind of doughnut) is the most common food sold for breakfast. At lunchtime, several other foods are commonly sold: chips, *chapati* (an Indian pan-cooked bread), soup, and *githeri* (a mixture of maize and beans). During the whole day, snacks like *mandazi*, chips, sweets, roasted groundnuts and roasted or boiled maize are being sold. At dinnertime, fried meat and fish are very common. Most of the products are mainly sold by women, but roasted meat is usually sold by men.

So far, research has mainly focused on the income-generating possibilities of street foods for the vendors and the hygiene of the foods being sold. Street foods provide the vendors with a reasonable income (FAO 1990, 1991; Nasinyama, 1992). The hygiene of the foods needs improvement and therefore recommendations have been proposed and implemented in several cities (FAO, 1990; Chakravarty & Canet, 1996; Costarrica & Morón, 1996; Dawson *et al.*, 1996; FAO, 1997). Street foods are also present in large quantities in Nairobi. However, the local authorities still prefer to remove the vendors from the streets because they block the roads and are seen as a health hazard for the population, in spite of FAOs arguments for legalisation and regulation of this informal sector activity because of its socio-economic and nutritional importance (FAO, 1997). So far, one study on street foods has been conducted in Nairobi (Korir *et al.*, 1998), describing street foods sold at construction sites are mainly sold as meals. These meals provide 17–38% of the recommended daily energy intake of manual labourers and all but one meal provide more than 50% of their recommended daily protein.

Some research has investigated the contribution of street foods to the food intake of consumers. An FAO expert group indicated that street foods provide cheap and nutritious food that can benefit the urban poor. This group hypothesised that many low-income urban families would be even worse off without the availability of street foods (FAO, 1990). Webb and Hyatt (1988) found that street foods provide 15% of the recommended dietary intake for energy and 18% for protein in the diet of secondary schoolstudents in Port-au-Prince, Haiti. Oguntona and Kanye (1995) showed that street foods contribute 25% of the energy and 52% of the protein intake of a group of urban adolescents in Nigeria. Sujatha *et al.* (1997) showed that street foods helped male urban workers in Hyderabad, India, to meet their recommended daily energy intake, while Oguntona and Tella (1999) determined the contribution of street foods to the energy (59%) and protein (59%) intake of urban market women in Nigeria. Ag Bendech *et al.* (1998) found that street foods contribute to the food intake of families of different socio-economic status in Bamako, Mali, but most to the ones with low incomes.

However, it is still not known whether low-income populations consume street foods on a regular basis. Therefore, the purpose of this study was to examine whether the people living in low-income settlements in Nairobi consume street foods on a regular basis. The study was also aimed at identifying the role of street foods in their dietary pattern and the reasons why they do or do not consume street foods as opposed to home-prepared foods.

We hypothesised that the households without a regular income (which means that household members are casual or temporary labourers or unemployed) consume more street foods than others do, because they cannot rely on a steady income and therefore have to buy their food on a day-to-day basis. A second hypothesis concerned one-adult households and households without a woman having a primarily domestic role: those households consume street foods more frequently than households with either two or more adults present or with a domestic worker, because of the time available for buying and preparing food.

METHODS

Design and study population

A cross-sectional descriptive study was carried out in Nairobi, Kenya. Two low-income areas with inhabitants belonging to the poorer population of Nairobi were selected. Korogocho is a slum area with 44,415 inhabitants counted during the population census of 1989 (CBS, 1994) and the people living there are considered as very poor. Only a few of the people in the subsample from Korogocho obtain a regular income, and even in those cases the income is low. Dandora is a low-middle-income area, with a population of 71,838 in 1989 (CBS, 1994). Most households here do have a regular income, although this is usually quite low.

This study focused on households in the home and not on consumers at the selling site. This was decided in order to gain an understanding of which members of the households consume street foods and which do not and their reasons for consuming or not consuming them.

The Nairobi population, like the Kenyan population in general, consists of people from many different ethnic groups. Therefore, we selected a cluster of streets from both areas where households with many different ethnic backgrounds lived. In principle, all households in these streets were included in the study population and approached on a door-to-door basis. When people were not at home during the first visit, a second or even third visit was tried on different days of the week (including the weekends) and different times of the day. In Korogocho 57% of all households living in the selected part were requested to participate. Of these, 4.3% refused to co-operate. In Dandora 63% were requested while 21.3% refused.

Eventually, 487 households in Korogocho and 524 in Dandora were interviewed in the cross-sectional study, which aimed to examine the frequency of street food consumption. A subsample of 73 households (36 in Korogocho and 37 in Dandora) was selected for an in-depth study, which was carried out to assess the role of street foods in the dietary pattern and to record the respondents' opinions towards street foods.

Cross-sectional study

The cross-sectional study consisted of a short structured questionnaire. It was administered by going from door to door to every household available in selected parts of the areas. The respondents were adults or older children (over 15 years old) present in the house. Since the respondent gave the information on all the individual household members, only one person in every household was interviewed. The respondent was usually the household head or the spouse (86%), in some cases a son or a daughter (7%), a brother or sister (in-law) of the head of the household (5%) or someone else (2%).

Information was obtained on the number of days in a week that street foods and kiosk foods were consumed. Other information concerned the relation to the head of the household, age, sex, ethnic background and employment status of every household member. Categories for employment status were regularly employed, self-employed, temporarily employed, casual labourer and unemployed.

In-depth study

For the in-depth study, a stratified sample was taken from the five largest ethnic groups represented in the cross-sectional study. Half of the selected households had reported consuming street foods daily and half had reported never consuming street foods at all. Equal numbers of households (18) were selected from the main ethnic groups of Kikuyu, Kamba, Luhya and Luo. They were all evenly divided between both areas and between the consumers and non-consumers. The Boran were only present in Korogocho and four households were selected.

The structured questionnaire administered to the subsample contained questions on the following topics: demographic and socio-economic information, the source of the meals eaten by all members of the household, the place where street foods were eaten and whether they were shared with other household members, and the opinion of the respondent on several aspects of street foods. Respondents who had reported consuming street foods were asked an open question for the reasons for doing so. After the spontaneous answer to

this general open question, several reasons for buying street foods were asked in a structured way.

All interviews were done by trained Kenyan interviewers who were accompanied by guides from the research area for safety and for help in finding their way around. The questionnaires were pre-tested and adjusted where necessary before the data collection started.

Data treatment

Cross-sectional study The information obtained on the frequency of street food consumption was individual. However, for analysis purposes household street food consumption was also needed. In most households the same numbers of days were given for the street food consumption of every single member, so this could be used as the frequency of street food consumption of the household. In the households where this was not the case, the most prevalent individual frequency of street food consumption was used as household street food consumption (4.4%). When this was also not possible the street food consumption of the adults (1.5%) or otherwise the average of the frequencies of all members (1.6%) was taken as the household street food consumption.

Household street food consumption was analysed in two ways: the *prevalence* (= the percentage of households consuming street foods for a specified number of days) and the *frequency* (= the actual number of days in a week street foods were consumed). Differences in prevalence were tested using chi-square analysis and analysis of variance was used to examine differences in frequency between groups. Scheffé's multiple comparison test was used to identify which groups significantly differed from each other. The level of significance used was 0.05.

In-depth study The data from the in-depth study are mainly descriptive. We only tested the differences in opinions of street food consuming and non-consuming households using the non-parametric Mann–Whitney test. The households with the answers 'depends on type of food' and 'don't know/no answer' were left out of these tests, because they cannot be regarded as an opinion in any direction. The programme SPSS was used for all statistical calculations.

RESULTS

Cross-sectional study

Table 2.1 shows some of the characteristics of the households in the two research areas, Table 2.2 gives the prevalence and frequency of street food consumption per study area and Table 2.3 depicts the relationship between household street food consumption and some household characteristics by research area.

Street foods are obviously present in both research areas. The data show that 78% of the households in Korogocho (low-income area) and 53% in Dandora (low-middle-income area) consumed street foods at least once per week (Table 2.2). Households in Korogocho reported a significantly higher frequency of street food consumption (3.6 days/week *vs* 2.0 days/week; $P<0.001$).

Table 2.1 Characteristics of households in the cross-sectional study in Nairobi

Characteristic	Korogocho	Dandora	Total
Number of households	487	524	1011
Age of household head (mean, SD)	34.0 (11.1)	31.6 (7.8)	32.8 (9.6)
Sex of household head (% female)	22	17	19
Household size (mean, SD)	3.6 (2.2)	3.1 (1.9)	3.4 (2.1)
Ethnicity (%)			
Kikuyu	28	45	37
Luo	39	26	32
Luhya	11	13	12
Kamba	9	8	9
Boran	8	0	4
Other	5	8	6
Employment status of head of household (%)			
Regularly employed	17	61	40
Self-employed	45	25	35
Unemployed/casual labourer	38	14	25

Table 2.2 Prevalence of street food consumption by study area (%) in Nairobi

	Korogocho (n=487)	**Dandora** (n=523)
0 days/week	22	47
1 – 2 days/week	23	23
3 – 5 days/week	15	10
6 – 7 days/week	40	20
Mean frequency (SD)	3.6 (3.0)	2.0 (2.7)*

* $P<0.001$, significant difference between the study areas.

The respondents reported that household members of all ages and of both sexes consumed street foods, except infants of less than 1 year of age. In all other age groups at least 22% of the household members reported consuming street foods daily. Age composition of the households was not related to the frequency of street food consumption within the household; testing for the presence or absence of an infant of less than 1 year old and the numbers of children in the household aged 1–5 years old did not reveal any differences. Frequency of street food consumption also did not differ between male-headed and female-headed households.

Household size varied from one to 13 members. Households with four or fewer members constituted 76% of the total sample in the cross-sectional study. In both areas, large households (eight or more members) consumed street foods more frequently than small households (up to three members) ($P<0.01$, Table 2.3). There was no significant difference in the frequency of street food consumption per week between households with one adult or two or more adults.

A little over 90% of the households in the cross-sectional study were part of one of the four largest ethnic groups in Kenya: Kikuyu, Luhya, Luo and Kamba (Table 2.1). In those

Table 2.3 Relationships between street food consumption (days/week) and household characteristics by study area in Nairobi

Characteristic		Korogocho		Dandora	
		n	*Mean frequency (SD)*	n	*Mean frequency (SD)*
Sex of household head	Male	379	3.6 (2.9)	435	2.0 (2.7)
	Female	108	3.5 (3.0)	88	2.1 (2.7)
Household size	< 4	278	3.6 (2.9)	332	1.8 (2.5)
	4 – 7	177	3.5 (3.0)	176	2.5 (2.8)
	8 +	32	4.1 (3.0)	15	3.3 (3.2) *
No. adults in household	1	137	3.7 (2.9)	152	1.9 (2.6)
	2 or more	350	3.5 (3.0)	371	2.1 (2.7)
Ethnicity	Kikuyu	138	3.6 (3.1)	237	1.8 (2.6)
	Luo	191	4.3 (2.7)	136	2.6 (2.8)
	Luhya	55	3.4 (2.9)	70	2.4 (2.8)
	Kamba	44	2.8 (2.9)	44	1.7 (2.4)
	Boran	40	1.7 (2.6)	0	-
	Other	19	2.4 (3.3)	36	1.7 (2.4)
Employment status	Regularly employed	83	2.9 (2.9)	319	1.9 (2.5)
	Self-employed	217	3.6 (3.0)	133	1.8 (2.6)
	Unemployed/casual labourer	185	3.9 (2.9)	71	3.4 (3.0) **

* $P<0.01$, household size 8+ different from the other sizes.

** $P<0.001$, differences between the three groups of employment status.

groups 22–30% of the households reported consuming street foods daily and 21–43% reported never purchasing street foods. Households from 14 other ethnic groups were also found during the study, but of those only the Boran were represented by a group of 40 households. Sixty-five percent of those households hardly ever consumed street foods.

As can be seen in Table 2.1, more heads of the households in Dandora were regularly employed than in Korogocho, where more were self-employed. Analysis of variance showed that the people who had no regular income (either unemployed, casual labourer or temporarily employed) consumed street foods more frequently than the self-employed, and they again reported consuming them more frequently than people with a regular job ($P<0.001$; Table 2.3). The mean numbers of days in a week that street foods were bought (= frequency) were 3.7 (SD=2.9), 2.9 (SD=3.0) and 2.1 (SD=2.7) for the unemployed, self-employed and regularly employed, respectively. The same pattern was still very clear when the effect of area (living in Korogocho or Dandora) had been taken into account first ($P<0.001$).

Apart from employment status, one might expect that when a household has at least one member whose primary role is domestic, the frequency of street food consumption is lower than in other households. In this study population, only 16 households had a househelp, of which 15 were from Dandora. The frequency of street food consumption of those 15 households did not differ significantly from that of households in Dandora who did not have anyone whose primary role was domestic, even though the mean frequencies seemed far

apart (1.53 *vs* 2.20 days/week). However, in many households, the mother had a primary role that was domestic: 207 households in Korogocho and 151 households in Dandora. The frequency of street food consumption here of 2.55 days/week (n=358) was significantly lower than that of households with no one with a primarily domestic role of 2.95 days/week (n=524; $P<0.05$). This was also the case in each area separately, and even when the effect of area and employment were taken into account first, the difference remained significant ($P<0.01$). When the presence of a person with a primarily domestic role was taken into account before determining the effect of the employment status of the head of the household, the relation between employment status and frequency of street food consumption did not change.

In-depth study

In Korogocho and Dandora, street foods were mainly eaten for breakfast and as snacks, while lunch and dinner were usually home-prepared (Table 2.4). The last column shows that it is also common to buy foods at other places, like kiosks or a canteen at work. Breakfast in particular was often bought outside the home. This trend was found in both research areas. The street food product that was most often bought as breakfast was *mandazi*, a deep fried product of dough, usually in a triangular form (Kenyan kind of doughnut). In most households the wife bought the *mandazi* and brought these home, where the whole family ate them in combination with home-prepared tea. In Dandora more households bought their lunch away from home. This is to be expected because more people had a regular job and did not have the time to go home for lunch, while self-employed people usually worked nearer home.

Table 2.4 Source of different types of meals on a weekly basis (n=73) in Nairobi

Type of meal	**Street foods** (%)	**Home-prepared** (%)	**Other sources**[a] (%)
Breakfast	19.9	54.0	26.1
Lunch	0.9	90.2	8.9
Dinner	0.4	99.6	0.0
In between meals	8.4	82.8	8.8

[a] Other sources = kiosk, restaurant, at school, etc.

The four main ethnic groups were represented in the in-depth study. Some clear differences in the source of breakfast between the groups can be seen (Fig 2.1). Kikuyu households seemed more inclined to buy their breakfast instead of preparing it at home. They purchased breakfast either from street food vendors or in kiosks. The Kamba seemed mainly used to preparing breakfast at home. However, the data collected are not detailed enough to show that there is a real cultural difference in street food consumption. Differences may be partly explained by the type of occupation or other factors.

In the in-depth study respondents were asked for their reasons to buy or not to buy street foods. As seen in table 2.5, the reasons for buying street foods varied. The main reason that was given spontaneously was that street foods are cheap (by 13 households, 35%). The reasons that street foods are ready/easy and that people just like them were both mentioned spontaneously by eight households (22%). Several more reasons were mentioned by some households, as can be seen in the table. Most households confirmed

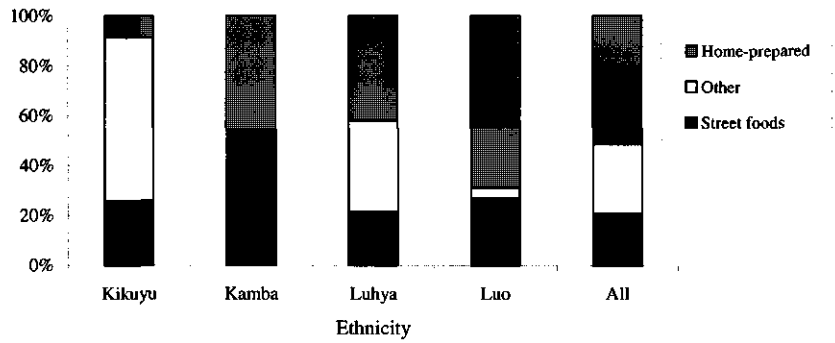

Figure 2.1 Sources of breakfast on a weekly basis (%; n = 69) by ethnicity in Nairobi.

after prompting that saving fuel and time were also important reasons (73 and 57% respectively), as are variety in the diet (51%) and the possibility of getting credit (30%).

Out of the 36 households that did not consume street foods 23 (64%) mentioned as a reason that the foods are dirty and not hygienically prepared or stored (Table 2.5). Other reasons for not buying street foods were mentioned by only a few households (8–17%).

Table 2.5 Reasons to buy or not to buy street foods in Nairobi[a]

	No. of households			
Reasons to buy (n = 37)	**Spontaneous**	**After prompting[b]**	**Reasons not to buy** (n = 36)	**No. of households**
Street foods are cheap	13		Foods are dirty, not hygienically prepared or stored	23
Street foods are ready/easy	8			
We just like them	8		Home prepared foods are preferred	6
To save time	6	+21		
We don't have all the ingredients at home	5		We don't like street foods	5
We know the person selling the food	2		The ingredients are not enough or their origin is unknown	5
To save fuel	1	+27		
To have more variety in the diet	1	+19	People get ill from eating these foods	3
Because we can get credit	0	+11		

[a] More than one answer per household possible.

[b] After a general question on reasons to buy street foods, these items were asked for separately. For example: +21 means that 6 + 21 = 27 agree that street foods save time.

Table 2.6 shows the opinions of the 73 respondents on the price, taste and health effects of street foods. Of the 37 households using street foods 70% stated that street foods are cheap. In the group of households that did not consume street foods 44% said street foods

are cheap, but in this group it was more often thought that street foods are too expensive (22 *vs* 8%). The difference between the groups was borderline significant ($P=0.052$). There was also a difference between the groups when the taste of street foods was compared with the taste of home-prepared foods ($P=0.05$). In both groups the majority said that home-prepared foods taste better, but five households in the street food consuming group said either that there is no difference in taste or that street foods taste better. There was an even more pronounced difference in the opinions of the groups about the effects of street foods on health ($P<0.001$). All households not consuming street foods considered them unhealthy and even the majority of the consuming households thought so. Only seven of the street food consuming households said street foods are beneficial to their health or have no effect.

Table 2.6 Opinions on price, taste and health effects of street foods by consuming group in Nairobi

Aspect		Households consuming street foods	Households not consuming street foods	All
Price	Too expensive	3	8	11
	Just right	6	6	12
	Cheap	26	16	42
	Depends on type of food	2	-	2
	Don't know/no answer	-	6	6
Taste	Street foods better	3	-	3
	No difference	2	-	2
	Home-prepared better	31	26	57
	Don't know/no answer	1	10	11
Effect on health	Very bad	15	28	43
	A little bad	13	3	16
	Not good or bad	1	-	1
	A little good	2	-	2
	Very good	4	-	4
	Don't know/no answer	2	5	7
Total		37	36	73

Discussion

Cross-sectional study

The majority of the households in the two research areas consume street foods. The frequency of street food consumption in the low-income slum area is significantly higher than in the low-middle-income area. A clear relation between the frequency of street food consumption and employment status of the head of the household appeared. Households without any regular income consume street foods more days per week than households where the head is self-employed; the latter, in turn, consume street foods more frequently than households with a regular income do. This finding supports our hypothesis that households with at best an irregular income consume street foods most frequently. In other words, the poorer community consumes street foods more frequently. Thus, street foods play an important role in the diet of the low-income urban dwellers of our study.

We think this finding may be extrapolated to the poorer population of Nairobi, because the populations in this study are part of that population and (the same kind of) street foods are available in most low and low-middle-income areas in Nairobi.

The per capita frequency of street food consumption does not differ between households with one or with two or more adults in the household. We hypothesised that the convenience of street foods would be especially useful for one-parent households because one adult might not have enough time to prepare the food for the household, but the data indicate no difference in the frequency of street food consumption. However, when the mother is at home, ie she has a primarily domestic role, this results in a lower frequency of street food consumption, which is an indication that available time is one of the determinants. This effect was not found in the households with a househelp, but this might be mainly due to the limited number of households in this group: their frequency of street food consumption seemed much lower than that of households with no person with a primarily domestic role, but the difference was not significant. Another finding is that large households appear to consume street foods more frequently than smaller households do. This suggests that the availability of resources, or the lack thereof, is a factor that influences street food consumption as well. When more mouths need to be filled while limited money is available, street food consumption appears an attractive option.

Ethnicity plays only a minor role in street food consumption. Only the Boran households, part of the selection in Korogocho, appear to consume less street foods: more than 50% of all Boran households never consumed street foods. This might be related to their religion. As Muslims, Boran have stricter rules about their food habits than have the other ethnic groups, which are mainly Christian. For example, the street foods might contain meat from animals not slaughtered according to Islamic rules. Another reason for not eating street foods might be that the dishes they prefer are not widely sold, because the Boran constitute a relative minority compared to the four large ethnic groups. As far as the larger ethnic groups (Kikuyu, Luo, Luhya and Kamba) are concerned, ethnic background does not seem related to the frequency of street food consumption. By observation, the numbers of vendors seem similarly distributed over the ethnic groups as the households in this study. Many of the street food products sold are not traditional to the ethnic groups; however, consumers tend to have a preference for vendors of their own ethnic background (Mwangi, unpublished data).

In the methods section we mentioned that 57 and 63% of all households living in the two selected parts were asked to participate. These percentages are an underestimation, but it is impossible to say what the exact numbers should be. In spite of repeated visits to all dwellings at different times of the day and week, it was not possible to obtain information on the state of occupancy of all the dwellings where no one opened the door.

A small proportion of the households in Korogocho (4.3%) refused to participate, as opposed to 21.3% in Dandora. People in Korogocho, a slum area, are much more used to strangers visiting them. Many non-governmental organisations and other institutions ask them for information for studies and projects, therefore they know it will usually not give them any problems or disadvantage to answer some questions, and they might actually get some benefit from it. In Dandora, however, people are much more suspicious and afraid that whatever information they give might be misused.

The question about the street food consumption as used in this study has some limitations. The respondent was asked to give an estimation of the number of days that every member of the household usually consumes street foods. In the majority of the households the woman (mother/wife) in the house was the respondent and she might have been able to give a good estimation in most cases. However, for household members who consume a lot of meals away from home it is also very easy to over- or underestimate the number of times these meals were street foods. As it is not possible to say whether an over- or an underestimation is more probable, the data have been used as collected.

A second limitation is that the frequency of consumption does not give any information on the amount and types of foods consumed as street foods and the observations of street foods available are limited to only two months during the short rainy season. The season, however, does not seem likely to have a large impact on the types and frequencies of foods consumed, because many foods are wheat flour or maize flour products, and their availability does not vary a lot during the year in this urban area. For a dish like *githeri* (maize with beans) the proportion of the ingredients may vary to some extent during the year, but this does not influence the availability of the types of foods as such.

The cross-sectional study was meant to give a first indication of the importance of street foods for a large population, and therefore it was not possible to ask for more detailed information from the individual households. Hence, the data did not allow analysis into a relationship between type and place of employment of the household members on the one hand, and the role of 'eating out,' be it in the street, in kiosks or in restaurants, on the other. The aim of the in-depth study was to get insight into the food habits of the study population and their perceptions of street foods. As this was already a long questionnaire, it was not possible within this study to ask for further information on detailed food intake. The use of the household as the unit of analysis instead of individuals at the selling site made it possible to determine the use of street foods by all age groups as foods are regularly taken home by mothers to share them with their children and other members of the household. It also allowed us to include people who do not consume street foods or only consume them every now and then, thus providing a more complete picture.

In-depth study

Respondents said that street foods are cheap and this was an important reason to buy them. The answers that buying street foods saves fuel and time can also be seen as part of this concept of cheap street foods. Apart from that, street foods can add to the variation in the consumers' diet.

The reasons for buying street foods in our study are similar to those in other studies in African cities. Two studies (FAO, 1991; Nasinyama, 1992) have examined several characteristics of street food consumers. Consumers in both studies were selected at the vending site. Most consumers were male, 76.4 and 67.8%, respectively. In both studies the main reasons to buy street foods were saving time, convenience and low cost. This is comparable to the results of this study. However, in the report from Nasinyama another reason mentioned by many consumers was 'clean', but it is not clear how this can be a reason for buying street foods. In those studies 'taste' was also given as a reason to buy

street foods, while in our study the taste of street foods was considered inferior to the taste of home-prepared foods.

It was to be expected that people who consume street foods have a more positive opinion about price, taste and effects of street foods on health than people who do not consume them. Nevertheless, even in the consuming group the general attitude towards street foods was rather negative. Street foods are seen as cheap, but also as less tasty than home-prepared foods and as unhealthy. This negative attitude needs to be changed into a positive one, so consumers will perceive street foods as an addition to a varied and balanced diet.

The present study shows that street foods are mainly eaten for breakfast but can actually be part of any meal. In the FAO study in Nigeria (1991) street foods were also mainly bought for breakfast (68.9%), while in the study of Nasinyama in Uganda they were mainly bought for lunch (63.7%).

The use of street foods during lunch might in fact be underestimated in this study. In most interviews the housewife was the respondent and she might not always have been aware that husband and/or children bought street foods for lunch while at work or at school. Also no distinction was made between different components of the meals. For example, fish is often bought as ready-cooked fish from street food vendors, but is then usually eaten with home-prepared staple food and vegetables during dinner. In the interviews this was still recorded as being home-prepared, even though that is only partly the case. This means the concept of street foods should be seen in a broader perspective.

Of course, the time of day when street foods are bought depends very much on the habits and place of occupation of the consumer and on the availability of street foods in different places at certain times of the day. In Nairobi, City Council policy also influences the availability of street foods. In the city centre, selling street foods is not allowed and in other parts of the city the vendors are sometimes forced by the police to leave the selling place and their materials are confiscated. As a consequence, their usual customers have to find another place to buy their food, which might not be available or be more expensive, with the result that many of the poorer customers will forego the meal usually bought from street vendors until they have come back to sell again.

In summary, contrary to people in the rural areas who can grow most of their food, people living in cities are mainly dependent on buying foods to be able to eat. The results of this study show that it is quite common for people living in low-income areas in Nairobi to buy ready-to-eat foods instead of preparing all their foods at home. Those ready-to-eat foods may be street foods or come from other places, but they cannot be ignored when assessing the food intake of urban dwellers.

Although the contribution of street food consumption to the daily food intake of poor urban dwellers is not quantified in energy and nutrients in this study, the results clearly show that street foods are important in the diet of the urban poor. The question whether street foods are consumed at the household level seems to be a combination of at least four factors: the level of the household's income; the regularity of the income; the number of mouths to fill; and time available to buy and prepare food. The importance of the phenomenon indicates that street foods might provide a good target for improving the diet of the urban poor, in terms of amount, variety and nutritional quality. It also shows that when

those illegal vendors are wiped off the streets, many of the poorest will be unable to buy their usual meals every day because a cheap source of food has disappeared.

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3

The contribution of street foods to energy and nutrient intake of 5–7 year-old children in a slum area of Nairobi

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Interview with woman

ABSTRACT

This cross-sectional survey investigated the energy and nutrient intake and the role of street foods therein of 5–7 year-old children living in a slum area in Nairobi. In addition, we hypothesized that children attending school would derive a larger part of their daily intake from street foods than children who do not attend school. Children were selected based on age and school attendance: a pre-school group with 37 children aged 5 years, a school-going group with 40 children aged 6 or 7 years attending primary school and a non-school-going group with 37 children aged 6 or 7 years not attending primary school. Two 24-hour recalls were conducted about schooldays with both the caretaker and the child and the source of each food consumed was recorded. Mean total food intake of the children was below the recommended daily intakes in all groups. 78% of all the children consumed street foods, which provided 21% of daily energy intake in all groups, while all sources of non-home prepared foods together provided 24%. The street foods provided relatively high proportions of fat but low proportions of micronutrients. Intake and thus adequacy was higher in the school-going than in the non-school-going group, reflecting a difference in socio-economic level of the family. No differences in the proportion provided by street foods was found between the groups. Street foods provide a substantial part of the diet of young urban children and even within the slum area, total intake of the children is related to socio-economic levels.

INTRODUCTION

In the ongoing process of urbanisation, it is widely recognized that the street food sector constitutes an increasingly important phenomenon, as a provider of income and a source of food for many urban residents in developing countries (Winarno & Allain, 1991; Chauliac & Gerbouin-Rerolle, 1996; FAO, 1997; Tinker, 1997). Especially the urban poor are considered to benefit from street foods as they often provide the vendors with a reasonable income and the consumers with cheap and convenient food (FAO, 1990; Tinker, 1997). Recent studies show that street foods are an important part of the daily diet of poor urban residents (Sujatha *et al.*, 1997; Ag Bendech *et al.*, 1998; *chapter 4*).

Urban children living in low-income areas are a vulnerable group, at risk of food insecurity (FAO, 1999). The relevance of street foods for children may be considered from two main perspectives as they can be both workers and consumers. As workers, they can be involved in preparing the foods (often at home), selling from fixed stalls, selling petty snacks while peddling the streets, or working for an employer, in order to help improve their family's income. Our interest is mainly with the other perspective that children are consumers of street foods, either consuming what their mothers buy and distribute within the family or as direct clients through buying street foods on the way between home and school (Chauliac & Gerbouin-Rerolle, 1996; Tinker, 1997).

Studies in several countries have shown that street foods can contribute substantially to the nutrient intake of children. For example, Webb & Hyatt (1988) have shown that the street food intake of secondary schoolchildren aged 11–23 years in Haiti provided 18% of the recommended allowance for energy and 15% for protein. Schoolchildren in Nigeria derived 25% of their daily energy and 52% of their daily protein intake from street foods (Oguntona & Kanye, 1995). In both studies, children were selected at or near their schools, possibly assuming that children who do not attend school hardly consume any street foods.

In a previous study in Nairobi we found that children of all ages, except infants, consume street foods on a regular basis (*chapter 2*). However, information about the actual contribution of street foods to the diet of young children or children who do not attend school is scarce. Only Ag Bendech *et al.* (1998), found that in Bamako, Mali, street foods provide a substantial part of the recommended daily energy and nutrients for 2–7 year-old children of various socio-economic levels. Thus, we aim to investigate the nutritional relevance of street foods for young children in further detail. As iron and vitamin A deficiency are thought to be the major micronutrient deficiencies in Kenya, even though the magnitude of the problem is not clear (GoK/UNICEF, 1998), the intake of these micronutrients will be taken into account as well.

Specifically, this study investigates the energy and nutrient intake and the role of street foods therein of 5–7 year-old children living in a slum area in Nairobi. In addition, we hypothesized that children going to school would derive a larger part of their daily intake from street foods than children who do not attend school.

METHODS

Setting and subjects

A cross-sectional survey was conducted in Korogocho, a slum area located on the eastern

side of Nairobi, Kenya. Korogocho, which covers an area of approximately 1 km^2, had 44,415 inhabitants in 1989, according to the population census (CBS, 1994). Considering the growth of Nairobi from 1.3 million in 1989 (CBS, 1994) to 2.1 million in 1999 (CBS, 2000), the population of Korogocho is also likely to have grown, but data from the latest population census done in 1999 are not yet available.

Because some cases of child abuse had been reported in the area just before the start of the field work, many inhabitants of Korogocho had become very suspicious of strangers. Therefore, local community health workers, trained as interviewers for this survey, were asked to select the children themselves by going from door to door in a selected part of the study area (*chapter 2*). Selecting the children at the household level enabled us to include those who did not attend school.

Initially, 120 children were selected, while complete data for analysis were obtained from 114 of them. Children were selected based on their age (year of birth) and school attendance and divided into three groups. One group consisted of 37 children 5 years of age, being still too young to attend primary school (pre-school group). Two other groups consisted of children aged 6 or 7 years. Forty attended primary school and 37 did not (school-going and non-school-going group).

Data collection

Demographic and socio-economic information about the child and its family were asked from the caretaker. The mother was the usual caretaker, only in two cases the caretaker was the father. Weight of the children was measured with bathroom weighing scale to the nearest 0.5 kg.

In October and November 2000, for each child two 24-hour recalls were collected about schooldays (thus not weekends or school holidays), by asking the caretaker about the child's food intake and subsequently asking the child itself for additional foods consumed while not at home. All foods consumed by the child from getting up until going to bed were recorded and special attention was given to the source of each separate food. In order to assess the amounts consumed most accurately, the interviewers carried household measures in different sizes with them and a book with pictures of fruits and vegetables in various sizes to enable the respondent to indicate the most appropriate size or volume. In addition, the cooking pans used in the home were measured to estimate volumes of home prepared meals, while all ingredients and their amounts were recorded.

Data treatment and analysis

Nutrient intakes were based on the Kenyan food compostion table (Sehmi, 1993). Daily intake was calculated as the mean of the two days of each individual. Recommended daily intakes (RDI) of energy and protein were based on age, sex and weight of the children (FAO/WHO/UNU, 1985). Kenyan RDIs for micronutrients were used (Sehmi, 1993).

Differences between the three groups of children were tested with Anova or alternatively Kruskal–Wallis for non-normal distributions and chi-square for categorical variables. To further examine the differences found with Anova Scheffé's multiple comparison test was used, and for differences found with Kruskal–Wallis the Mann–Whitney test with adjusted *P*-

values was used. Differences in the proportions derived from street foods between energy and nutrients were tested with Wilcoxon signed rank test. All differences were tested one-sided and *P*-values less than 0.05 were considered significant. The SPSS statistical package (version 8.0) was used for all statistical calculations (SPSS Inc.).

RESULTS

Characteristics of the children and their families

The distribution of boys and girls was similar among the three groups (Table 3.1) and the ages of the children in the school-going and non-school-going group did not differ. Mean household size was the same among the groups and gender and level of education of the heads of the household were also similar in all groups. Employment status of the heads of the households in the school-going group was better than in the other groups (Table 3.1, $P<0.05$). The heads of households in the pre-school group had been living in Nairobi for a shorter period than the ones in the school-going group ($P<0.05$). Household income was higher in the school-going group than in the pre-school and non-school-going groups ($P<0.001$). The mean body weight of the children was lower in the pre-school group than in both other groups (Table 3.1, $P<0.001$).

Table 3.1 Demographic and socio-economic characteristics of pre-school, school-going and non-school-going children and their family from a slum area in Nairobi.

Characteristic	Pre-school	School-going	Non-school-going
n	37	40	37
Age (years)	5	6 or 7[†]	6 or 7[†]
Sex of child (% boy/girl)	43/57	40/60	54/46
Gender of head of household (% female)	46	35	30
Education level of head (%)			
None	3	5	5
Four years primary school	6	5	3
Complete primary school	53	38	51
Secondary school	39	53	41
Employment status of head (%)			
Unemployed	3	3	3
Casual labourer/temporarily employed	41	45	59
Self-employed	46	25	32
Regularly employed	11	28	5
Body weight of child in kg (mean ±SD)***	16.1 ±1.8[a]	18.2 ±2.0[b]	18.5 ±2.7[b]
Household size (mean ±SD)	4.4 ±1.1	4.6 ±1.0	4.5 ±0.8
Number of years head is living in Nairobi* (mean ±SD)	12 ±7.0[a]	16 ±6.6[b]	14 ±6.7[ab]
Monthly family income in Kenyan shilling*** (n) (mean ±SD)	(32) 4083 ±2884[a]	(36) 6467 ±3153[b]	(34) 3791 ±2924[a]

[†] Percentage of 6-year-old children: 45% in school-going and 41% in non-school-going group.
* $P<0.05$; *** $P<0.001$; Comparison of three groups: [a]different from [b]with $P<0.05$

Adequacy of energy and nutrient intakes

On average the mean energy intake of the three groups was 215 kJ/kg body weight, while the mean recommendation was 353 kJ/kg body weight.

Both absolute intakes and the adequacy (proportion of the RDI) are shown in Table 3.2. The intakes of energy and vitamin A were below recommended daily intakes in all three groups. Protein and iron intake were found to be adequate (>100% of RDI), while calcium intake was found to be marginally adequate in all groups.

The absolute intake of energy, protein and fat was higher in the school-going than in the non-school-going group (Table 3.2). The energy percentage from protein was similar among the groups, while the energy percentage from fat was higher in the school-going group than in the other groups.

The adequacy (% of RDI) of the energy and iron intake was higher in the school-going than in both other groups ($P<0.05$, Table 3.2) and the adequacy of protein intake tended to be higher in the school-going than in the non-school-going group ($P=0.058$). Inadequate protein intake was found in 10% of the children in the school-going group and in 38% in the non-school-going group. No differences in adequacy were found for calcium and vitamin A intake between the groups.

Table 3.2 Energy intake and energy% from protein and fat (mean ±SE) and adequacy (% of RDI) of energy and nutrient intake (median [25th – 75th percentiles]) of 5–7 year-old children living in a slum area of Nairobi.

	Pre-school 5 years old	**School-going** 6–7 years old	**Non-school-going** 6–7 years old
n	37	40	37
Intake[†]			
Energy (MJ)**	3.5 ±0.1	4.1 ±0.1	3.6 ±0.1
Protein (g)**	19.8 ±1.0	23.5 ±0.7	20.6 ±0.8
Fat (g)**	15.1 ±1.4	23.3 ±2.2	15.9 ±1.2
Vitamin A (RE)	185 ±23	189 ±20	231 ±29
Iron (mg)*	12 ±1.1	16 ±1.5	12 ±0.5
Calcium (mg)	372 ±28	399 ±20	381 ±28
Energy% from protein	9.7 ±0.3	9.9 ±0.3	9.8 ±0.3
Energy% from fat**	15.9 ±0.9[a]	20.7 ±1.5[b]	16.5 ±0.9[a]
Adequacy (%)			
Energy**	55 [48–63][a]	65 [54–75][b]	57 [47–67][a]
Protein[x]	122 [97–136][ab]	122 [108–156][a]	112 [88–127][b]
Vitamin A	49 [29–85]	42 [24–74]	44 [36–93]
Iron**	227 [188–255][a]	284 [227–333][b]	242 [209–280][a]
Calcium	89 [64–105]	96 [67–120]	86 [61–125]

[†] Comparisons of absolute intakes are between school-going and non-school-going only.

** $P<0.01$; * $P<0.05$

[x] $P=0.058$

[a] different from [b] with $P<0.05$

Street food and other non-home prepared food intake

Of all children, 78% were found to have consumed street foods. When all sources were considered, 89% of all children were found to have consumed non-home prepared foods, including schoolmeals, foods bought at kiosks and foods eaten at the house of a friend or relative. Although it seemed that more children in the non-school-going group consumed street foods than in the other groups, this difference was not significant (Table 3.3).

The median contribution of street foods to daily energy of the children consuming street foods was approximately 21%. We found no differences in proportional contribution of street foods to energy or nutrient intake between the groups (Table 3.3). Considering all non-home prepared foods together, a median of 24% of daily energy was provided by these foods and no differences were found between the groups (data not shown).

The median contribution of street foods to daily fat intake was 35% and the median contribution to protein intake 24% (Table 3.3). Thus, street foods contributed more to fat and protein intake compared with energy intake ($P<0.01$). Conversely, street foods provided lower proportions of daily vitamin A (13%) and iron (17%) intake compared with energy intake ($P<0.01$). This pattern was found in all three groups, although not significant for all nutrients in each group (Table 3.3). The energy percentage from fat in street foods (Table 3.3) is higher than in the total diet (Table 3.2) in all groups ($P<0.001$).

Table 3.3 The percentage of children consuming street foods, energy percentage from protein and fat in street foods and the proportion of energy and nutrients provided by street foods in the diet of those 5–7 year-old children, living in a slum area of Nairobi.

	Pre-school	School-going	Non-school-going	All
% consuming street foods	73	73	89	78
n	27	29	33	89
Energy% from protein in sf [a]	11.8 ±0.8	11.1 ±0.8	11.7 ±0.9	11.5 ±0.5
Energy% from fat in sf [a]	26.8 ±2.5	32.5 ±3.4	24.7 ±1.8	27.9 ±1.5
Proportion (%) of daily intake provided by street foods (median [25th – 75th percentile])				
Energy	24 [14–36]	27 [15–36]	17 [9–30]	21 [13–32]
Protein	26 [16–36]#	29 [15–39]	20 [10–31]#	24 [15–36]†
Fat	31 [20–55]†	39 [22–58]†	30 [13–48]†	35 [18–55]†
Vitamin A	13 [3–35]	23 [6–47]	6 [2–25]†	13 [3–34]†
Iron	18 [11–29]#	19 [11–30]#	14 [5–26]	17 [9–28]†
Calcium	19 [11–34]	27 [9–39]	20 [9–31]	22 [10–35]

[a] mean ±SE

Different from proportion of daily intake provided by energy

# $P<0.05$

† $P<0.01$

DISCUSSION

The total daily energy intake of 5–7 year-old children was found to be lower than the recommended daily intake, while protein intake was found to be adequate. Iron and calcium intake were (marginally) adequate, while vitamin A intake was too low. Street foods contributed 21% of total energy intake in all groups, but no differences in the contribution of

street foods to energy or nutrient intakes were observed between the three groups. The contribution of street foods to fat intake was relatively high, but the contribution to iron and vitamin A intake was low.

As all major ethnic groups as well as families from every religious group were represented in the selected children, we think the study population can be considered representative of this slum area, despite the fact that perfect randomisation could not be applied in the selection process. The interviewers were asked to select the children themselves by going from door to door, instead of telling them in advance from which houses the children should be selected.

To assess dietary intake we used 24-hour recalls. This is considered to provide a proper estimate of dietary intake at group level (Gibson, 1990; Sawaya *et al.*, 1996). However, in some studies 24-hour recalls have been found to underestimate food intake (Kroke *et al.*, 1999; Bathalon *et al.*, 2000). An important advantage for this study was that the 24-hour recall method could easily be adjusted to include the sources of the foods consumed.

The daily energy intake of the children in this study was found to be inadequate. As the study took place in a slum area, thus mainly among poor urban residents, this result could be expected, although it might be aggravated by the tendency of 24-hour recalls to underestimate food intake (Kroke *et al.*, 1999; Bathalon *et al.*, 2000).

Iron intake in this study was found to be adequate, but when actual absorption is considered this might be an overestimation, as most iron is from plant origin and the bioavailability will be low (Hurrell, 1997).

The nutritional quality of the non-home prepared foods (including the street foods) consumed by the children needs to be considered. As the children have an inadequate energy intake, the high fat content of the non-home prepared foods is necessary to increase their energy intake. However, the relatively low contribution of non-home prepared foods to micronutrient intake is of concern, especially as the vitamin A intake of the children is also inadequate.

Street foods were the major source of non-home prepared foods in the children studied, with only small amounts of energy and nutrients provided by other sources of non-home prepared foods. A previous study in the same area found already that in this area of Nairobi street foods are the major source, while in a neighbouring, higher-income area kiosk foods are also an important source of non-home prepared foods for adults and children (*chapter 4*).

In the study done in Bamako, Mali, by Ag Bendech *et al.* (1998), 95% of the children aged 2–7 years consumed street foods, which is not very different from the 78% we found. The median contribution of street foods to the daily requirements of energy and protein of 2–7 years old children from poor families by Ag Bendech *et al.* was also comparable to the proportions provided by street foods in our study (approximately 16 and 15% *vs* 16 and 19%, respectively). However, Ag Bendech *et al.* found a much larger contribution of street foods to the intake of vitamin A and iron requirements than we did to daily intake (approximately 120 and 34% *vs* 6 and 12%, respectively). This is probably the result of differences in the types of foods consumed as street foods in the countries studied.

The contribution of 16% of street foods to the energy intake in the current study is comparable to the contributions of 15% to the recommended dietary allowance for school-

going children in Haiti (Webb & Hyatt, 1988) and 25% of daily intake in adolescents in Nigeria (Oguntona & Kanye, 1995).

Although total intake was inadequate in all three groups, energy, protein and fat intake were significantly higher in the school-going than in the non-school-going group. This suggests that more food is available to the children who attend school than to children of the same age who do not go to school. We think this is related to the socio-economic status of the families, indicating that families in this slum area that have a slightly higher income can provide their children with more food and also send them to school. The higher total food intake in the school-going group did not result from a higher proportion of intake from non-home prepared foods, as the proportions of energy and nutrients from these foods were similar in both groups.

When the socio-economic levels represented by the school-going and non-school-going group would each comprise half of the population of the area, one would expect that the results in the pre-school group would be halfway between the two. However, the adequacy of the energy and nutrient intake in the pre-school group is similar to that of the non-school-going group and not to the school-going group, as is the household income. This could indicate that the families of the children in the pre-school group have the same socio-economic level as those of the non-school-going group. This in turn suggests that most families have extremely low incomes and only relatively few families in the area are part of the slightly higher socio-economic level as represented by our school-going group. However, an economic survey in the area is needed to verify this finding.

In conclusion, total food intake was low, and the proportion of energy and nutrients provided by street foods were found to be an important part of the daily diet of pre-school, school-going and non-school-going children in a slum area of Nairobi. Even within the slum area, socio-economic levels seem to have an impact on total energy and nutrient intake of the children. The high fat content of the street foods consumed is a positive contribution to improve total energy intake, but the micronutrient content appears worrysome and may need improvement.

Both this study and the study by Ag Bendech *et al.* (1998) show that street foods provide a substantial part of more than 15% of the energy in the diet of young urban children. Therefore, as street foods are generally available in many cities in the developing world, it is very likely that street foods are an important source of energy and nutrients for most children living in cities in developing countries and particularly for the ones living in low-income areas.

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4

Non-home prepared foods: contribution to energy and nutrient intake of consumers living in two low-income areas in Nairobi

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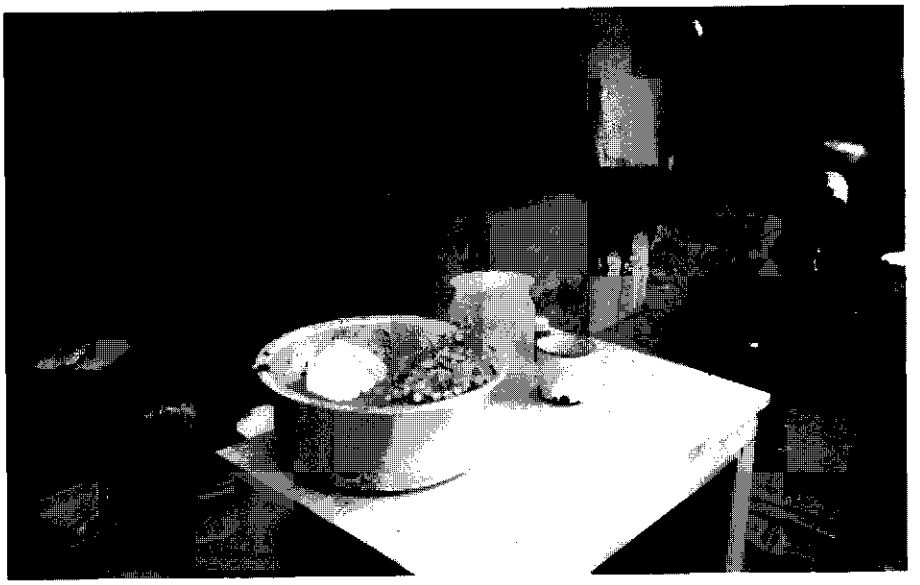


Irio *sold as street food*

ABSTRACT

Objective: To determine the nutritional importance of non-home prepared foods for men, women and schoolchildren living in two low-income residential areas of Nairobi, and the sources of these non-home prepared foods.

Design, setting and subjects: A survey was conducted in Korogocho, a slum area and Dandora, a low-middle-income residential area. 241 men, 254 women and 146 children aged 9 to 14 years were included in the study. Food intake was measured using three 24-hour recalls per individual, with special attention for the sources of all foods consumed.

Results: The median proportion of daily energy intake of consumers provided by non-home prepared foods ranged from 13% for schoolchildren in Korogocho to 36% for men in Dandora. The median contribution to fat intake was higher than to energy, but the contribution to iron and vitamin A intake was lower than to energy intake. Men consumed more non-home prepared foods on weekdays than in the weekend. Intakes of energy and most nutrients were below Kenyan RDI in all groups, but similar for consumers and non-consumers. In Korogocho, street foods were the main source of non-home prepared foods. In Dandora, both kiosks and street foods were major sources.

Conclusions: Non-home prepared foods are an important source of energy and nutients for men, women and schoolchildren in Nairobi. In Korogocho street foods and in Dandora both kiosks and street foods are the main sources of non-home prepared foods. The adequacy of energy and nutrient intake does not differ between consumers and non-consumers of non-home prepared foods.

INTRODUCTION

One of the consequences of urbanisation is a change in dietary patterns. In developing countries rural populations consume coarse grains, roots and tubers as main foods, whereas urban populations rely more on wheat and rice and more frequently consume processed foods such as bread, sugar and dairy products (Popkin & Bisgrove, 1988; Braun *et al.*, 1993; Kennedy & Reardon, 1994; Drenowski & Popkin, 1997). Another important phenomenon among urban populations is the tendency to consume more foods outside the house and thus prepare less food at home (Popkin & Bisgrove, 1988; Delisle, 1991; Braun *et al.*, 1993; Drenowski & Popkin, 1997).

In this paper we examine the consumption of all foods that have not been prepared at home, regardless of which other place it has been prepared at or where it is consumed. Hence, the definition of 'non-home prepared foods' as used in this paper is "ready-to-eat foods and beverages, processed or fresh, which are acquired outside the consumer's own place of living".

Street foods are an example of non-home prepared foods that are consumed in urban areas in developing countries (for a definition of street foods: see *chapter 1*). Large amounts of money circulate in this business (Dawson & Canet, 1991; Winarno & Allain, 1991; FAO, 1997), indicating the importance of these ready-to-eat foods in the urban diet. Street foods have received ample attention for their role in income generation and hygienic quality (e.g. FAO, 1997; Tinker, 1997; Ekanem, 1998). Less is known about their contribution to dietary intake. Several studies show that especially the urban poor consume street foods on a regular basis (Atuanya, 1987; Ag Bendech *et al.*, 1998; *chapter 2*), because they are cheap and time-saving and can be bought in small quantities (Winarno & Allain, 1991; *chapter 2*). According to FAO (1990) many urban families would even be worse off without the availability of cheap street foods.

Although street foods supply non-home prepared foods to urban residents, they are not the only source of ready-to-eat foods available. Other sources include kiosks (small licensed restaurants) and canteens at work. The type of foods sold in kiosks are similar to street foods, but one can buy several of those foods in one kiosk. The same foods are also sold around workplaces, but more choice is available as they also cater for higher-income workers. However, the relevance of these other sources of non-home prepared foods in the diet of poor urban residents is largely unknown.

The food intake and nutritional status of poor urban populations are often marginal (Braun *et al.*, 1993). The prevalence of stunting in children under five was 33.6% in Kenya and 30.2% in Nairobi in 1994. Iron-deficiency anaemia and vitamin A deficiency are certainly thought to be prevalent in Kenya, but the magnitude and distribution of the problems are not clear (GoK/Unicef, 1998). Non-home prepared foods might provide an important contribution to the diet of the urban poor.

In Nairobi, many people in low-income areas consume street foods several days per week and the purchase of ready-to-eat foods from kiosks is also common, as has been described previously (*chapter 2*). Street foods that are consumed most are described by Mwangi *et al.* (2001). Examples are *mandazi* (a Kenyan kind of doughnut), *samosa* (a small meat pie), and potato chips.

Our study aims to answer two questions:

1) Is the consumption of non-home prepared foods of nutritional importance to men, women and schoolchildren living in two low-income residential areas of Nairobi?
2) Are non-home prepared foods mainly street foods as the literature suggests or are more sources available to the urban poor?

SUBJECTS AND METHODS

Setting and subjects

A survey was conducted in two previously selected lower-income areas in Nairobi as described before (*chapter 2*), because the inhabitants belong to the poorer population of Nairobi. Korogocho is a very-low-income slum area and Dandora a low-middle-income residential area. We randomly selected 302 households out of 1011 households from a previous study, where a cluster of streets in each area was selected and therein all available households were interviewed (*chapter 2*). From every household we selected a man, and/or a woman and/or a child to assess their food intake, as far as the household contained members fulfilling the criteria. Children were selected in the age range of 9 to 14 years because this is the school-going age and they are old enough to answer some questions themselves.

Initially, 302 households were included, resulting in 669 eligible individuals. The numbers of children, men and women differed (Table 4.1), because of the selection procedure. The numbers of children are lower than the numbers of adults because one-person households and households without children (in the right age group) were also included in the selection. Eventually, complete food intake records were obtained for 641 individuals from 297 households (149 households from Korogocho and 148 from Dandora).

Enumerators were recruited in the study areas and trained to administer the general questionnaires and 24-hour dietary recalls. Data collection took place between April and July 1999.

Food intake assessment

In three separate visits within several weeks, each subject was interviewed about his/her food intake using 24-hour recalls. During the first visit, data on demographic variables were also collected (including age, educational level and employment status). The dietary recalls covered two weekdays and one weekend day. We recorded all foods consumed from waking up until going to bed, including the amount consumed and source of every single food. For every dish prepared at home all ingredients and amounts were recorded (if necessary with the help of the wife or mother). To facilitate the quantity estimates, standardised household measures (14 cups, plates and bowls in total) were provided by the enumerator and where possible the cooking pan used in the house was measured. The enumerators also carried pictures of common fruits and vegetables indicating different sizes. All materials and pictures were based on measured weights, volumes and sizes to estimate portion sizes as accurate as possible. Standardized recipes were used for non-home prepared foods: for each recipe needed five or six recipes were collected and the average used as the standardized recipe.

Data treatment and analysis

Nutrient intakes were calculated using the Kenyan food composition table (Sehmi, 1993) for 92% of the products. For 3 products we used the food composition data from West *et al.* (1988), for 1 product chemical analysis by the department of Food Technology of the University of Nairobi and for 3 products a release of the Dutch Nutrient Database (NEVO, 1993).

An 'average' day of the week was calculated with the formula: {(weekday 1 + weekday 2)*2.5 + weekendday*2}/7. The resulting daily intakes have been used for all calculations, except for comparing weekdays and weekends, where the original three intakes were used.

Nutrient adequacies are based on the Kenyan Recommended Daily Intakes (RDI), age and sex taken into account (Sehmi, 1993). For nutrients where a range was given the lower limit was used. Adequacies are presented as percentages of the RDI.

Differences between the study areas and between men, women and children were tested using Student's T-tests or alternatively Mann–Whitney test for non-normal distributions and chi-square tests for categorical variables. Differences between energy and nutrients were tested with the Wilcoxon Signed Rank test. Differences between weekdays and weekends were tested with analysis of variance.

Results are presented by study area and by group (men, women and children). A distinction is made between consumers and non-consumers of non-home prepared foods. For comparison within groups, the proportion of participants not consuming any non-home prepared food at all is too small (16%). Therefore, in this paper *non-consumers* are those respondents who form the lowest quartile (of each group) of 'proportion of daily energy consumed as non-home prepared foods'. The highest proportion of energy from non-home prepared foods found among the non-consumers defined this way is 11.5% for a man from Korogocho (while the overall mean among all non-consumers is 2.2%).

RESULTS

Characteristics of subjects

Age, education level and employment status of the groups are presented according to study area and consumer status (Table 4.1). Ages did not differ between consumers and non-consumers in any of the subgroups, nor between the study areas. For the men in the very-low-income area Korogocho, the consumers had a better employment status than the non-consumers ($P<0.05$). Men consuming non-home prepared foods in the low-middle-income area Dandora had a higher education level than men not consuming them ($P<0.05$). No differences were found between women consuming or not consuming non-home prepared foods. When comparing the two areas, men and women in Dandora showed a higher education level and employment status than men and women in Korogocho ($P<0.001$).

Contribution of non-home prepared food to energy and nutrient intake of consumers

Table 4.2 shows the contribution of non-home prepared foods to the daily energy and nutrient intake of men, women and children in the two study areas. The non-consumers (as defined in the methods section) among the men still derive a small part of their daily intake

Table 4.1 Characteristics of subjects by study area, separately for consumers and non-consumers* of non-home prepared foods.

Group	Characteristic	Korogocho Slum area		Dandora Low-middle-income area	
		consumers	non-consumers	consumers	non-consumers
Men	n	82	30	99	30
	Age, mean ±SD	34.9 ±9.7	37.5 ±11.3	34.2 ±7.4	36.3 ±9.7
	Education (%) [a]			[b]	
	None	22	33	3	10
	Primary school	42	33	4	17
	Secondary or more	37	33	93	72
	Employment status (%) [a]	[b]			
	Unemployed/casual labourer	45	37	20	23
	Self-employed	33	60	22	27
	Regularly employed	22	3	57	50
Women	n	94	38	97	25
	Age, mean ±SD	31.3 ±10.2	32.1 ±11.2	30.5 ±7.0	28.7 ±4.3
	Education (%) [a]				
	None	36	24	8	4
	Primary school	53	68	20	39
	Secondary or more	11	8	72	57
	Employment status (%) [a]				
	Unemployed/casual labourer	47	45	43	60
	Self-employed	51	53	26	28
	Regularly employed	2	3	31	12
Children	n	49	19	61	17
	Age, mean ±SD	11.2 ±1.8	11.2 ±1.8	11.1 ±1.6	10.4 ±1.7

*Consumers are the individuals in the highest three quartiles of proportion of energy consumed from non-home prepared foods, while the lowest quartile is defined as the non-consumers.

[a] Difference between the study areas, $P<0.001$

[b] Difference between consumers and non-consumers, $P<0.05$

from non-home prepared foods, but among the women and children this amount is negligible. Comparisons are made between consumers only.

Among consumers, the median contribution of non-home prepared food to the energy intake of men was 27.1% in Korogocho and 36.2% in Dandora. For women and children the median proportion ranged between 13% and 22% (Table 4.2). In both areas, men consumed more of their daily energy and nutrients from non-home prepared foods than women and children ($P<0.01$) and all groups in Dandora derived more energy and iron from non-home prepared foods than the groups in Korogocho ($P<0.01$).

The contribution of non-home prepared foods to daily fat intake was higher than the contribution to energy intake in all groups ($P<0.001$; Table 4.2). Conversely, the contribution of non-home prepared foods to total daily iron intake in Korogocho was lower than to energy intake ($P<0.001$), while in Dandora the contribution of these foods to vitamin A and calcium

Table 4.2 Proportion (%) of daily energy and nutrient intakes of men, women and children in Nairobi provided by non-home prepared foods; by study area and non-home prepared consumption level (presented as: median proportion [25th–75th percentile]).

		Korogocho		Dandora	
		Slum area		Low-middle-income area	
Group	Nutrient	Consumers*	Non-consumers	Consumers	Non-consumers
Men	n	82	30	99	30
	Energy[a]	27.1 [18.1–33.9][b,c]	3.4 [0.0–7.5]	36.2 [21.9–48.9][b,c]	6.1 [1.6–9.1]
	Protein	29.2 [19.3–43.2][b,c,e]	2.0 [0.0–7.1]	34.8 [18.8–51.8][b,c]	3.3 [0.0–10.7]
	Fat	36.6 [25.5–54.9][b,c,d]	2.5 [0.0–12.6]	42.6 [22.3–55.7][b,c,d]	5.8 [0.0–10.7]
	Vitamin A	21.4 [10.9–38.4][b,c,e]	0.2 [0.0–6.8]	17.7 [10.3–33.8][b,c,d]	1.7 [0.0–6.2]
	Iron[a]	20.4 [8.8–30.3][b,c,d]	1.3 [0.0–3.4]	54.8 [21.5–71.1][b,c,d]	3.5 [1.3–14.7]
	Calcium	25.7 [17.5–38.8][b,c]	2.1 [0.0–7.2]	28.6 [16.9–47.8][b,c,e]	6.2 [1.1–8.2]
Women	n	94	38	97	25
	Energy[a]	15.4 [9.4–23.0]	0.0 [0.0–0.1]	20.1 [12.2–31.9]	0.0 [0.0–3.1]
	Protein	15.2 [9.1–23.5]	0.0 [0.0–0.5]	16.0 [8.7–26.9][d]	0.0 [0.0–1.6]
	Fat	27.1 [17.0–35.8][d]	0.0 [0.0–0.1]	25.1 [16.3–41.2][d]	0.0 [0.0–0.9]
	Vitamin A	14.6 [7.5–26.5]	0.0 [0.0–0.0]	11.4 [6.1–23.4][d]	0.0 [0.0–2.4]
	Iron[a]	7.1 [3.9–14.5][d]	0.0 [0.0–0.1]	21.2 [6.4–56.0][e]	0.0 [0.0–1.9]
	Calcium	18.2 [10.7–25.0]	0.0 [0.0–0.1]	18.5 [9.3–26.8][e]	0.0 [0.0–2.2]
Children	n	49	19	61	17
	Energy[a]	13.4 [9.6–20.5]	0.0 [0.0–0.0]	22.4 [12.9–34.8]	0.0 [0.0–0.0]
	Protein	14.8 [7.5–22.6]	0.0 [0.0–0.0]	15.6 [8.6–27.8][d]	0.0 [0.0–0.0]
	Fat	26.0 [15.7–36.0][d]	0.0 [0.0–0.0]	26.2 [14.6–41.6][d]	0.0 [0.0–0.0]
	Vitamin A	11.7 [5.1–21.3]	0.0 [0.0–0.0]	14.0 [4.9–25.1][d]	0.0 [0.0–0.0]
	Iron[a]	8.1 [3.6–15.9][d]	0.0 [0.0–0.0]	17.4 [5.7–57.1]	0.0 [0.0–0.0]
	Calcium	16.1 [9.4–27.0][e]	0.0 [0.0–0.0]	19.3 [11.0–27.6][e]	0.0 [0.0–0.0]

[a] Difference between consumers in Korogocho and Dandora, $P<0.01$

[b] Difference between men and women, $P<0.01$

[c] Difference between men and children, $P<0.01$

[d] Different from proportion of daily energy, $P<0.001$

[e] Different from proportion of daily energy, $P<0.05$

were lower than to energy intake ($P<0.001$ and $P<0.05$ respectively). Only for men in Dandora was the proportion of daily iron intake from non-home prepared foods higher than that of daily energy intake ($P<0.001$).

Weekday or weekend?

On weekdays a larger proportion of energy intake by men was derived from non-home prepared foods than in weekends. The proportions for consumers in Korogocho were 30.2% on weekdays versus 21.6% in the weekend, while in Dandora they were 37.3 *vs* 30.2% respectively ($P<0.05$). The proportion of fat intake derived from non-home prepared foods was significantly higher on weekdays than in weekends for men in Dandora (41.8 *vs* 33.7%, $P<0.05$), but not for men in Korogocho. For women and children consuming non-home prepared foods, no differences were found between weekdays and weekends.

Nutritional adequacy

Total energy intake is low in all groups (Table 4.3). For all groups energy, protein and fat intake are higher in Dandora than in Korogocho ($P<0.001$; data not shown). The percentage of energy from fat is 4.5–8% higher in Dandora than in Korogocho in all groups ($P<0.001$), while the percentage of energy from protein is around 10% for all (Table 4.3).

Table 4.3 Energy intake and % from protein and fat (mean ±SD) and adequacy of energy and nutrients (percentage of RDA presented as: median [25th–75th percentiles]) according to study area and non-home prepared consumption level.

Group	Characteristic	Korogocho Slum area		Dandora Low-middle-income area	
		Consumers*	Non-consumers	Consumers	Non-consumers
Men	n	82	30	99	30
	Energy intake in MJ [a]	5.6 ±1.1	6.3 ±2.3	7.1 ±1.5	7.1 ±2.1
	Energy% from protein [a]	9.7 ±1.7	10.0 ±1.7	10.8 ±1.8	10.3 ±1.6
	Energy% from fat [a]	19.1 ±5.5	18.4 ±6.0	27.0 ±5.3 [b]	23.8 ±7.8
	Adequacy (% of RDA)				
	Energy [a]	52 [46–58]	55 [44–70]	64 [57–76]	64 [55–74]
	Protein [a]	65 [53–74]	68 [57–86]	87 [75–105]	82 [70–100]
	Vitamin A [a]	27 [21–43] [b]	40 [33–66]	56 [40–75]	55 [46–77]
	Iron [a]	406 [334–499]	416 [311–526]	737 [436–1145] [b]	517 [426–774]
	Calcium	160 [112–199]	180 [119–217]	187 [149–232]	175 [141–208]
Women	n	94	38	97	25
	Energy intake in MJ [a]	5.1 ±0.9	5.2 ±1.7	6.7 ±1.9	6.5 ±1.9
	Energy% from protein	9.6 ±1.7	10.1 ±1.9	9.7 ±1.5	10.2 ±1.4
	Energy% from fat [a]	18.3 ±5.7	16.9 ±6.2	24.6 ±6.2 [b]	21.4 ±5.6
	Adequacy (%)				
	Energy [a]	61 [51–68]	61 [47–68]	77 [62–92]	71 [60–90]
	Protein [a]	65 [57–85]	70 [56–87]	92 [72–111]	86 [74–109]
	vitamin A [a]	34 [22–46]	36 [24–49]	60 [43–79]	64 [48–87]
	Iron [a]	124 [110–161]	118 [97–169]	207 [151–305]	174 [144–241]
	Calcium [a]	136 [103–183]	134 [89–169]	167 [136–206]	170 [139–211]
Children	n	49	19	61	17
	Energy intake in MJ [a]	4.0 ±0.9	3.6 ±1.3	5.8 ±1.5	5.6 ±1.5
	Energy% from protein	10.3 ±3.5	10.6 ±1.4	9.3 ±1.3 [b]	11.0 ±1.2
	Energy% from fat [a]	16.5 ±4.7	16.1 ±5.5	23.8 ±6.3	21.0 ±6.3
	Adequacy (%)				
	Energy [a]	42 [38–49]	39 [34–45]	62 [54–73]	64 [54–76]
	Protein [a]	59 [48–74]	58 [55–66]	82 [72–97] [b]	108 [98–122]
	vitamin A [a]	33 [22–45]	28 [18–45]	69 [49–83]	81 [62–115]
	Iron [a]	194 [162–255]	201 [142–224]	376 [284–652]	327 [260–357]
	Calcium [a]	79 [53–90]	66 [46–71]	95 [84–129]	98 [89–140]

*Consumers are the individuals in the highest three quartiles of proportion of energy consumed from non-home prepared foods, while the lowest quartile is defined as the non-consumers

[a] Difference between Korogocho and Dandora, $P<0.001$

[b] Difference between consumers and non-consumers within the area, $P<0.05$

ces between consumers and non-consumers in
ntage of energy from protein or fat in any of the
non-home prepared foods had a lower energy
did not consume these foods. Men and women
ndora retreived a higher energy percentage from
rogocho the higher fat content of the non-home
reach the same level of fat intake as the non-
higher energy percentage from fat.
are below Kenyan RDI for all groups (Table 4.3).
ke seems adequate for adults but marginal for
is better in Dandora than in Korogocho in all

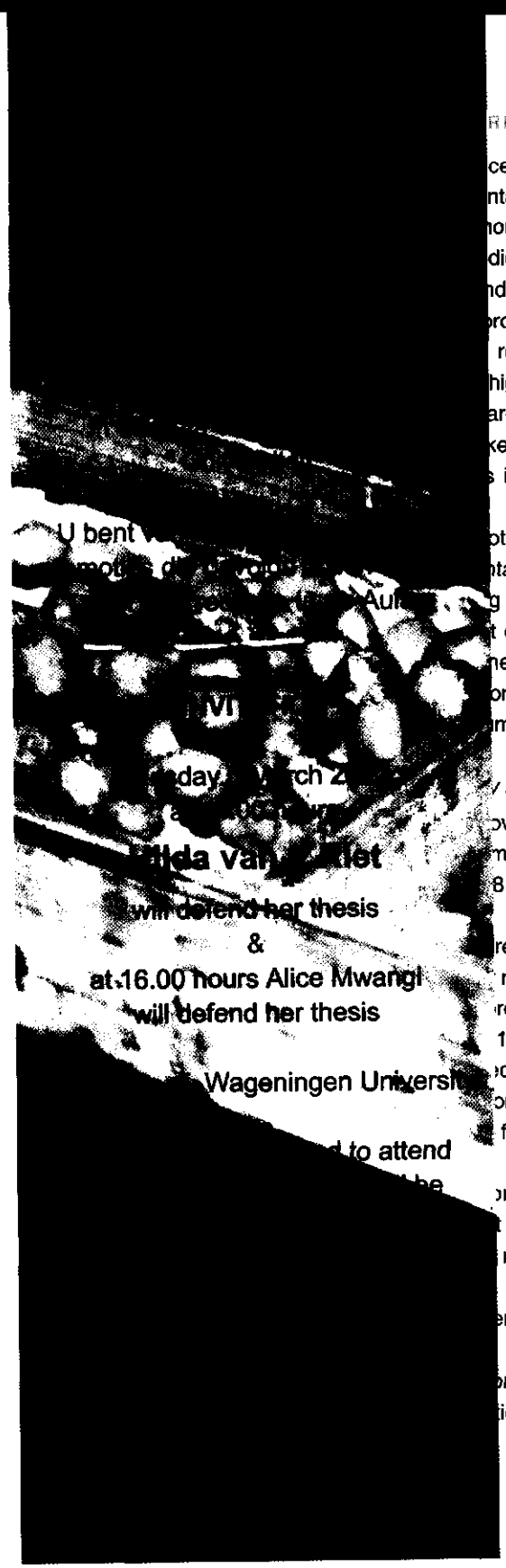
ot consuming non-home prepared foods, only a
ntakes were observed, which did not point in the
g non-home prepared foods in Korogocho had a
t consuming those foods; men consuming non-
ner iron adequacy than the men not consuming
ome prepared foods in Dandora had a lower
ming them.

y meals

ovided 38% of daily energy, lunch 29%, dinner
middle-income area, the division was breakfast
8%. These percentages were similar for men,

repared foods contributed importantly to energy
men even more during lunch (51–72%) (Table
roportion of breakfast energy from non-home
1), while all groups in Dandora derived a larger
ed foods during lunch and snacks ($P<0.05$). In
on-home prepared foods for lunch than women
foods played a minor role at dinnertime in both

nsumed as a replacement for home-prepared
for the whole meal (data not shown). When
mostly form the solid component, consumed in
sugar and often milk as well). Non-home
ement of a home-prepared lunch, because the
More than 95% of all dinners is fully home-
nent (e.g. fried fish) is added to an otherwise
ion of snacks simply varies with the place and



METHODS

Study sites and respondents

A cross-sectional survey was carried out in two lower income areas in Nairobi that had been selected for previous studies (*chapters 2 and 4*). One is a very-low-income slum area, Korogocho, with a population of 44,415 according to the population census of 1989 (CBS, 1994). The other is a low-middle-income residential area, Dandora, with 71,838 inhabitants in 1989 (CBS, 1994).

Within each area a cluster of streets was selected and therein all available households were interviewed for a previous survey (*chapter 2*). From the initial 1011 households we randomly selected 302 households for the current study. Within each of the selected households the man and woman, as far as they were part of the household, were selected for individual data collection. Six households were left out of the analysis because of incomplete data. For the analyses for this paper, data from 241 men and 254 women, originating from a total of 296 households were used.

Data collection

With a structured questionnaire we collected data on the household and the individual level, including demographic data, socio-economic data, household properties and assets and food and non-food expenditures. Based on a previous study (*chapter 2*) household size, employment status and presence in the household of a person with a primarily domestic role were expected to be determinants of non-home prepared food consumption. In addition, presence of school-age children, gender of the head of the household, level of education, distance to work (in minutes), period living in the city, person with/without income of his/her own, expenditures on food and socio-economic status were added as potential determinants, because those characteristics are commonly considered to be related to food consumption or nutritional status (Braun *et al.*, 1993; Garrett & Ruel, 1999; Delpeuch *et al.*, 2000).

Food intake has been assessed by conducting three standardised 24-hour recalls for each individual, including the registration of the sources of all foods consumed. All ingredients and amounts of home-prepared foods were recorded. For non-home prepared foods standardised recipes were used, based on an average of five or six collected recipes. Nutrient intakes were mainly based on the Kenyan food composition table (Sehmi, 1993). A more detailed description of the food intake assessment and related calculations can be found elsewhere (*chapter 4*).

Data analysis

The socio-economic status determinant was constructed using principal component analysis (PCA), with varimax rotation (Nooij, 1995). PCA is a technique that constructs new, calculated, orthogonal factors giving the highest possible fit within the variation given by the included measured variables. We constructed six PCA factors (together explaining >70% of the variation and eigenvalues >1) that could all be interpreted with the loadings of the variables. The first two factors were used for further analysis, because we considered two determinants in relation to socio-economic status to be adequate. The two factors together

explained 39% of the variation from all 37 variables used in the PCA. The 37 variables included were expenditures on different food groups (11 variables), expenditures on ready-to-eat foods (2), expenditures on non-food groups (12), building materials of different parts of the house (2), ownership of the house (1), ownership of furniture and other assets (7), and availability of facilities (2).

We found high correlations between the first PCA factor and the eleven food group expenditure variables, as they all loaded highly (>0.785) on this factor and low (<0.115) on all other factors. The second PCA factor was highly loaded on by building materials of the house and availability and expenses on facilities (like water and electricity) and rent. Consequently, we will term the first PCA factor "weekly food expenditures" and the second "status of the house and related issues" (considered to be an appropriate proxy for socio-economic status).

From the individual nutrient intakes we calculated the proportion of total daily energy provided by non-home prepared foods. These values were angular transformed to improve normality and homoscedasticity. As mentioned before we previously found that gender and area were determinants of non-home prepared energy consumption (*chapter 4*), therefore all following analyses were done separated for the four groups.

In all four groups we conducted ANOVA (GLM procedure) for all determinants separately. All determinants were used as categorical variables, in tertiles when the original was continuous. Scheffé's multiple comparison test was used to compare between categories. We considered these tests to be indicative only, especially where unequal numbers of individuals in subgroups might exceed the robustness of the test involved. *P*-values smaller than 0.05 were considered statistically significant. *P*-values between 0.05 and 0.10 are also mentioned, but considered borderline significant only. We used the SPSS statistical package (version 8.0) for all statistical calculations.

RESULTS

The determinants gender and study area

Fig 5.1 illustrates the relation between gender and study area (or general income level) with non-home prepared food consumption. Men derived a higher proportion of daily energy from non-home prepared foods than women (26 *vs* 16% respectively, $P<0.001$) and the contribution of non-home prepared foods to the daily energy intake was less in the slum area compared with the low-middle-income area (17 *vs* 24 respectively, $P<0.001$). There was no interaction effect between gender and area ($F=0.01$, $P=0.95$): the difference in energy derived from non-home prepared foods between men and women was independent of the area.

Men: determinants of non-home prepared food consumption

Employment status and distance (in time) to the place of work were found to be determinants of non-home prepared food consumption for men in the slum area (Table 5.1, $P<0.05$). Within employment status the self-employed men in the slum area derived less energy from non-home prepared foods than those those who were casual labourers or regularly employed (17 *vs* 26 and 26% respectively). Men from the slum area who had to

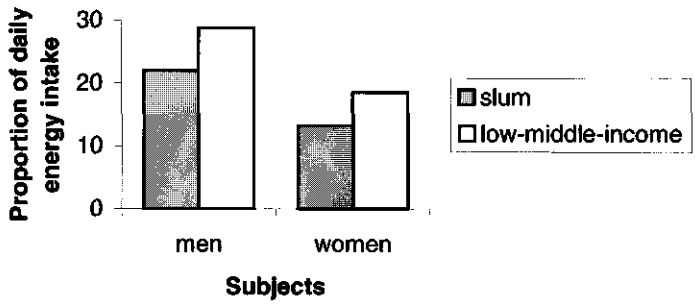


Figure 5.1 Mean proportion (%) of daily energy intake derived from non-home prepared foods for men and women in two study areas in Nairobi.

travel more than 60 minutes to work consumed a larger proportion of daily energy from non-home prepared foods than the ones travelling less than 30 minutes (36 *vs* 19%). The weekly food expenditures was a borderline significant determinant of non-home prepared food consumption among the men in the slum area ($P=0.070$): men in the high tertile seemed to derive less energy from non-home prepared foods when compared to men in the low tertile.

In the low-middle-income area status of the house (as proxy of socio-economic status) was found to be a determinant of non-home prepared food consumption among the men (Table 5.1, $P<0.05$): the men in the high tertile derived more energy from non-home prepared foods compared to both other tertiles (31 *vs* 26 and 11%). The expected determinants household size and presence of person with a primarily domestic role were not found to be determinants for the men in both areas.

Women: determinants of non-home prepared food consumption

Presence of school-aged children and distance to work were determinants of the proportion of energy derived from non-home prepared foods for women in the slum area (Table 5.2, $P<0.05$). Women with school-aged children derived less energy from non-home prepared food than did women without children in this age group (12 *vs* 16%). Regarding the distance to work: women who had to travel less than 30 minutes consumed more energy from non-home prepared food than women with a distance of more than 30 minutes (15 *vs* 3.5%), but this last group was very small ($n=7$). The expected determinants household size and employment status were not found to be determinants among women in the slum area (Table 5.2).

In the low-middle-income area the issue whether the woman had an income of her own and employment status were determinants of proportion of energy derived from non-home prepared foods (Table 5.2, $P<0.01$). Women with an income derived more energy from non-home prepared foods than women without an income of their own (22 *vs* 13%) and self-employed women derived less energy from non-home prepared foods than regularly or casually employed women (15 *vs* 23 and 31% respectively).

Table 5.1 Proportion of daily energy intake (%) provided by non-home prepared foods of men with different characteristics (mean ±SE).

Determinant	Slum area			Low-middle-income area		
	n	%	F	n	%	F
Study area [a]	112	22 ±1.5		129	29 ±1.6	
Household size			.012			1.74
1 to 3 members	58	22 ±1.9		44	31 ±2.8	
4 to 7 members	46	22 ±2.6		80	29 ±2.1	
8 or more members	8	22 ±4.1		5	15 ±4.8	
Schoolchildren in the family			2.23			.420
no	50	24 ±1.9		39	30 ±2.9	
yes	62	20 ±2.1		90	28 ±2.0	
Domestic person present			.861			1.17
no	47	24 ±2.3		69	27 ±2.1	
yes	65	21 ±1.9		60	31 ±2.5	
Years living in community			.732			1.08
less than 2 years	0	-		23	26 ±3.6	
2–10 years	80	24 ±1.8		75	28 ±2.1	
11–20 years	22	18 ±2.8		24	30 ±4.0	
more than 20 years	9	16 ±3.7		5	43 ±7.7	
Level of education			.185			1.12
none	28	21 ±3.1		6	29 ±11	
primary	44	23 ±2.3		9	21 ±7.2	
secondary or more	40	21 ±2.4		112	30 ±1.7	
Man has income			.530			.516
no	2	14 ±8.7		4	22 ±11	
yes	110	22 ±1.5		124	29 ±1.7	
Employment status			4.44*			.309
casual labourer	45	26 ±2.4		23	26 ±3.8	
self-employed	46	17 ±2.2		30	29 ±3.8	
regular	19	26 ±2.8		71	30 ±2.1	
Distance to work (in time)			5.03**			.608
1–30 minutes	69	19 ±1.8		57	30 ±2.3	
31–60 minutes	35	26 ±2.5		62	27 ±2.5	
61–120 minutes	6	36 ±6.1		4	29 ±11	
Weekly food expenditures [b]			2.73#			.013
low	34	25 ±2.6		45	29 ±2.7	
medium	45	24 ±2.3		36	28 ±2.8	
high	33	16 ±2.5		46	30 ±3.0	
Status of house & related issues [b]			.893			3.44*
low	76	23 ±1.8		3	11 ±2.6	
medium	36	21 ±2.6		44	26 ±3.0	
high	0	-		80	31 ±2.0	

[a] Difference between the areas: $F=8.24$, $P<0.01$

[b] Constructed through principal component analysis: see methods

Differences between categories: * $P<0.05$; ** $P<0.01$; # $P=0.070$

Table 5.2 Proportion of daily energy intake (%) provided by non-home prepared foods of women with different characteristics (mean ±SE).

Determinant	Slum area			Low-middle-income area		
	n	%	F	n	%	F
Study area [a]	132	13 ±1.1		122	19 ±1.3	
Household size			2.29			2.56#
1 to 3 members	58	15 ±1.6		36	17 ±2.1	
4 to 7 members	62	12 ±1.4		82	20 ±1.7	
8 or more members	12	10 ±5.0		4	5.3 ±3.1	
Schoolchildren in the family			4.93*			.005
no	46	16 ±1.7		31	18 ±2.3	
yes	86	12 ±1.3		91	19 ±1.6	
Domestic person present			.667			.487
no	54	14 ±1.9		57	20 ±1.9	
yes	78	12 ±1.2		65	18 ±1.8	
Femaleheaded household			1.03			2.18
no	95	13 ±1.2		110	18 ±1.3	
yes	37	15 ±2.3		12	24 ±4.5	
Years living in community			.683			2.17#
less than 2 years	2	19 ±5.9		21	17 ±3.4	
2–10 years	81	13 ±1.3		75	18 ±1.7	
11–20 years	38	12 ±1.7		23	21 ±2.3	
more than 20 years	11	19 ±6.0		3	37 ±9.0	
Level of education			1.05			1.55
none	43	15 ±2.1		9	16 ±3.6	
primary	76	12 ±1.3		28	16 ±2.9	
secondary or more	13	12 ±2.7		82	20 ±1.6	
Woman has income			.045			7.65**
no	55	13 ±1.5		43	13 ±1.7	
yes	77	14 ±1.5		79	21 ±1.7	
Employment status			.036			4.67*
casual labourer	6	14 ±4.1		14	31 ±4.8	
self-employed	68	14 ±1.7		32	15 ±2.3	
regular	3	15 ±7.3		33	23 ±2.4	
Distance to work (in time)			6.43*			.131
1–30 minutes	70	15 ±1.6		49	22 ±2.2	
31–60 minutes	7	3.5 ±1.6		29	22 ±2.6	
Weekly food expenditures [b]			2.01			1.69
low	34	16 ±2.3		50	16 ±2.0	
medium	54	13 ±1.6		31	20 ±2.8	
high	44	11 ±1.8		40	21 ±2.1	
Status of house & related issues [b]			1.64			.174
low	81	14 ±1.4		3	16 ±4.5	
medium	51	12 ±1.6		34	17 ±2.4	
high	0	-		84	19 ±1.6	

[a] Difference between the areas: $F=9.54$, $P<0.01$

[b] Constructed through principal component analysis: see methods for description

Differences between categories: * $P<0.05$; ** $P<0.01$; # $P<0.10$

In addition, two borderline significant determinants were found in the low-middle-income area (Table 5.2). Women from large households (>7 members) seemed to derive less energy from non-home prepared foods than women from smaller households ($P=0.081$), while women living in the urban community for more than 20 years seemed to derive more energy from non-home prepared foods than women living less years in Nairobi ($P=0.096$). However, with both determinants the groups being different from the rest are very small (n=4 and n=3 respectively).

Source of non-home prepared foods

In the slum area most men and women consuming non-home prepared foods, derived these foods from street foods only (74% of the men and 89% of the women), whereas in the low-middle-income area both street foods and kiosk foods were major sources of non-home prepared foods (Table 5.3). For the small group of women in the slum consuming non-home prepared foods from both street and kiosk foods a larger proportion of their daily energy was provided by these foods than for the women consuming street foods only (Table 5.3, $P<0.05$).

Men and women in the low-middle-income area consuming both street foods and kiosk foods derived a larger proportion of energy from non-home prepared foods than those consuming non-home prepared foods from a single source ($P<0.01$). Differences between single sources were found to be borderline significant only ($P<0.10$).

Table 5.3 Proportion of daily energy intake (%) provided by non-home prepared foods, according to source of food by area (mean ±SE).

Source	Slum area			Low-middle-income area		
	n	%	F	n	%	F
Men			2.54#			19.7**
Street food consumption only	67	25 ±1.9		17	18 ±3.5	
Kiosk food consumption only	7	16 ±1.9		47	26 ±2.6	
Street and kiosk food consumption	17	30 ±2.2		52	40 ±1.9	
Women			3.91*			24.4**
Street food consumption only	90	16 ±1.2		30	14 ±1.3	
Kiosk food consumption only	3	13 ±4.9		29	19 ±2.1	
Street and kiosk food consumption	8	28 ±4.7		38	31 ±2.0	

Differences between the subgroups of sources:
* $P<0.05$; ** $P<0.01$
# $P<0.1$

DISCUSSION

In each of the groups of men and women from a slum and a low-middle-income area of Nairobi in this study we found different determinants of non-home prepared food consumption. In those determinants we discerned a pattern from rather basic determinants to determinants with a more complicated nature with increasing socio-economic level of the

group and the socio-economic level appeared to be related to a shift from street food to kiosk food consumption (Fig 5.2).

The women in the slum area can be considered as having the lowest socio-economic level of the four groups. For them, the presence of school-age children and - for those employed - distance to work were found to be determinants of non-home prepared food consumption. This indicates the importance of the composition of the family for the behaviour of these women. Both the men in the slum area and the women in the low-middle-income area are part of a slightly higher socio-economic level. For these two groups, more economic characteristics were determinants of non-home prepared food consumption, namely employment status and distance to work for the men from the slum area and having an income of their own and (for those employed) employment status for the women from the low-middle-income area. In the group with the highest socio-economic level, the men in the low-middle-income area, the determinant is a more complex one. Not the status of their employment (as most of them fall in the highest category of having a regular job) but their actual socio-economic status as operationalised through the constructed factor 'status of the house' is a determinant of their non-home prepared food consumption.

Generalisation of the results to poor urban populations in other countries or to higher income groups should only be done with great care, because circumstances and behaviours of people may vary greatly in different cultures and with varying income levels, possibly resulting in other determinants.

Principal component analysis (PCA) was used to compose a measure of socio-economic status. Ruel *et al.* (1999) have used PCA to create a socio-economic index score before, based on data on quality of housing and household assets. We think that especially our second factor 'status of the house' can be considered a valid indicator of socio-economic status in our study population, because the individuals in the lowest tertile are mainly from the slum area and in the highest tertile from the low-middle-income area, with an overlap in the second tertile. The overlap in the second tertile also indicates that the difference in socio-economic status between the areas is gradual and not a distinct difference between the slum and low-middle-income areas.

The first indirect factor from the PCA was constructed of expenditures on different food groups. Although it was not specified in the question asked, it seems that respondents have interpreted these questions on all food expenditures as expenditures on raw foods only. Especially in the slum area, the proportion of non-home prepared foods consumed tends to increase with lower 'weekly food expenditures', which may indicate that they spent more on non-home prepared foods.

Although expected (see methods), household size and presence of a person with a primarily domestic role were no determinants of non-home prepared food consumption in this survey, while employment status was a determinant in an opposite direction. The current study focused on the proportion of energy derived from non-home prepared foods, as opposed to frequency of consumption in the other study (*chapter 2*), and included all sources of foods that were not prepared at home, not street foods only. Therefore, determinants can differ between the two studies. Moreover, the opposing relation found in the studies with employment status is clearly the result of the different approaches. In the previous study (*chapter 2*) we found that street foods are consumed more often by individuals with a lower

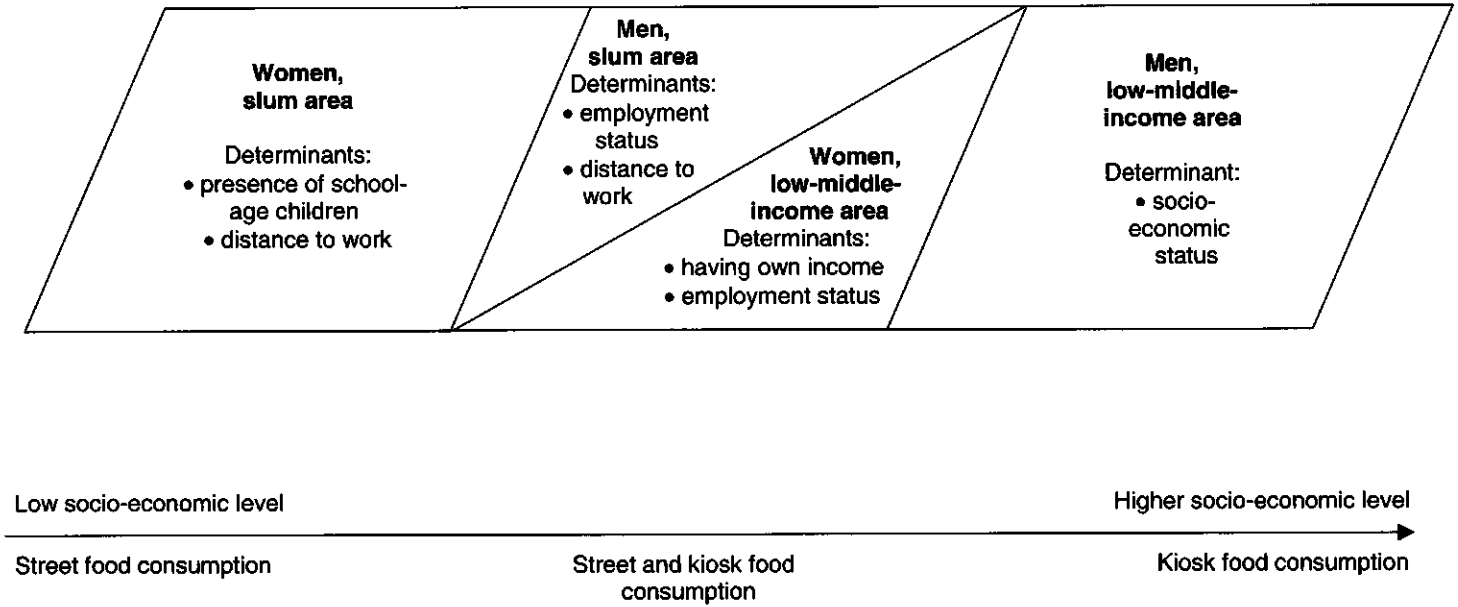


Figure 5.2 Determinants of proportion of daily energy provided by non-home prepared foods for different groups and the relation with socio-economic level and source of non-home prepared foods.

employment status and in the current study we found that the total proportion of non-home prepared food consumed is higher in the individuals with a regular income (or highest employment status). The people with a regular (and often higher) income can choose whether to buy street foods or the slightly more expensive kiosks foods. In addition, they often need to buy non-home prepared foods as the distance to return home for lunch is too far, thus resulting in a higher proportion of non-home prepared food consumption, but often with a low frequency of street food purchase. In the low-middle-income area, this regular income and the distance between home and work also explain the higher proportion of non-home prepared foods consumed by the men in the highest socio-economic tertile.

The low utilisation of kiosk foods by residents of the slum area in this study is most likely an indication of their limited resources, forcing them to use street foods when they want or need other than home-prepared foods.

As mentioned before, Ag Bendech *et al.* (1998) found that poor households consume street foods more frequently. Nasinyama (1992) studied the consumers from the vendor's site, showing diversity among them with regard to age, level of education and occupation, but also finding that more than half of the consumers in their study came from the lower socio-economic group. Both these studies support our finding that a low income is a determinant of street food consumption.

Sujatha *et al.* (1997) studied street food intake in urban workers living in a slum area. Their failure to find a relation with the absence of the woman from the home because of a job of her own is similar to our finding that 'presence of a domestic person' was not a determinant of non-home prepared food consumption. They could also not find a relation between street food consumption and having a job that required moving around (such as vending and rickshaw pulling). Unfortunately, no studies with regard to the consumption of other sources of non-home prepared foods could be found.

In summary, among low-income urban residents, the determinants of non-home prepared food consumption were found to become more complicated with a higher socio-economic level of the group, while also a shift from street food to kiosk food consumption appeared with increasing socio-economic levels. To our knowledge, this is the first study to find a clear pattern that describes part of the complex topic of urban food habits and the growing phenomenon of foods being consumed outside the home.

Our results suggest that banning or removing street foods would negatively affect the energy intake of especially the urban poor, as their access to enough affordable food is impaired. Still the political debate on legalising or banning the street food trade remains. Legalising the street food trade and allotting and facilitating areas where they can be sold could be used to support the urban poor in obtaining enough affordable food, thus improving their food security.

ACKNOWLEDGEMENTS

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6

Are street foods an attractive alternative to home-prepared foods for low-income urban residents? The case of Nairobi

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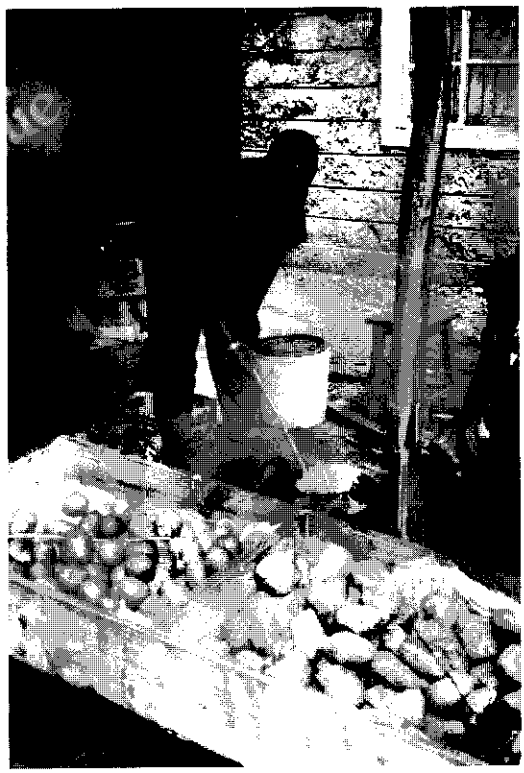

Street food mandazi *and chips seller*

ABSTRACT

The aim of this study is to determine whether street foods are an attractive alternative to home-prepared foods for poor urban dwellers, as is often stated in literature. Three products *mandazi, chapati* and *githeri* were selected in two low-income areas in Nairobi. An amount of 100g as well as energy and nutrients derived from street food *chapati* were cheaper than home-prepared in the very-low-income slum area, but more expensive in the low-middle-income area. Nutrients derived from street food *mandazi* were more expensive than home-prepared ones in both areas. *Githeri* street food and home-prepared versions were found similar in price in the slum area. Taking into account time of preparation, availability, accessibility and convenience in addition to the price, street foods constitute an attractive alternative to home-prepared foods for the urban poor.

INTRODUCTION

Street foods are being sold in many cities in developing countries. Annually, millions of dollars are involved in this trade (Dawson & Canet, 1991; Winarno & Allain, 1991; Bhat & Waghray, 2000). However, most governments mainly consider street foods as a health hazard and a nuisance causing congested streets. Therefore vendors are at risk of being wiped off the streets and their materials confiscated.

Street foods provide advantages to both vendors and consumers. Vendors make a living out of selling street foods, earning several times the national minimum wage (Akinyele, 1987; FAO, 1991; Nasinyama, 1992; Tinker, 1997). The variety of street foods sold is large and many products are stated to have a good nutritional value (Tinker, 1997). The safety of the street food products is not always up to international standards, but can be improved when authorities and vendors work together (Tinker, 1997). Schoolchildren, students, urban workers and whole families have been found to consume street foods (Webb & Hyatt, 1988; Oguntona & Kanye, 1995; Sujatha *et al.*, 1997; Ag Bendech *et al.*, 1998; Oguntona & Tella, 1999; van 't Riet *et al.* 2001). According to FAO (1990), many low-income families would be worse off without the availability of cheap and nutritious street foods.

Although many authors mention that street foods are cheaper than home-prepared foods for urban dwellers (FAO, 1990; 1997; Tinker, 1997; Ruel *et al.*, 1999), actual comparisons of prices are not very well documented. According to Levin *et al.* (1999), a cheaper diet indicates lower cost per calorie. However, from a nutritional point of view, not only energy, but also nutrient content should be taken into account when comparing the value of foods. Therefore, the cost of energy and nutrients derived from street foods and home-prepared foods is the main focus of this paper.

The aim of this paper is to compare the price of the street food and home-prepared versions of the products *mandazi*, *chapati* and *githeri* from two residential areas in Nairobi and to determine whether street foods are an attractive alternative to home-prepared foods for low-income urban residents.

METHODS

Selected products

The products *mandazi*, *chapati* and *githeri* have been selected because they are commonly consumed as a meal or an important (staple) part of a meal in Nairobi and are both cooked at home and easily available as street foods.

Mandazi is a Kenyan kind of doughnut. It is made of deep-fried dough, often in a triangular form. It is very commonly eaten as breakfast or snack. The main ingredients are wheat flour and cooking fat. *Chapati* is Indian flat bread. It is consumed with a stew or curry. It mainly forms a staple food for supper or lunch. Wheat flour and cooking fat are also the main ingredients of *chapati*. *Githeri* is originally one of Kenya's staple foods made of maize and red beans. It can be cooked with maize and beans only, but many variations are also prepared by adding different types of beans, potatoes, vegetables, cooking fat or spices. It is usually consumed for lunch or supper and leftovers are often taken for breakfast.

Data collection

We requested women from two residential areas to prepare the products at home. They were living in Korogocho, a very-low-income slum area, and Dandora, a low-middle-income residential area. *Mandazi* and *chapati* were prepared by three women each in both areas. Three women in Korogocho cooked *githeri*. The women were instructed to prepare the products in their usual way. They wrote down the exact amounts of ingredients they used in household measures, the money spent on ingredients and fuel and the number of portions (*mandazi* and *chapati*) or total volume (*githeri*) prepared. The day after preparation the *mandazi* and *chapati* were collected and weighed in the office.

From three or four vendors per product per area ingredients, amounts and number of portions were asked. From each vendor a portion was bought and weighed in the office and the price of the portion recorded. In Dandora, *githeri* was rarely sold, hence it was not included in that area.

Data treatment

We calculated the average energy and nutrient content of the home-prepared and street food products per 100g product, and the price per 100g and per amount of energy, protein, fat, iron and calcium. The energy and nutrient contents were based on the Kenyan Food Composition Table (Sehmi, 1993). For *githeri* a volume-to-weight conversion factor was determined by measuring volume and weight of a portion bought for that purpose.

The prices of the home-prepared products were calculated with the expenses on ingredients and fuel and the weights of the portions. The prices of the street food products were based on the selling price and the weight of the portions as bought from the vendors. Data are presented for the two areas separately. Student's t-tests were used for all comparisons.

RESULTS

Nutrient content

Street food *mandazi* contained less energy and fat than home-prepared ones in both areas (Table 6.1). In Korogocho the street food version contained more protein than the home-prepared version. The street food *mandazi* from Korogocho contained less protein, iron and calcium than the ones from Dandora. Conversely, they appeared to contain more energy and fat ($P=0.055$ and 0.065 respectively).

In Korogocho the street food *chapati* contained more protein, iron and calcium and (borderline significantly) less energy ($P=0.054$) and fat ($P=0.051$) than home-prepared *chapati*, while there were no differences in Dandora (Table 6.2). There were also no differences in nutrient contents of street food *chapati* between the areas.

Street food *githeri* contained more energy, protein, iron and calcium than home-prepared *githeri* (Table 6.3).

Price comparison

In *githeri*, which was determined in Korogocho, the price of 100g and fat seemed higher in street food than home-prepared, while the prices of energy, protein, iron and calcium seemed lower, but the differences were not found to be significant (Table 6.4).

From street food *mandazi* in Korogocho 100g, energy and fat were more expensive than from home-prepared ones and in Dandora energy, fat, iron and calcium were more expensive from street food *mandazi* (Table 6.5). Energy from street food *mandazi* in Korogocho was cheaper than in Dandora and fat appeared cheaper in Korogocho as well ($P=0.062$).

In street food *chapati* in Korogocho 100g, energy, protein, iron and calcium was cheaper than in home-prepared ones (Table 6.5). In Dandora, on the contrary, the same nutrients were more expensive from street food *chapati*. When comparing the street food *chapati* from the two areas, the ones from Korogocho were cheaper than the ones from Dandora with regard to these same aspects.

Table 6.1 Mean nutrient content per 100g of street food and home-prepared *mandazi* derived from two study areas in Nairobi.

Nutrient	Korogocho[k]		Dandora[d]	
	Street food	*Home-prepared*	*Street food*	*Home-prepared*
Energy (kJ)	1403	1608*	1252	1757*
Protein (g)	5.59	5.01*	6.34[a]	6.29
Fat (g)	16.8	22.2*	11.7	25.9**
Carbohydrate (g)	42.5	43.0	44.2	42.2
Iron (mg)	1.02	0.92	1.15[a]	1.28
Calcium (mg)	20.3	18.4	23.1[a]	41.8

[k] Very-low-income slum area

[d] Low-middle-income area

** $P<0.01$, * $P<0.05$: differences between home-prepared and street food from same area.

[a] $P<0.01$: differences between street foods from the two areas.

Table 6.2 Mean nutrient content per 100g of street food and home-prepared *chapati* derived from two study areas in Nairobi.

Nutrient	Korogocho[k]		Dandora[d]	
	Street food	Home-prepared	Street food	Home-prepared
Energy (kJ)	1136	1569	1335	1271
Protein (g)	6.81	5.79*	6.32	6.64
Fat (g)	7.44	22.2	14.3	12.4
Carbohydrate (g)	46.5	39.5*	43.1	43.3
Iron (mg)	1.24	1.05*	1.15	1.25
Calcium (mg)	24.8	21.1*	23.0	29.4

[k] Very-low-income slum area

[d] Low-middle-income area

* $P<0.05$: differences between home-prepared and street food from same area.

Table 6.3 Mean nutrient content per 100g of street food and home-prepared *githeri* in Korogocho, Nairobi.

Nutrient	Street food	Home-prepared
Energy (kJ)	1430	966**
Protein (g)	15.3	8.61**
Fat (g)	4.60	5.92
Carbohydrate (g)	64.6	37.9**
Iron (mg)	7.59	4.61**
Calcium (mg)	160	85.4**

** $P<0.01$

Table 6.4 Prices (in Kenyan shillings) of street food and home-prepared *githeri* from Korogocho, Nairobi.

Price per	Street food	Home-prepared
100g	4.07	2.79
1000Kj	2.84	2.90
10g protein	2.68	3.24
10g fat	8.83	4.74
10mg iron	5.42	6.06
100mg calcium	2.57	3.30

Table 6.5 Prices (in Kenyan shillings) of street food and home-prepared *mandazi* and *chapati* derived from two study areas in Nairobi.

Product	Price per	Korogocho[k]		Dandora[d]	
		Street food	Home-prepared	Street food	Home-prepared
Mandazi	100g	6.90	5.70**	7.08	5.77
	1000kJ	4.93	3.55***	5.66[c]	3.28***
	10g protein	12.4	11.4	11.2	9.20
	10g fat	4.18	2.57**	6.42	2.22*
	1mg iron	6.82	6.22	6.15	4.53*
	10mg calcium	3.41	3.11	3.08	1.42**
Chapati	100g	2.40	4.76*	7.62[a]	4.00***
	1000kJ	2.12	3.03***	5.82[b]	3.15**
	10g protein	3.53	8.30*	12.2[b]	6.07**
	10g fat	3.35	2.22	6.52	3.35
	1mg iron	1.94	4.56*	6.68[b]	3.21**
	10mg calcium	0.97	2.28*	3.34[b]	1.42**

[k] Very-low-income slum area

[d] Low-middle-income area

*** $P<0.001$, ** $P<0.01$, * $P<0.05$: differences between home-prepared and street food from the same area.

[a] $P<0.001$, [b] $P<0.01$, [c] $P<0.05$: differences between street foods from the two areas.

Discussion

In the slum area of Korogocho *chapati* from street foods was cheaper than home-prepared, both per 100g and for several nutrients. Conversely, street food *mandazi* appeared more expensive and the prices of street food and home-prepared *githeri* did not differ much. In Dandora, the low-middle-income area, the two types of street foods investigated were found to be more expensive than home-prepared foods.

The main reason that the result of the price comparison between home-prepared and street foods differed between the two study areas is that vendors in the slum area sell their foods with extremely low profit margins, as they are dependent on the purchasing power of their customers. In addition, the ingredients in the slum area are more expensive than in the low-middle-income area because they are sold in smaller quantities, making home-prepared foods more expensive.

This study was undertaken in one city and studied the price of three products based on a limited number of producers. It was not possible to collect data in more towns and because of the burden involved it was hard to find women willing to participate. In addition the influence of season on price of ingredients was not taken into account. Because of these limitations, the results of the prices cannot be generalised to all towns, countries and products.

This paper tries to provide more insight in the discussion of the assumption that street foods are cheaper than home-prepared foods, especially because this is often stated without any background information. The only reference found that considered street foods an expensive source of calories was Levin *et al.* (1999).

More factors than just the prices of the foods per se are involved in the value of street foods and home-prepared foods. From the consumer's point of view and in particular the poor one, the price of a product will always be evaluated in relation to the portion size and energy provided. This is in agreement with the way Levin *et al.* (1999) define a cheap diet. However, the decision of the consumer to consume home-prepared or street foods is also influenced by aspects of time, availability, accessibility, convenience and cultural habits.

It is complicated to quantify the time used for food preparation in terms of money. Time will be a lot more valuable to an adult who is responsible for both income generation and caring for children than to a household where these tasks can be divided among two or more adults. As a result of these different perceptions of time, individuals will also attribute different values to saving time through buying street foods instead of preparing food at home or travelling home for lunch.

Many street foods are easily available and accessible in Nairobi, in particular in low-income residential areas, the city centre, industrial and transit areas. However, ingredients and fuel for home-preparation have to be bought in small shops or supermarkets. Mostly, the cheaper supermarkets are located in better-off areas, resulting in long travel distances for the dwellers of low-income areas. The benefit of buying cheaper products in supermarkets may be lost by just going there, as they cannot afford to buy large quantities. Even in industrialised countries such as the United Kingdom reaching large supermarkets selling cheap products poses problems for poor families (Leather, 1997).

Cultural habits also influence the use of street foods. Foods like *mandazi* are more often bought outside the house than prepared at home. Preparation takes a long time and they are widely available in residential areas from street vendors and in kiosks. *Chapati*, however, is a food which is often consumed for special occasions, such as Sundays or when visitors stay for a meal. In such a situation it is appreciated when the woman in the family prepares them herself.

Storage of larger quantities of ingredients at home can also be a problem in the small dwellings. In addition, when poor family members or friends know food is present, they might also visit more frequently to share in what is there.

Concluding remarks

The value of street foods is more than the price of a portion. Especially in very-low-income areas, the price of nutrients as derived from street foods can be cheaper than from home-prepared foods. In addition, the convenience of saving time and having street foods available where and when wanted, for many individual consumers clearly outweighs a little amount of extra money needed for *mandazi*, *chapati* or *githeri*. In other towns and cities the difference in price between home-prepared or street food products may be larger or smaller, but the convenience will remain an important determinant in the decision what to eat by poor urban residents all over the developing world. Hence street foods will always be an attractive and sometimes even inevitable alternative to home-prepared foods for many urban poor.

Street foods are a phenomenon that is there to stay. This leaves the local authorities the obligation to ensure the safety of the products by legalizing the trade and enforcing the necessary hygienic and quality regulations. However, it also gives them the opportunity to use these foods in improving the food and nutrition security of the poor urban residents. Nutritionists should co-operate with vendors in trying to enhance the nutritional value without making the products too expensive for poor consumers.

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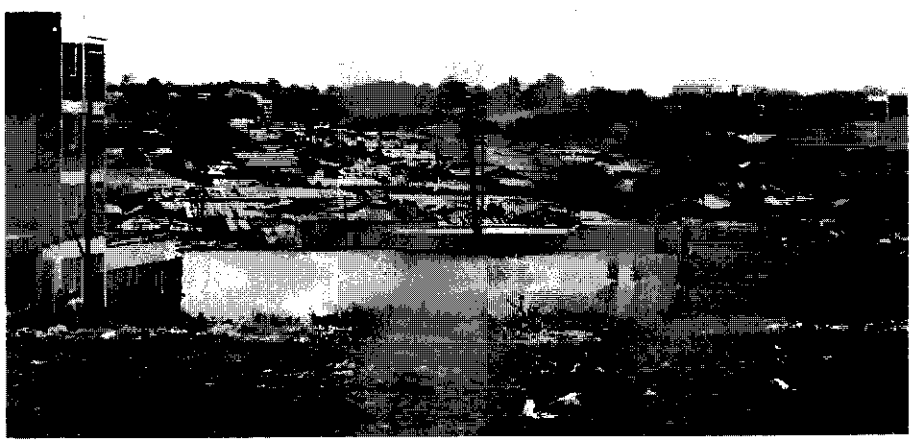
7

Discussion



Overview over the slum area of Korogocho

This thesis demonstrates that non-home prepared food consumption is a common phenomenon in the dietary pattern of low-income urban residents in Nairobi. These non-home prepared foods provided a substantial part of daily energy and nutrient intake of men, women and children in both a slum and a low-middle-income area. The major source of non-home prepared foods were street foods for the consumers in the lowest socio-economic level, with a shift towards kiosk foods with increasing socio-economic level of the consumers.

In the first part of this chapter the main findings are put into a broader perspective with respect to the objectives formulated in *chapter 1*. Next, limitations and advantages of the methods used in the surveys are discussed. Subsequently, as this thesis is part of a project resulting in two theses, a summary of the complementary findings of Alice Mwangi (2002) is presented. This chapter ends with a consideration of policy implications and concluding remarks.

MAIN FINDINGS

Street food consumption: who, how often and why?

FAO (1990, 1997) stated that especially low-income sectors of the population depend heavily on street foods. However, this statement is mainly deduced from studies where the consumers had been selected at the vending site and many consumers were found to belong to lower socio-economic strata (e.g. Akinyele, 1987; FAO, 1991; Nasinyama, 1992). In order to establish the relevance of street foods for the low-income sectors of the population, we selected the households for our studies in two low-income residential areas. In *chapter 2*, the frequency of street food consumption was compared between the residents of the slum and the low-income area and between households with varying characteristics. Our finding that the majority of our study population as a whole do consume street foods regularly support the assumption of FAO that street foods are of importance to the urban poor.

The main reasons for people to consume street foods were that they were cheap, ready available where needed and time-saving, while the main reason not to consume street foods was that they were dirty, not hygienically prepared or stored (*chapter 2*). This is in correspondence with the findings and concerns stated by many others (FAO, 1991, Nasinyama, 1992; FAO, 1997; Tinker, 1997). Obviously, street foods are popular among consumers, but there is need to ensure the safety of street foods and awareness of consumers in this respect.

In short, low-income residents of Nairobi consume street foods several days per week, because they are cheap and convenient.

Nutritional contribution of non-home prepared foods

With increasing urban poverty, food insecurity is a growing concern in urban areas (Braun *et al.*, 1993). Although enough food is available to feed all urban residents, access to this food poses a problem for many of the urban poor (Braun *et al.*, 1993; Hartog *et al.*, 1995). Street foods are available in the places where they are needed and often sold with low profit margins for the vendors, thus making a cheap source of food for the urban poor (FAO,

1997). Besides street foods, non-home prepared foods from other sources were also consumed regularly by the residents of the two low-income areas (*chapter 2*). Especially in view of the high cost of travelling from work to home, high prices of cooking fuel and relatively expensive ingredients for cooking when small amounts are bought at a time, non-home prepared foods can improve the accessibility of a large variety of foods for the urban poor (Tinker, 1997; Maxwell, 1999).

Non-home prepared foods were found to contribute substantially to total daily energy and nutrient intake in men, women, 9–14 and 5–7 year-old children from a slum and low-middle-income area in Nairobi (*chapters 3 and 4*). Contribution to energy intake ranged from 13% in 9–14 year-old children in the slum area to 36% in men from the low-middle-income area. Furthermore, total energy and nutrient intakes were below recommended daily intakes in most groups. However, the adequacy of energy and nutrient intake did not differ between consumers and non-consumers. Thus the consumption of non-home prepared foods did not appear to lead to a higher nutritional quality of the diet, but it did not have a negative impact either (*chapter 4*). Non-home prepared foods constitute an important component of the daily diet of the consumers often replacing a whole breakfast or lunch, not just a minor snack during the day.

Non-home prepared foods contributed relatively high proportions of fat to daily intakes (*chapters 3 and 4*). As total energy intakes were inadequate in most groups, this high fat density is a welcome contribution to daily energy intake. However, for urban residents with adequate energy intakes the consumption of high fat non-home prepared foods may not be so beneficial. Fat-rich diets have since long been associated with high-income populations. However, analyses by Drenowski & Popkin (1997) point out that the recent availability of cheap vegetable oils has made high-fat diets accessible even to low-income populations. The increasing intake of fats, in combination with increasing intakes of refined sugar and diminishing intakes of dietary fibre and reducing physical activity in urban populations increase their risk of obesity, coronary heart disease and diabetes.

Street foods were the major source of non-home prepared foods for men, women and children in the slum area. In the low-middle-income area, both kiosk foods and street foods were important sources: kiosk foods for the men, with a lower contribution of street foods, both sources for women and mainly street foods for children (*chapter 4*). In conclusion, both street foods and kiosk foods provide a substantial contribution to energy and nutrient intakes, thus constituting important components of the phenomenon of purchasing ready-to-eat foods by low-income urban populations. Although, the poorest among them appear to prefer or be limited to the cheaper, informal street foods.

Determinants of non-home prepared food consumption

Earlier studies showed that customers of street foods come from all socio-economic strata of the population (Akinyele, 1987; Nasinyama, 1992; Tinker, 1997). We found a relation of the socio-economic level of the consumers with both the determinants of non-home prepared food consumption and the source of the non-home prepared foods (*chapter 5*).

Women in the slum area are considered to be the lowest socio-economic level among the study subjects, because their income is often lower than that of men or they depend on their husband's income. These women consumed more non-home prepared foods when

school-aged children were not part of the family and with less distance to work. Street foods are the main source of non-home prepared foods for them. Men in the slum area consumed higher proportions of non-home prepared foods with better employment status and longer distance from home to work. For these men, street foods were the major source of non-home prepared foods, while kiosk foods provided only a minor proportion. Women in the low-middle-income area consumed larger proportions of non-home prepared foods when they had an income of their own and, among those, with a better employment status. To these women, kiosk foods and street foods appeared of equal importance. The men from the low-middle-income area are considered to be the highest socio-economic level among the study subjects. Their proportion of non-home prepared food consumption increased with increasing socio-economic status. Kiosk foods were the major source of non-home prepared foods for these men, while street foods only played a minor role in their food intake.

These findings show that non-home prepared food consumption itself is very common in the low-income population of Nairobi, but that the amount consumed is associated with the, mainly employment related, characteristics of the consumers. Moreover, even within the low-income population of the city, a gradual change in the sources of the non-home prepared foods used was observed.

Street foods have already become a common feature of urban life. With increasing poverty and time constraints to survive in cities in developing countries the street food phenomenon will only increase. However, even when economic growth will be established and the number of poor will decrease, the vendors will adjust their products to the wishes and possibilities of their customers. Although street foods are an important source of food for the urban poor and they would certainly be worse off without this cheap source of food, we expect that, with increasing prosperity in cities, the trade will adjust and grow with their customers, and cannot be expected to disappear. In fact, in cities in several countries, such as Bogor, Indonesia and Chonburi, Thailand, the street food trade has been regulated and their customers come from all socio-economic strata of the cities, both the poor and the affluent (Tinker, 1997).

The question remains whether street foods will always remain street foods, when circumstances of vendors and consumers improve. When street foods are regulated, the vendors may be relocated from the street to covered market places or shopping malls, and with increasing investments in their own business the trade could easily turn into many small fast food restaurants instead of actual vendors of foods on the streets. However, regardless of the direction in which the trade will develop, the concept of cheap and varied ready-to-eat foods will always be an attractive way of procuring food for urban residents, as the time available for cooking food at home competes with the pressure of the multiple responsibilities and time constraints in urban life.

Price of street foods and home-prepared foods

Street foods are considered to be cheaper than home-prepared foods (FAO, 1990; Braun *et al.*, 1993; FAO, 1997). Therefore, we compared the price of street foods and home-prepared foods in the two low-income areas of Nairobi (determined as the actual cost per calorie, based on ingredients and fuel). Contrary to our expectation we found that most street food products were more expensive than the home-prepared ones (*chapter 6*), thus making street

foods an expensive source of calories (Levin *et al.*, 1999). Only *chapati* in the slum area was cheaper from street foods than home-prepared. However, when the time involved in cooking, shopping and travelling is included in the price, street foods are a very attractive alternative to foods prepared at home (Winarno & Allain, 1991; Tinker, 1997; Ruel *et al.*, 1999; *chapter 6*).

The limited purchasing power of the urban poor make that street foods are a convenient way of acquiring food during the day. When they are away from home or having a meal on their own, cooking food themselves is impossible or at least inconvenient, and especially in areas where the street foods are readily available and a variety of products is being sold at reasonable prices the choice is easy.

METHODOLOGICAL CONSIDERATIONS

Study areas and subjects

The purpose of this study was to determine the relevance of non-home prepared food consumption for low-income urban residents. Therefore, two low-income residential areas of Nairobi were selected. Carrying out research in these surroundings posed several challenges that had to be met.

Both study areas harbour mainly low-income residents. Alcoholism and crime are common features, because many people are unemployed or earn extremely low incomes that may not suffice to support their families. For non-residents it is therefore dangerous to walk around alone, because outsiders are always recognised as such and interesting people to rob. For that reason, the interviewers were recruited from the research areas, giving the additional advantage that they knew their way around. Furthermore, an assistant always accompanied the interviewers to improve their safety and to assist with the interviews.

Most residents of both areas were willing to participate immediately. However, especially in the low-middle-income area, several people were also very suspicious about any visitor, making them asking many questions from the interviewers before participating in the interview. All interviewers were provided with badges stating their own name and a telephone number where enquiries could be made and they all carried a copy of the research permit to enable them to show to respondents that they were employed in an authorised research project.

For both safety and goodwill with the residents, we worked from offices in the field situated at well-known organisations. One was Provide International, a small clinic in the slum area Korogocho, and the other was Gospel Tabernacle Church in the low-middle-income area Dandora. Besides providing us with office space, both these organisations also assisted us in recruiting interviewers and assistants to administer the interviews.

In the study areas the roads were not paved, resulting in very muddy paths in the rainy season. Certainly after several days of rain, the interviewers had a hard time of reaching all the houses of the respondents, reducing the number of interviews undertaken per day.

Selection of subjects at household level

For this study, all respondents were selected at their home. We selected a cluster of streets within each study area. All available households in those streets were then interviewed (=

present and willing to participate). For subsequent surveys random samples from this first group of households were taken and of each selected household the appropriate members for the survey were included.

Most studies on consumption of street foods selected their respondents at the vending site (Akinyele, 1987; FAO, 1991; Nasinyama, 1992) or specific gathering places. This provides an advantage when it is the intention to study a certain group of consumers, such as schoolchildren or urban workers (Webb & Hyatt, 1988; Oguntona & Kanye, 1995; Sujatha *et al.*, 1997; Oguntona & Tella, 1999). However, customers visiting vending sites often have a higher chance of being selected than customers buying street foods less frequently, thus leading to a bias in the study population.

Because we wanted to study the relevance of street food consumption for the general population living in the two study areas we decided that selecting them at their homes would result in the most representative sample. Previously, only Ag Bendech *et al.* (1998) selected their respondents at the household level. An additional advantage of selecting respondents at the household level was that this way we also obtained information about the people not consuming street foods at all or only small amounts and it gave us the opportunity to include other sources of non-home prepared foods as well.

Individual food intake vs. household food intake

In our study we selected households, but assessed individual food intake from the household members. We did not assess food consumption at the household level, because those methods do not include non-home prepared foods and food available to the household is recalculated to *per capita* or adult equivalent food consumption, without knowing the actual intra-household allocation of the foods (Cameron & Staveren, 1988; Gibson, 1990).

Some studies measured consumption of food intake at home and non-home prepared foods over different lengths of period or food intake at home at the household level and street foods individually (Streetfood Project, 1992; Ag Bendech *et al.*, 1998; Oguntona & Tella, 1999). Other studies measured street food intake only or analysed the foods themselves, providing only the contribution to recommended daily intakes and not to actual intake (Webb & Hyatt, 1988; Korir *et al.*, 1998). This makes it hard to conclude on the real contribution of non-home prepared foods to the total diet consumed.

In order to avoid the pitfalls of household food availability and different periods for home-prepared and non-home prepared, and to obtain a most precise estimation of the contribution of non-home prepared foods to the actual daily diet, we decided to assess the food intake individually. We also made sure that we interviewed the individuals themselves (with help of the person cooking the food for all ingredients), because someone else does not usually know what one eats while in a different place.

Recipes of non-home prepared meals and food composition table

Nutrient intakes of individuals are based on the recipes of the meals consumed. For the home-prepared meals, all ingredients were asked from the person who cooked the food. However, to calculate the nutrient intake from non-home prepared foods for each individual we collected five or six recipes for each type of meal in the research areas and used the

average to calculate nutrient intakes.

The most accurate method to calculate each individuals non-home prepared food intake we should have visited the specific food seller, be it a street food vendor or a kiosk owner, and ask for the ingredients used for the meal reported by the respondent, as has been done in another study (Ag Bendech et al., 1998). However, this was impossible practically and logistically, as the vendors were located all over Nairobi. Within the research areas, the ingredients used did not vary widely. Thus, the major differences between the average figures used and actual recipes will have occurred for meals consumed outside the research areas (for example by men having lunch near their place of work in another part of Nairobi). There the type and amount of ingredients used may differ more from the averages we used.

To calculate the nutrients provided by the foods consumed (both home-prepared and non-home prepared) we used the Kenyan food composition table for most of the products (Sehmi, 1993). This table is based on laboratory analyses of foods sold in Kenya and where possible we even used the figures for Nairobi. Therefore, this was the most accurate estimation of the nutrient composition that could be used in this research.

Quality of ingredients in non-home prepared foods

For street foods to be safe and nutritious, it would be ideal if the vendors used high quality, fresh ingredients for their products providing the highest amounts of good quality nutrients. However, as street foods are sold at low prices, the ingredients also have to be cheap.

Because vendors buy the raw materials used to prepare street foods in larger quantities than the average consumers purchases for home use and often travels to the cheapest markets to do so, the cost of single servings are in fact competitive to the cost of home cooking. However, the vendors may purchase low quality ingredients in order to keep their prices low or to increase their profits (FAO, 1990). For instance, cheap ingredients may be discarded by hotel owners because they have already been stored for long times or ingredients may be contaminated with chemicals (e.g. pesticides) and therefore offered for sale at very cheap prices.

An example from Kenya is an amount of maize that was considered unfit for human consumption by the local authorities and was subsequently thrown at a dumpsite near Nairobi. Although officially not fit for human consumption, it was still food and therefore many of the urban poor went to the dumping site to get as much free maize as possible. Although not proven, this maize is likely to have served as a cheap source of maize for several street food vendors.

Another way of keeping ingredients cheap is using them as long as possible, for example, fat for deep-frying may be replaced after very extensive use only, which may lead to toxic substances in the fat. Furthermore, prohibited colouring and preservatives might be used, to make products look more fresh (FAO, 1990; Tinker, 1997; Bhat & Waghray, 2000a).

Thus, besides the well-documented microbiological hazards of the street food trade, the quality of the ingredients used for cooking also need the close attention of food inspectors to prevent disease outbreaks among consumers.

Extrapolation of results

Street foods and other non-home prepared foods provided a significant contribution to the diet of the residents of a slum and a low-middle-income area in Nairobi. The same kind of street foods are available in many other lower income areas of Nairobi, and our study population was mixed in ethnic background, religion, age-groups, occupations, and other characteristics, therefore, our findings can be generalised to all residents of low-income areas of Nairobi.

Our conclusions certainly apply to Nairobi, and probably similar findings would be found in other cities of Kenya. The implications of the findings of this study can also be extrapolated to the poor urban residents of cities in other developing countries.

Although the contribution of street foods and other non-home prepared foods to daily energy and nutrient intakes would not be exactly the same, they are expected to provide a significant part of daily intakes as the consumption of non-home prepared foods is common in all cities and large varieties of street foods are available in many cities in the developing world (Tinker, 1997; Bhat & Waghray, 2000a, 2000b, 2000c).

As mentioned in chapter 1, this thesis is part of a research project aimed at providing a comprehensive insight into the street food phenomenon. This thesis focused on the consumption of street foods. Another important issue is the meaning of street foods for the vendors. This is the focus of the complementary thesis by Alice Mwangi of which a summary is presented here.

SUMMARY OF THE MAIN FINDINGS OF THE COMPLEMENTARY THESIS BY ALICE MWANGI (2002)

Street food vending is a strategy utilised by many poor urbanites to employ themselves and earn an income, which has become necessary because of declining economic growth and increasing urban poverty. The aim of the study was to assess the scope of the street food phenomenon in Nairobi, the nutritional quality of the street foods sold and the socio-economic importance of the street foods for the vending households.

There is an inverse relation between the density of street food vending activities and the income level of city areas. This implies that the main users of street foods are the urban poor. Contrary to the belief that the use of street foods is related to the convenience of saving time by busy urban dwellers, the underlying drive is the affordability of street foods, given the financial means and income flow of the consumers, mainly the urban poor.

Presentation of foods by vendors in terms of food group variety depends on the city location, which reflects the demands of consumers. Female vendors provide more variety but this is offered only where consumers are able to afford. Hence, the socio-economic status of the street food consumers dictates what is offered. More food group diversity is found among vendors in the working area (Industrial Area) while less variety is found among individual vendors in the slums and the low-middle-income area. Nutrient quality of street foods also appeared to be better in the Industrial Area than in the slums and the low-middle-income residential area. In spite of this, many street food vendors are sellers of one food group. In addition, the ability of the foods served to provide adequate energy and

micronutrients, particularly vitamin A, is limited.

It is not the lack of hygiene knowledge that hinders vendors from applying safe food practices but probably the lack of an enabling environment, low economic power of vendors and buyers, and consumer attitude towards food hygiene. Although vendors had well established knowledge on general issues of basic hygiene, their level of knowledge (and also level of education) did not necessarily influence their practices of food hygiene. The issue that emerges is the question of transforming knowledge into practice.

Street food vending provides substantial income, with more than one-third of the vendors earning at least twice the official minimum wage. For about half of the vending households, street foods are their major income provider. High reliance on street foods as a major income provider is associated with vending households in the poorer districts of the city. Apart from the role of providing reliable income, the majority (97%) of vending households also feed from the street food pot. Street foods provide substantial energy for vending household members, averaging 16% of RDI for households vending snack and/or breakfast foods and 32% of RDI for those vending lunch meals. It also avoids wastage from left-over food where refrigeration is not available.

From the two theses, we conclude that street food vending in Nairobi is a strategy driven by both demand for cheap and convenient food and supply due to income diversification and economic stress. The low-income urban dwellers appear to be major players in the street food phenomenon. Street food vending is an important source of livelihood for vending households in terms of income and food and at the same time a substantial source of energy and nutrients for residents of low-income urban areas.

The street food trade is not a recognised, but at best a merely tolerated activity in Kenya and several other developing countries. The relevance of street foods for low-income urban residents as both vendors and consumers as revealed in the two theses illustrates that the street food trade deserves the attention of urban authorities and policy makers.

POLICY IMPLICATIONS[1]

The number of people living in urban areas of the developing world are expected to increase rapidly and particularly in the less developed regions (United Nations, 2001). There is a projected significant increase in poverty, food insecurity and undernutrition in the urban areas unless these aspects are reduced in direct proportion to the growth in urban population (Haddad *et al.*, 1999; Pinstrup-Andersen, 2000). In Nairobi, absolute poverty already more than doubled in only three years, between 1994 (22%) and 1997 (50%) (GoK, 2001).

With urbanisation, people loose the ability to produce their own food and rely heavily on food purchases (Ruel *et al.*, 1999). In addition, there is a general trend everywhere in cities in the world that people are taking more of non-home prepared foods, due to the urban way of life (Ruel *et al.*, 1999; Solomons and Gross, 1995). With increasing urbanisation, consumption of non-home prepared foods will also increase. However, increasing urban

[1] This section of the thesis has been written jointly with Alice Mwangi and also appears in her thesis (Mwangi, 2002).

poverty means that there will be need for cheap and nutritious food outlets in the urban areas. Hence, the use of street foods in terms of intake and importance will probably increase with further urbanisation of Nairobi.

The problem is that many governments in Sub-Saharan Africa persist in thinking about urban food insecurity primarily in terms of aggregate food supply to the cities, rather than the ability of poor households in urban areas to purchase food (Maxwell, 1999). In addition, most programme and policy analyses rely on simple urban-rural comparisons which mask enormous differences between socio-economic groups in urban areas (Menon *et al.*, 2000). The current trends of increasing urban poverty and inequality in developing countries suggest that household and individual empowerment of the urban poor are fundamental to their access to food. For the urban poor formal social nets such as government price subsidies are less evident and coping strategies have tended to be individualistic and household-based (Atkinson, 1994; Maxwell, 1999). Their access to local political processes remains in question. Frequently, municipal governments negatively impact on the poor by destroying employment opportunities through harassment of the informal sector and non-provision of infrastructure. Street food vending is one such informal activity that faces banning and lacks official recognition in developing countries such as Kenya. The authorities in most cases fail to see the positive aspects of these activities.

The results presented here and those by Mwangi (2002) show that street foods are important in providing employment and food for the urban poor. Banning of street food vending in Nairobi will therefore destroy jobs and rob the poor of a means of livelihood and a cheap source of food. Authorities need to be convinced of the potential of street foods for food and nutrition of the low-income urban consumers and of the role of street foods as a source of livelihood for vendors. The lack of recognition of the street foods sector leaves its operators in a state of uncertainty. Absence of some mode of control and monitoring exposes street food consumers to health risks. The challenge to food policy is to provide an empirically sound basis for policy and programme formulation in urban areas, particularly as it relates to low-income people's ability to acquire food, health care, and other basic necessities.

Hence, there is need to recognise and legalise eating out places for the urban poor, such as street foods sites, without imposing tedious requirements that are not achievable by the poor. The goal should be to ensure that the food is safe, nutritious and affordable to consumers and profitable to vendors. This can be achieved when all parties, being the vendors, the consumers and the city authorities, are involved in the process. Non-governmental organisations and academic institutions could also be included to facilitate development and implementation of the necessary policies and programmes.

Efforts need to be directed into putting in place education programmes for street food vendors and consumers on the importance of safe and nutritious food. The programmes should aim at making vendors sensitive to food safety measures and the consumers should also be made responsible for the safety of the food they eat and to make demands for safe foods. Apart from education programmes, policies and programmes that would lead to the improvement of the micronutrient quality of street foods need to be considered. Thus, the potential role of street foods in nutritional intake and the scope for increasing nutritional contribution needs to be explored and incorporated in the programmes.

City planning and infrastructure needs to cater for street food vending locations especially in low-income areas. Providing vending locations will prevent the obstruction of traffic by vendors. Such locations should be supplied with sanitation facilities such as running water, toilets and garbage disposal facilities. Such amenities are essential for vendors to comply with the necessary hygiene regulations. Vendors should be guided on how to invest in safe food practices at minimum cost. This will involve development of cheap and appropriate technologies that vendors can afford.

Implementation of any policies and programmes should incorporate evaluation and monitoring of their effects on prices of street foods as well as on the socio-economic and nutritional benefits for consumers and vendors.

Finally, one might argue that street foods are only associated with poverty and that they will become less important or disappear when poverty decreases. However, we think that with improved economic status, vendors are bound to develop the street foods business into more than just serving the poor with affordable food. In the Philippines where street food vending has been recognised for instance, vending and consumption of street foods cuts through the cross-section of socio-economic profile of the population ranging from the more affluent sector at one end of the spectrum to the disadvantaged at the other end (Azanza, 2000). Therefore, vendors are bound to adapt the sector to the prevailing clientele. Hence, policy measures in terms of legalising the sector and pursuing better street food quality remain necessary.

STREET FOODS AND HIV/AIDS

During our studies in the low-income areas of Nairobi, we were confronted with some serious public health problems, such as the high prevalence of tuberculosis and HIV/AIDS. Although no data on this issue were collected for this study, HIV/AIDS is a growing problem in many Sub-Saharan African countries, including Kenya. It is estimated that over 28 million people in Sub-Saharan Africa are currently infected with HIV (UNAIDS/WHO, 2001). In Kenya, 2.1 million people were living with HIV by the end of 1999 and over 15% of the pregnant women in Nairobi is infected (UNAIDS/WHO, 2000).

Many HIV/AIDS infected individuals are the income earners of their families. When they fall ill, other members of the family will need to replace the lost income, while at the same time having to take care of the patient him/herself. In addition, a lot of money is needed for medication and, eventually, funeral cost. Often this leads to increasing poverty and food insecurity of the families involved, while for the infected individuals consumption of enough food of good nutritional value is essential to remain in good health for as long as possible.

What role can street foods have in alleviating the suffering of the individuals and families affected by this disease? Using street foods for consumption would save time that can instead be used for earning money or taking care of the patient. As street foods are not very expensive, this could easily turn out to be beneficial to the family budget. Furthermore, affected families could be assisted in starting their own street food business, providing them with an income directly.

Another alternative is that NGOs supporting families affected by HIV/AIDS, could contract street food vendors from the community and buy their foods so these are cooked

especially for families that have been affected by HIV/AIDS, ensuring the vendors of an income and the families of food. Naturally these foods will have to be prepared hygienically and be of good nutritional value, as sick people and especially HIV/AIDS patients are very susceptible to infections and need nutritious food to prevent fast deterioration of their health status. This support could also be used in both directions: giving a family affected by HIV/AIDS the opportunity to provide food for several families, thus earning an income and having food at the same time.

CONCLUDING REMARKS

The street food trade involves large amounts of money (Dawson & Canet, 1991; Winarno & Allain, 1991), provides income to vendors (FAO, 1990, 1997; Tinker, 1997; Mwangi, 2002). This thesis illustrates that non-home prepared foods provide a substantial part of the daily diet of low-income urban residents and that street foods contribute specifically to the food security of the lowest income consumers.

In view of the growing number of urban residents and the increasing number of poor among them and the role street foods have in providing food and income to the urban poor, street foods deserve recognition by local and national authorities and the attention of urban policy makers, to improve the vending circumstances and benefits for the consumers.

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Summary

Street food seller of roasted maize

The absolute numbers of the poor are growing worldwide and an increasing proportion of the poor is living in urban areas. In many Sub-Saharan countries the economic growth does not keep up with the population growth. Combined with high rates of inflation this results in diminished employment opportunities and increased cost of living, causing increasing poverty. In urban areas, people depend on purchasing most of their food, but because of low purchasing power, the food security of the urban poor is seriously impaired.

Time constraints in the urban context increase the demand for foods that do not need a long preparation time, resulting in increasing purchases of ready-to-eat foods. For the urban poor, especially ready-to-eat foods sold on the streets are considered to be an important source of fast and inexpensive food. In addition, the vending of street foods provides many urban residents with employment and income. However, in many developing countries, including Kenya, street food vending lacks official recognition and even faces banning because authorities consider street food vending to pose a health hazard to the urban population and to be a nuisance in urban life by blocking roads, while they fail to see any positive aspects of the street food trade for vendors or consumers.

Despite the fact that street food vending is not recognised in many developing countries, it is generally thought that many poor families would be worse off without the availability of those street foods. However, little is known to which extent street foods actually contribute to the nutritional well-being of poor urban residents and it is not known which and how much other non-home prepared foods contribute to the diet.

Therefore, this study aimed to determine the relevance of street food and other non-home prepared food consumption as part of the total dietary pattern and their contribution to nutritional intake of residents of low-income urban areas. In a complementary thesis Alice Mwangi focused on vendors and their street foods. For this thesis, street foods are defined as "ready-to-eat foods and beverages, processed or fresh, which are sold on the streets as opposed to stores and licensed establishments, and which are sold at a stationary location or by mobile vendors". Non-home prepared foods are defined as "ready-to-eat foods and beverages, processed or fresh, which are acquired outside the consumer's own place of living".

To describe how often, by whom and why street foods are consumed in two low-income areas, a cross-sectional survey was carried out in a slum and low-middle-income residential area of Nairobi (*chapter 2*). The frequency of street food consumption of the members of 1011 households was recorded using a structured questionnaire and in-depth interviews were done with a subsample of 73 households. Sixty-five percent of all households consumed street foods at least once a week. The average frequency of street food consumption was 3.6 days/week in the slum area, which was higher than the 2.0 days/week in the low-middle-income area ($P<0.001$). The frequency of street food consumption was related to the employment status of the head of the household ($P<0.001$): the average frequency of street food consumption was 3.7 days/week when the head was irregularly or unemployed, 2.9 days/week when self-employed and 2.1 days/week when the head was regularly employed. Furthermore, in households where an adult woman with a primarily domestic role was present, the frequency of street food consumption was less than when non was present (2.55 *vs* 2.95 days/week, $P<0.05$). The main reasons that respondents gave for buying street foods was that they were cheap, convenient and saved

time. For others, the main reason not to buy street food was that they were dirty, not hygienically prepared or stored. In short, street food consumption is a regular component in the diet of the urban poor, because they are cheap and convenient.

But are street foods really cheap? Although many authors have stated that street foods are a cheap source of food, hardly any evidence can be found. Therefore, we compared the price of three food products when prepared at home or bought from the street food vendor (*chapter 6*). For each product information on ingredients and price was collected from vendors and several women were asked to prepare the product at home and record all ingredients used, with their prices. In the slum area, *chapati*, an Indian flat bread, was cheaper from street food vendors than home-prepared, both per 100g and for several nutrients (e.g. protein and iron). The price of *githeri*, a meal of mainly maize and beans, was similar when bought in the street or home-prepared. *Mandazi*, a Kenyan kind of doughnut, was more expensive from the street than when home-prepared in the slum area. In the low-middle-income area, both *chapati* and *mandazi* were more expensive from street food than home-prepared. However, these comparisons only took the actual money spent on the foods into account. In fact, the convenience of saving time and having street foods available where and when wanted, clearly outweighs the little amount of extra money needed to buy *chapati*, *githeri* and *mandazi* for many consumers, making street foods an attractive alternative to home-prepared foods for many low-income residents of Nairobi.

Thus, street foods are part of the diet of the majority of the poor residents of Nairobi, but what is their actual contribution to daily food intake? Two additional surveys were carried out to assess total food intake and to estimate the proportion of daily intake derived from street foods and other sources of ready-to-eat foods.

In *chapter 3* the contribution of street foods to the diet of 5–7 year-old children from the slum area was assessed and the hypothesis tested that children attending school consume more of their daily intake from street foods than children who do not attend school. Children were selected at the household level and recruited specifically for this survey. Two 24-hour recalls were done with 114 children and their caretakers. Of these children 37 were 5 years old and still too young to attend school. The other 77 children were 6 or 7 years old, of whom 40 attended primary school and 37 did not. Average daily energy intake was inadequate (below recommended daily intake) in all three groups, but higher in the school-going than in the pre-school and non-school-going groups. Seventy-eight percent of all children consumed street foods. Among those consumers, 21% of total daily energy intake was provided by street foods. The proportion of daily fat (35%) and protein (24%) provided by street foods was higher than the proportion of energy, while the proportion of vitamin A (13%) and iron (17%) contributed by street foods was lower than that of energy. The proportions of energy and nutrients provided by street foods did not differ between the school-going and non-school-going group.

In *chapter 4* the contribution of non-home prepared foods to the diet of men, women and 9–14 year old children from the slum and the low-middle-income area was assessed. Households were randomly selected from the 1011 household from the first survey. Three 24-hour recalls were carried out with each individual. Eighty-four percent of all individuals consumed non-home prepared foods. Among consumers, men derived a larger proportion of their daily energy and nutrient intakes from non-home prepared foods than women and

children did and the consumers from the low-middle-income area derived larger proportions of their intakes from non-home prepared foods than the ones from the slum area ($P<0.001$). The contribution of non-home prepared foods to energy intake ranged from 13% for the children in the slum to 36% for the men in the low-middle-income area. As in 5–7 year-old children (*chapter 3*), non-home prepared foods provided relatively high proportions of fat and protein and low proportions of micronutrients. The level of energy and nutrient intake was higher in the low-middle-income than in the slum area ($P<0.001$), but average total energy intake was below recommended daily intakes in all groups. Adequacy of energy and nutrient intakes was similar in consumers and non-consumers from the same area. Street foods were the major source of non-home prepared foods for men, women and children in the slum area. Kiosk foods were the main source of non-home prepared foods for the men in the low-middle-income area, while street and kiosk foods were equally important sources for the women and street foods were the main source for the children from the low-middle-income area.

In *chapter 5* determinants of non-home prepared food consumption by men and women were identified by examining the relation between characteristics of respondents and the proportion of energy derived from non-home prepared foods. Because we had found that non-home prepared food consumption differed between respondents from the slum and low-middle-income areas and between men and women (*chapter 4*), analyses were performed within the four groups of men and women from the two areas. In the determinants we discerned a pattern from rather basic determinants to determinants with a more complicated nature with increasing socio-economic level of the group. The socio-economic level also appeared to be related to a shift from street food to kiosk food consumption: Women in the slum area are considered to be the lowest socio-economic level among the study subjects, because their income is often lower than that of men or they depend on their husband's income. These women consumed more non-home prepared foods when school-aged children were not part of the family and with less distance to work. Street foods are the main source of non-home prepared foods for them. Men in the slum area consumed higher proportions of non-home prepared foods with better employment status and longer distance from home to work. For these men, street foods were the major source of non-home prepared foods, while kiosk foods provided only a minor proportion. Women in the low-middle-income area consumed larger proportions of non-home prepared foods when they had an income of their own and, among those, with a better employment status. To these women, kiosk foods and street foods appeared of equal importance. The men from the low-middle-income area are considered to be the highest socio-economic level among the study subjects. Their proportion of non-home prepared food consumption increased with increasing socio-economic status. Kiosk foods were the major source of non-home prepared foods for these men, while street foods only played a minor role in their food intake.

The findings of *chapters 3 and 4* reveal that non-home prepared foods provide a substantial part of daily food consumption of various household members living in low-income areas in Nairobi. Street foods are the major source for residents of the slum area, while both kiosk foods and street foods are important sources for residents of the low-middle-income area. Also considering the importance of the socio-economic levels within the areas as demonstrated in *chapter 5*, it is concluded that non-home prepared foods are an

important source of food for all low-income residents and that especially street foods are the most important source for the poorest among them. In her complementary study, Alice Mwangi demonstrated that street food vending is an important source of livelihood for vending households in terms of income and food.

In view of the growing number of urban residents, the increasing number of poor among them and the role street foods have in providing food and income to the urban poor, the street food trade deserves recognition by local and national authorities and the attention of urban policy makers, to improve the opportunities of vendors to ensure their livelihood and to ensure the availability of cheap, safe and nutritious food for low-income consumers.

Samenvatting

Main entrance to Kabete Campus, University of Nairobi

Het totale aantal arme mensen in de wereld neemt nog altijd toe en een steeds groter deel van hen woont in stedelijke gebieden. In veel landen in Afrika ten zuiden van de Sahara kan de economische groei deze bevolkingsgroei niet bijhouden. In combinatie met hoge inflatie leidt dit ertoe dat de werkgelegenheid afneemt en het levensonderhoud duurder wordt, met als gevolg dat de armoede toeneemt. Om aan voedsel te komen zijn mensen in steden *afhankelijk van het kopen van hun eten, maar door hun lage koopkracht is de* voedselzekerheid van de armen ernstig aangetast.

De tijdsdruk voor de stedelijke bevolking verhoogt de vraag naar voedingsmiddelen die geen lange bereidingstijd nodig hebben, waardoor ook het kopen van kant-en-klare voedingsmiddelen toeneemt. Voor de armen in de steden worden vooral kant-en-klare producten die op straat verkocht worden beschouwd als een belangrijke bron van gemakkelijk en goedkoop voedsel. Daarnaast levert de verkoop van deze *street foods* werkgelegenheid en inkomen aan veel stedelingen. Echter, in veel ontwikkelingslanden, waaronder Kenia, wordt de handel in *street foods* niet officieel erkend en zelfs bedreigd met afschaffing. De autoriteiten beschouwen de handel in *street foods* namelijk als overlast in het stedelijke leven doordat wegen geblokkeerd worden, als een verloedering van het moderne stadsbeeld dat zij graag zouden zien en als een gevaar voor de stedelijke volksgezondheid. Zij erkennen dan ook niet dat deze *street foods* positieve aspecten hebben voor de verkopers en de consumenten.

Ondanks het feit dat de handel in *street foods* in veel ontwikkelingslanden niet wordt erkend door de stedelijke autoriteiten, wordt toch algemeen aangenomen dat veel arme families slechter af zouden zijn zonder de beschikbaarheid van deze *street foods*. Weinig is echter bekend over hoeveel *street foods* daadwerkelijk bijdragen aan de totale voedselinname en voedselzekerheid van de stedelijke armen en er is al helemaal niets bekend welke andere bronnen van niet-thuisbereide producten bijdragen aan de voeding en hoeveel die bijdragen.

Daarom was het doel van deze studie om het belang te bepalen van de consumptie van *street foods* en andere niet-thuisbereide voedingsmiddelen in het voedingspatroon en hun bijdrage aan de voedingsinname van de bewoners van arme stedelijke wijken. In een complementaire studie richtte Alice Mwangi zich op de verkopers en de *street food* producten zelf. In dit proefschrift worden *street foods* gedefinieerd als "kant-en-klare voedingsmiddelen en dranken, bewerkt of vers, die op straat verkocht worden vanaf een vaste plaats of door ambulante verkopers (in tegenstelling tot in winkels en etablissementen met een vergunning)". Niet-thuisbereide voedingsmiddelen worden gedefinieerd als "kant-en-klare voedingsmiddelen en dranken, bewerkt of vers, die buiten de woning van de consument zijn verkregen".

Een eerste onderzoek werd uitgevoerd om inzicht te verkrijgen door wie, hoe vaak en waarom *street foods* worden geconsumeerd in twee arme wijken van Nairobi (*hoofdstuk 2*). De frequentie waarmee *street foods* werden gegeten door de leden van 1011 huishoudens werd vastgelegd met behulp van een gestructureerde vragenlijst. Vervolgens werden uitgebreidere interviews gedaan met een subgroep van 73 huishoudens. Vijfenzestig procent van alle huishoudens gebruikte ten minste één keer per week *street foods*. De gemiddelde frequentie waarmee *street foods* werden geconsumeerd was 3,6 dagen per week in de sloppenwijk, wat hoger was dan de 2,0 dagen per week in de laag-middeninkomen wijk

($P<0,001$). De frequentie van *street food* consumptie was gerelateerd aan de werkgelegenheidssituatie van het hoofd van het huishouden ($P<0,001$): de gemiddelde frequentie van *street food* consumptie was 3,7 dagen per week als het hoofd werkloos was of onregelmatige baantjes had, 2,9 dagen per week als het hoofd zijn eigen baan gecreëerd had en 2,1 dagen per week als het hoofd van het huishouden een vaste baan had. Bovendien was de frequentie waarmee *street foods* werden geconsumeerd lager in huishoudens waar een volwassen vrouw aanwezig was die het huishouden als voornaamste taak had (2,55 dagen per week) dan in huishoudens waar zo iemand niet aanwezig was (2,95 dagen per week; $P<0,05$). De voornaamste redenen die respondenten gaven om *street foods* te gebruiken was dat zij deze goedkoop, makkelijk en tijdbesparend vonden. Voor anderen was de belangrijkste reden om geen *street foods* te gebruiken dat ze vies, onhygiënisch bereid of bewaard werden. Kort gezegd, de consumptie van *street foods* is een vast onderdeel van het voedingspatroon van de stedelijke armen, omdat ze goedkoop, beschikbaar en tijdbesparend zijn.

Maar zijn *street foods* wel echt goedkoop? Hoewel veel auteurs zeggen dat *street foods* een goedkope bron van voedsel zijn, is het moeilijk hier bewijs voor te vinden. Daarom hebben we de prijzen vergeleken van drie producten zoals ze thuis werden bereid of op straat waren gekocht (*hoofdstuk 6*). Van elk product werd informatie verzameld over de ingrediënten en prijs van de straatverkopers. Verder werd een aantal vrouwen gevraagd om de producten thuis te bereiden en alle ingrediënten en hun prijs op te schrijven. In de sloppenwijk was *chapati*, een soort Indiase pannenkoek, goedkoper bij de straatverkoper dan thuisbereid, zowel per 100 gram als voor de voedingsstoffen (zoals eiwit en ijzer). De prijs van *githeri*, een maaltijd van voornamelijk maïs en bonen, was hetzelfde bij de straatverkoper en thuisbereid. *Mandazi*, een Keniaans soort donut, was duurder bij de straatverkoper dan thuisbereid in de sloppenwijk. In de laag-middeninkomen wijk waren zowel *chapati* als *mandazi* duurder bij de straatverkoper dan thuisbereid. Echter, bij deze vergelijkingen is alleen het exacte bedrag in geld onderzocht. In feite wegen voor de meeste consumenten het gemak van tijdbesparing en de directe beschikbaarheid van *street foods* (bij werkplekken, scholen, busstations e.d.) op tegen het beetje extra geld dat nodig is om *chapati*, *githeri* of *mandazi* te kopen. Daarom vormen *street foods* een aantrekkelijk alternatief voor thuisbereid voedsel voor veel arme bewoners van Nairobi.

Het is duidelijk dat *street foods* een belangrijk onderdeel van het voedselpatroon vormen voor de meerderheid van de arme bewoners van Nairobi, maar wat is hun daadwerkelijke bijdrage aan de dagelijkse voedselinname? Twee vervolgonderzoeken zijn uitgevoerd om de totale voedselinname te bepalen en te schatten welk deel van de dagelijkse inname wordt verkregen uit *street foods* en andere bronnen van kant-en-klaar voedsel.

In *hoofdstuk 3* is de bijdrage bepaald van *street foods* aan de voeding van kinderen van 5 tot 7 jaar uit de sloppenwijk. Ook werd de hypothese getoetst dat kinderen die naar school gaan een groter deel van hun dagelijkse inname uit *street foods* verkrijgen dan kinderen die niet naar school gaan. De kinderen werden geselecteerd op het niveau van het huishouden en speciaal voor dit onderzoek gerekruteerd. Bij alle 114 kinderen werd, in samenwerking met hun verzorgers, tweemaal de 24-uurs navraagmethode uitgevoerd. Onder deze kinderen waren er 37 die 5 jaar oud waren en nog niet naar school gingen. De andere 77 kinderen waren 6 of 7 jaar oud, 40 van hen gingen naar de basisschool (schoolgaande

groep) en 37 niet (niet-schoolgaande groep). De gemiddelde dagelijkse energie-inname was onvoldoende (minder dan de aanbevolen hoeveelheid) in alle drie de groepen. De energie-inname was wel hoger in de schoolgaande dan in de niet-schoolgaande groep. Achtenzeventig procent van alle kinderen gebruikte *street foods*. In deze groep van *street food* consumenten werd 21% van de totale dagelijkse energie-inname bijgedragen door *street foods*. De bijdrage van *street foods* aan de dagelijkse vet- (35%) en eiwitinname (24%) was hoger dan die aan de energie-inname, terwijl de bijdrage van *street foods* aan de vitamine A (13%) en ijzerinname (17%) lager was dan die aan de energie-inname. De procentuele bijdrage van *street foods* aan de energie- en voedingsstoffeninname verschilde niet tussen de schoolgaande en de niet-schoolgaande groep.

In *hoofdstuk 4* is de bijdrage bepaald van niet-thuisbereid voedsel aan de voeding van mannen, vrouwen en kinderen van 9 tot 14 jaar uit de sloppenwijk en de laag-middeninkomen wijk. De huishoudens werden aselect geselecteerd uit de 1011 huishoudens van het eerste onderzoek. Elk individu werd driemaal geinterviewd over zijn voedselinname met behulp van de 24-uurs navraagmethode. Vierentachtig procent van alle personen gebruikte niet-thuisbereid voedsel. Onder deze consumenten van niet-thuisbereid voedsel verkregen mannen een groter deel van hun dagelijkse energie- en voedingsstoffeninname uit dit niet-thuisbereide voedsel dan vrouwen en kinderen. Ook verkregen de consumenten uit de laag-middeninkomen wijk een groter deel van hun dagelijkse innames uit niet-thuisbereid voedsel dan de consumenten uit de sloppenwijk ($P<0{,}001$). De bijdrage van niet-thuisbereid voedsel aan de energie-inname varieerde van 13% bij de kinderen uit de sloppenwijk tot 36% bij de mannen uit de laag-middeninkomen wijk. Net als bij de kinderen van 5 tot 7 jaar (*hoofdstuk 3*), leverde het niet-thuisbereide voedsel relatief hoge bijdragen aan de vet- en eiwitinnames en lage bijdragen aan de micronutriënteninnames. Het niveau van energie- en voedingsstoffeninname was hoger in de laag-middeninkomen wijk dan in de sloppenwijk ($P<0{,}001$), maar de gemiddelde totale energie-inname was minder dan de aanbevolen hoeveelheden in alle groepen. De mate waarin de aanbevolen hoeveelheden voor energie- en voedingsstoffeninname werd bereikt, was vergelijkbaar voor de consumenten van niet-thuisbereid voedsel en niet-consumenten uit dezelfde wijk. In de sloppenwijk vormden *street foods* de voornaamste bron van niet-thuisbereid voedsel voor de mannen, vrouwen en kinderen. In de laag-middeninkomen wijk waren kiosken (kleine restaurantjes) de voornaamste bron van niet-thuisbereid voedsel voor de mannen, terwijl *street foods* en kiosken even belangrijke bronnen waren voor de vrouwen en *street foods* de voornaamste bron van niet-thuisbereid voedsel waren voor de kinderen uit de laag-middeninkomen wijk.

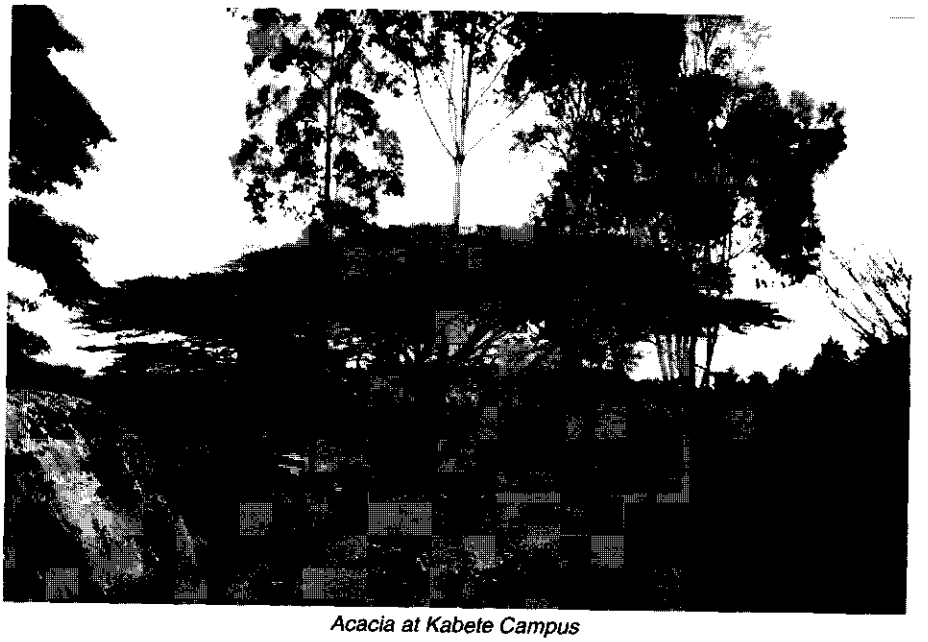
In *hoofdstuk 5* werden determinanten van niet-thuisbereide voedselinname onderzocht voor mannen en vrouwen, door de relatie tussen kenmerken van de respondenten en de bijdrage van niet-thuisbereid voedsel aan hun dagelijkse energie-inname te onderzoeken. Omdat we al eerder hadden gevonden dat de niet-thuisbereide voedselconsumptie verschilde tussen de respondenten uit de sloppenwijk en de laag-middeninkomen wijk en tussen mannen en vrouwen (*hoofdstuk 4*), werden de analyses uitgevoerd voor alle vier groepen van mannen en vrouwen uit de twee wijken. In de gevonden determinanten observeerden wij een patroon van eenvoudige determinanten naar meer gecompliceerde determinanten met een toenemend sociaal-economisch niveau van de groep. Het sociaal-

economisch niveau bleek ook gerelateerd aan een verschuiving van *street food* consumptie naar consumptie van voedingsmiddelen in kiosken: Vrouwen uit de sloppenwijk worden beschouwd als de laagste sociaal-economische groep binnen de groepen van respondenten, omdat hun inkomen vaak lager is dan dat van mannen of omdat ze afhankelijk zijn van het inkomen van hun echtgenoot. Deze vrouwen gebruikten meer niet-thuisbereid voedsel als kinderen in de schoolleeftijd geen deel uitmaakten van hun huishouden en wanneer de afstand tot hun werk korter was. *Street foods* waren voor hen de belangrijkste bron van niet-thuisbereid voedsel. Mannen uit de sloppenwijk met een betere werkgelegenheidssituatie en een grotere afstand tussen huis en werk gebruikten meer niet-thuisbereid voedsel. Voor deze mannen waren *street foods* de belangrijkste bron van niet-thuisbereid voedsel, terwijl kiosken slechts een klein deel leverden. Vrouwen uit de laag-middeninkomen wijk consumeerden meer niet-thuisbereid voedsel als ze een eigen inkomen hadden en binnen deze subgroep als hun werkgelegenheidssituatie beter was. Voor deze vrouwen waren *street foods* en kiosken even belangrijk als bronnen van niet-thuisbereid voedsel. De mannen uit de laag-middeninkomen wijk worden beschouwd als het hoogste sociaal-economische niveau binnen de onderzoeksgroep. Onder hen nam de bijdrage van niet-thuisbereid voedsel aan de energie-inname toe met een toenemende (gemeten) sociaal-economische status. Kiosken waren voor deze mannen de voornaamste bron van niet-thuisbereid voedsel, terwijl *street foods* slechts een kleine rol speelden in hun voedselinname.

De bevindingen uit *hoofdstuk 3 en 4* laten zien dat niet-thuisbereid voedsel een substantieel deel levert van de dagelijkse voedselinname van verschillende leden van de huishoudens uit arme wijken van Nairobi. *Street foods* zijn de voornaamste bron voor de bewoners van de sloppenwijk, terwijl zowel *street foods* als kiosken belangrijke bronnen zijn voor de bewoners van de laag-middeninkomen wijk. Met inachtneming van het belang van het sociaal-economische niveau binnen de wijken, zoals aangetoond in *hoofdstuk 5,* concluderen wij dat niet-thuisbereid voedsel een belangrijke voedselbron vormt voor alle arme bewoners en dat vooral *street foods* de belangrijkste bron zijn voor de armsten onder hen. In haar complementaire studie toonde Alice Mwangi aan dat handelen in *street foods* een belangrijke bron van bestaan is voor de huishoudens van de verkopers, zowel in termen van inkomen als van voedsel.

Gezien de toename van de stedelijke bevolking, het groeiend aantal mensen daarin dat arm is en het belang van *street foods* als bron van inkomen en voedsel voor de arme stedelijke bevolking, verdient de handel in *street foods* erkenning door de lokale en nationale overheden en de aandacht van stedelijke beleidsmakers, zodat de mogelijkheden van verkopers om hun inkomen te verzekeren en de beschikbaarheid van goedkoop, veilig en voedzaam voedsel voor de arme consumenten verbeterd worden.

Muhtasari



Acacia at Kabete Campus

Idadi ya watu maskini duniani inazidi kuongezeka, hasa mijini. Katika nchi nyingi za Afrika kusini mwa Sahara, kuongezeka kwa idadi ya watu hakuambatani na ustawi wa uchumi. Tukiongeza kuzorota kwa uchumi, ufukara umeongezeka kwa sababu mahitaji ya maisha yamekuwa ghali na kuna ukosefu wa ajira. Katika sehemu za mijini, wakaazi hutegemea kununua vyakula lakini kwa sababu ya ukosefu wa pesa, hakuna hakikisho la uwepo wa vyakula kwa hawa wakaazi.

Harakati mijini zimeongeza mahitaji ya vyakula vya haraka kuandaliwa, ndiposa kuongezeka kwa ununuzi wa vyakula vilivyo tayari kuliwa. Kwa maskini wa mijini, vyakula vinavyouzwa mitaani ni vimesemakana kuwa vya umuhimu kwa vile ni vya haraka na vya bei nafuu. Zaidi, uchuuzi wa chakula cha mitaani ni ajira na njia ya mapato kwa wakaazi wengi. Walakini, katika nchi nyingi zinazoendelea, Kenya moja yao, uchuuzi wa chakula cha mitaani haujatambuliwa kirasmi na unaelekea kuangamizwa kwa vile unaonekana, kwa wanamamlaka, kuwa hatari kwa afya ya umma na mpangilio wa miji kwa kuziba mabarabara, lakini hawaangalii manufaa ya uchuuzi huu kwa wanaouza na wanaonunua.

Ingawa uchuuzi wa chakula mitaani haujatambuliwa kirasmi, inaeleweka kuwa umaskini mijini ungekuwa hata zaidi kusingekuwa na huu uuzaji. Machache yanaeleweka juu ya mchango wa chakula cha mitaani na kile visichoandaliwa manyumbani kwa mahitaji ya lishe ya wakaazi maskini wa mijini.

Kwa hivyo, lengo la huu utafiti lilikuwa kufahamu mchango wa chakula cha mitaani na vyakula vinginge ambavyo haviandaliwi manyumbani kama sehemu ya mlo na pia kwa mahitaji ya lishe mwilini kwa wakaazi wa maeneo ya mapato ya chini mijini. Kwenye utafiti mwingine unaoambatana na huu, Alice Mboganie Mwangi alilenga wauzaji na vyakula wanavyouza mitaani. Kwenye utafiti huu, chakula cha mitaani kinaelezewa kuwa ""chakula kilicho tayari kwa kuliwa, pamoja na vinywaji vilivyoboreshwa au la, ambavyo vinauzwa katika sehemu ambayo imetengwa au kwa kutembezwa na wauzaji mitaani au sehemu za wazi, tofauti na vile vya mabohari au mijengo ya muda iliyo na vibali maalum". Chakula kisicho andaliwa manyumbani kimeelezewa kuwa "chaakula ama kinywaji tayari kutumiwa, ambacho kimeboreshwa ama bichi, ambacho kinapatikana nje ya makaazi ya mutumiaji".

Kuelezea ni mara ngapi, nani na sababu gani chakula cha mitaani kinatumiwa katika sehemu mbili za mapato ya chini, uchunguzi ulifanywa katika sehemu ya mabanda ya mapato duni na ingine ya mapato ya wastani ya chini mjini Nairobi (*sura ya pili*). Mahojiano kutumia maswali yaliyopangwa yalifanywa kwa wakaazi wa viambo 1011 kuelezea ni mara ngapi chakula cha mitaani kinanunuliwa, kufuatiwa na mahojoano ya kindani kwa viambo 73 vilivyochaguliwa. 65% ya hivi viambo vilikula chakula cha mitaani mara moja na zaidi kwa wiki. Katika sehemu ya mabanda, wakaazi walikula hiki chakula kadiri siku 3.6 kwa wiki ambayo ni juu kulinganishwa na sehemu ya mapato ya kadiri ya chini ambayo wakaazi walikula kadiri siku 2.0 kwa wiki ($P<0.001$). Ununuzi wa hiki chakula uliambatana na aina ya ajira ya kiongozi wa kiambo ($P<0.001$): Ununuzi ulikuwa siku 3.7 kwa wiki kwa kiongozi wa kiambo ambaye hakuajiriwa ama alikuwa na ajira ya muda, siku 2.9 kwa wiki kwa yule aliye na ajira ya kibinafsi, na siku 2.1 kwa wiki kwa muajiriwa wa kazi ya kudumu. Kwa viambo

ambavyo kulikuwa na mwanamke akifanya kazi ya nyumbani, ununuzi wa chakula cha mitaani ulizidi ule wa viambo ambavyo havikuwa na mwanamke wa aina hiyo (siku 2.55 kwa 2.95 kwa wiki, $P<0.05$). Sababu waliohojiwa walitoa za kununua chakula cha mitaani ni kwamba kina bei nafuu, kinafaa na ni cha haraka. Kwa wengine, sababu za kutonunua chakula cha mitaani ni kwa vile nikichafu, hakiandaliwi na kuwekwa kwa usafi wa kutosha.

Lakini, chakula cha mitaani kweli ni cha bei nafuu? Hasa ingawa waandishi wamesema kuwa chakula cha mitaani kina bei nafuu, hakuna ushahidi wa kutosha. Kwa hivyo, tulilinganisha vyakula aina tatu wakati vimeandaliwa nyumbani na vile vilivyonunuliwa kutoka kwa mchuuzi wa mitaani *(sura ya sita)*. Kwa kila aina ya chakula, habari juu ya vichopo na bei ilisanywa, na wanawake kadhaa waliulizwa kuandaa hivi vyakula manyumbani na kuweka rekodi juu ya vichopo walivyotumia na bei zao. Kwa sehemu za mabanda, chapati ilikuwa ya bei nafuu kutoka kwa wauzaji wa mitaani kuliko kwa watengenezaji wa nyumbani, kwa 100g na pia kwa lishe kama unyama na madini ya chuma (*iron*). Bei ya githeri kwa waliotengeneza nyumbani ilikuwa sawa na bei ya mitaani. Mandazi yalikuwa ya bei ya juu mitaani kuliko yale yaliotengenezwa nyumbani. Lakini kulinganishwa huku kulifanywa kwa pesa zilizotumiwa pekee. Ukweli ni kuwa, urahisi wa chakula cha mitaani wa kutopoteza wakati na kupatikana mahali na wakati vinavyotakikana unazidi kila senti ambayo inatakikana kununua chapati, mandazi na githeri kwa walaji, na hivyo kufanya chakula cha mitaani cha kuvutia sana kwa wakaazi wa maeneo ya mishahara ya chini mjini Nairobi.

Kwa hivyo chakula cha mitaani ni sehemu ya mlo wa wakaazi wa mijini, lakini mchango wao katita lishe hasa ni gani? Ukaguzi mara mbili zaidi ulifanywa kuthamini vyakula vyote vinavyoliwa na kukadiria sehemu inayonunuliwa kutoka mitaani na sehemu zingine za vyakula vilivyo tayari kwa kula.

Katika *sura ya tatu*, mchango wa chakula cha mitaani kwa watoto wa kati ya miaka 5–7 kutoka sehemu ya mabanda ulithaminiwa na dhanio lilibaini kwamba watoto washule wanakula chakula cha mitaani zaidi kuliko wale ambao hawaendi shuleni. Watoto 114 na walezi wao waliulizwa, mara mbili, kukumbuka vyakula walivyokula katika saa 24 zilizopita. Kwa hawa watoto, 37 walikuwa wa miaka tano na wahakuwa wa umri wa kuenda shule. Wale wengine 77 walikuwa wa miaka sita au saba, ambao 40 walikuwa wakienda shule na 37 hawakuwa. Kwa kadiri, vyakula watoto walikuwa wakila kila siku vilikuwa chini ya lengo la kadiri ya mahitaji ya kila siku kwa hawa watoto aina tatu lakini juu kwa walioenda shuleni kuliko wale ambao hakuwa wametimiza umri wa shule na wale ambao hawakuwa wakienda. 21% ya vyakula vya nguvu kila siku ilitokana na chakula cha mitaani. Mchango wa mafuta (35%) na unyama (24%) ulizidi ule wa nguvu na vitamini A (13%) na *iron* (17%). Mchango wa lishe na vyakula vya nguvu mwilini haukutofautiana kwa watoto wa shule na wale ambao hakuwa wanaenda shuleni.

Katika *sura ya nne*, mchango wa vyakula visivyoandaliwa manyumbani kwa wanaume, wanawake na watoto kati ya miaka 9–14 kutoka sehemu ya mabanda na sehemu ya mapato ya wastani ya chini umeangaziwa. Viambo vilichaguliwa baghala kutoka vile viambo 1011 vya ukaguzi wa kwanza. Makumbusho mara tatu ya muda wa saa 24 yalitumiwa kwa

kila mhojiwa. 84% kwa wote walikuwa wakila vyakula visivyoandaliwa manyumbani. Wanaumme waliongoza kwa hivi vyakula wakifuatwa na wanawake kisha watoto na sehemu ya mapato ya kadiri ya chini ilizidi ile ya mabanda kwa ulaji wa vyakula visivyoandaliwa manyumbani ($P<0.001$). Hivi vyakula vilichangia kati wa 13% kwa watoto wa sehemu ya mabanda na 36% kwa wamaume wa sehemu ya malipo ya kadiri ya chini. Kwa watoto wa kati ya miaka 5–7 (*sura ya tatu*), vyakula visivyoandaliwa manyumbani vilichangia kiwango kikubwa cha mafuta na unyama kuliko lishe zile zinazohitajika kwa kiwango kidogo mwilini (*micronutrients*). Viwango vya vyakula vya nguvu na lishe vilikuwa vya juu katika sehemu ya mapato ya kadiri ya chini ($P<0.001$), lakini chini kuliko kiwango cha kadiri kinachohitajika mwilini kila siku kwa vikundi vyote. Mchango wa lishe na nguvu ulikuwa sawa kwa walaji na wasiokula hivi vyakula katika kila eneo. Chakula cha mitaani ndicho kilitumiwa zaidi kwa vyakula visivyoandaliwa manyumbani kwa wanaume, wanawake na watoto katika sehemu za mabanda. Chakula cha vioski ndicho kilitumiwa zaidi kwa vyakula visivyoandaliwa manyumbani kwa wanaume wa sehemu za malipo ya kadiri ya chini, lakini chakula cha vioski na cha mitaani kilikuwa cha umaana sawa kwa wanawake. Kwa watoto chakula cha mitaani kilikuwa chanzo kikubwa katika sehemu za malipo ya kadiri ya chini.

Katika *sura ya tano*, maazimio ya ulaji wa vyakula visivyoandaliwa manyumbani kati ya wanaume na wanawake yalibainiwa kwa kuangalia uhusiano kati ya wahojiwa na kiwango cha nguvu walizozipata kutokana na vyakula visivyoandaliwa manyumbani. Kwa vile tulipata kuwa na utofauti kati ya sehemu ya mabanda na ile ya malipo ya wastani ya chini *(sura ya nne)*, uchunguzi ulifanywa kwa vikundi vinne vya wanaume na wanawake wa sehemu hizi mbili. Maazimio yalipangwa kutoka yale rahisi kwenda kwa yale magumu kulingana na kiwango cha hali ya maisha na kiuchumi ya wahojiwa. Hali ya maisha na kiuchumi ya wahojiwa ilionekana pia ikilingana na ununuzi wa vyakula yaani kutoka kile cha mitaani kwenda cha vioski. Wanawake wa sehemu za mabanda ndio walikuwa na hali ya maisha na kiuchumi ya chini kwa vile mapato yao yalikuwa ya duni zaidi ama walitegemea mabwana zao. Wanawake walikula vyakula visivyoandaliwa manyumbani zaidi wakati hawakuwa na watoto wa umri wa shule ama wakati sehemu zao za kazi zilikuwa karibu. Chakula cha mitaani kilikuwa chanzo kikuu cha vyakula visivyoandaliwa manyumbani kwao. Wanaume wa mabanda walikula vyakula visivyoandaliwa manyumbani zaidi hasa wakati walikiwa na ajira nzuri na sehemu zao za kazi zilikuwa mbali. Kwa hawa wanaume, chakula cha mitaani kilikuwa chanzo chao kikubwa na kile cha vioski kilichangia sehemu ndogo tu. Wanawake wa sehemu za mapato ya kadiri ya chini walikula zaidi vyakula visivyoandaliwa manyumbani wakati walikuwa wanapata mapato yao na zaidi wale waliokuwa na ajira nzuri. Kwa hawa wanawake, chakula cha vioski na cha mitaani kilikuwa na umuhimu sawa. Wanaume wa sehemu ya mapato ya kadiri ya chini ndio waliokuwa na hali ya maisha ya juu zaidi kwa wahojiwa na ulaji wa vyakula visivyoandaliwa manyumbani kwao uliongezeka na ubora wa hali yao ya maisha na kiuchumi. Chakula kutoka vioski kilikuwa chanzo chao kikubwa cha vyakula visivyoandaliwa manyumbani na chakula cha mitaani kikichangia sehemu ndogo.

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za mabanda na kile cha vioski kwa wakaazi wa maeneo ya mapato ya kadiri ya chini. Kutokana na uchunguzi uliofanywa kwa hali ya msiha na kiuchumi *(sura ya tano)*, vyakula visivyoandaliwa manyumbani ni chanzo muhimu kwa wakaazi wa mapato ya chini na hasa chakula cha mitaani ni cha umuhimu zaidi kwa wale walio maskini sana kati yao. Kwa lile somo lingine, Alice Mwangi alipata kuwa uchuuzi wa chakula mitaani unachangia sana maishilio ya wachuuzi kwa mapato na chakula.

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Asante sana

Hilda

About the author ...

Hilda van 't Riet was born on 17 December 1969 in Veenendaal, The Netherlands. In 1988 she completed secondary school at the *Christelijk Lyceum Veenendaal.* During her study Human Nutrition at the former Wageningen Agricultural University, The Netherlands, she focused on social aspects of nutrition, with special attention for nutrition in developing countries. In February 1995 she went to Malaysia, where she studied the food habits of Malay families and elderly people in Kelantan and Terengganu. From September 1995 until June 1996 she conducted a study comparing the effectiveness of AIDS-extension to Iraqi refugees by Dutch health workers and trained Iraqi volunteers. In June 1996 she obtained her MSc-degree in Human Nutrition. For two years during her study, she was a member of the *Richtings onderwijs commissie* of the study, involved in guarding the quality of the study.

From January 1997 she was appointed as a PhD-fellow by the Netherlands Foundation for the Advancement of Tropical Research (WOTRO/NWO) to conduct the research as has been described in this thesis. The research project was conducted as a co-operation between the Division of Human Nutrition and Epidemiology of Wageningen University and the Unit of Applied Nutrition, Department of Food Technology and Nutrition of the University of Nairobi.

In August 1999 she participated in the PhD-study tour to South Africa. Since March 2000 she is a member of the board of the Owili Foundation. This foundation aims to offer AIDS orphans in Kenya opportunities for the future, by collecting money for education and medical care and donating this to families in need. In March and April 2001 she participated in an evaluation mission of the World Food Programme as a nutrition consultant. This evaluation mission assessed to what extent the goals have been reached with respect to the maintenance or improvement of the nutritional status of Ethiopean and Eritrean refugees in refugee camps in Sudan.

The author in her car

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