

**Urban Agriculture in Greater Accra:
Reviewing Research Impacts for Livelihoods,
Food, and Nutrition Security¹**

by

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September 2000

¹Paper (based on IDRC project 003149) prepared for workshop “Cities Feeding People: Lessons Learned from Projects in African Cities,” Nairobi, June 21-25, 1998.

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Abstract

This paper evaluates an IDRC project in Accra entitled “Urban Agriculture: Food Security and Nutritional Status in Greater Accra (Ghana)”. This project was a sub-component of a larger study of urban livelihoods, food security, and nutritional status, the Accra Urban Food and Nutrition Study (AUFNS) carried out jointly by Noguchi Memorial Institute of Medical Research (NMIMR) and the International Food Policy Research Institute (IFPRI), with funding from the World Health Organization (WHO), the Rockefeller Foundation, IDRC, and the Canadian International Development Agency (CIDA). The first part of this paper rapidly summarizes the major findings of the urban agriculture component of the overall study, as they relate to the research questions stated. The second part is a brief self-assessment by the two principal investigators of lessons learned during the study that can be usefully extrapolated to other studies or interventions into urban agriculture. An appendix summarizes the findings of the overall AUFNS report.

The project looked at the distribution of urban agriculture in various socio-economic areas of the city (including an evaluation of who farms and where), the impact of food and nutrition security, environmental aspects, contamination of food for human consumption, and the impact of urbanization on peri-urban land rights and livelihoods. Their self-assessment of the eight areas of impact revealed that the project was particularly strong in building local partnerships and in their use of a multi-disciplinary approach which allowed the study to encompass a holistic view of urban agriculture. They also cite in their major findings and in their self-assessment unexpected findings in terms of gender analysis as the study uncovered a much larger proportion of male farmers than was expected.

Introduction

In January 1997, an agreement between the International Development Research Centre (IDRC) and Noguchi Memorial Institute for Medical Research (NMIMR) was signed for the research project “Urban Agriculture: Food Security and Nutritional Status in Greater Accra (Ghana).” This study was a sub-component of a larger study of urban livelihoods, food security, and nutritional status, the Accra Urban Food and Nutrition Study (AUFNS), carried out jointly by NMIMR and the International Food Policy Research Institute (IFPRI), with funding from the World Health Organization (WHO), the Rockefeller Foundation, IDRC, and the Canadian International Development Agency (CIDA).

The inclusion of urban agriculture was identified as an important component of the study by a stakeholders’ meeting in 1996. Further detailed planning was conducted at a second meeting held in 1997, after funding had been secured. This study coincided with a number of other studies or efforts in Greater Accra all of which raise, but do not directly address, the issue of urban and peri-urban agriculture. While the NMIMR study is focused primarily at the community, household, and individual level, the Food and Agriculture Organization (FAO) undertook a study on the food supply and distribution system of the city (Argenti 1996), which ultimately suggested the need for further investigation and investment in urban agriculture. The World Bank has recently completed an extended poverty study, which included a participatory assessment of urban poverty in Accra (Norton et al. 1995). While not dealing in any way with urban agriculture, that study, and several others accompanying it, noted with alarm the rate at which the level of urban poverty in Accra is growing. CIDA followed up with an assessment of poverty in Accra, including proposals for possible intervention (Bortei-Doku Aryeetey and Aryeetey 1996). A University of Ghana/Stockholm Environment Institute team has been working on an environmental assessment of the city for several years, and has noted important links between a deteriorating urban environment and the deteriorating human health situation in Accra (Benneh et al. 1993). The changing nature of property rights and its impact on land use in the immediate peri-urban fringe of the city has been under study for some period by a team from the Land Tenure Center and the University of Science and Technology (Roth et al. 1995), noting the emergence of a robust market in land rights, but one with unintended consequences for the groups selling land.

The AUFNS study had several objectives, namely: identifying vulnerable groups within the Greater Accra area; understanding the causes of vulnerability to food and livelihood insecurity and malnutrition; suggesting improved policies or programmatic interventions to reduce vulnerability; and developing qualitative and quantitative indicators to monitor a variety of outcomes in the urban and peri-urban area.

With these objectives in mind, the suggestion of a component to investigate urban agriculture coalesced around the following research questions :

1. What is the geographic, demographic, and socio-economic distribution of urban agriculture in Greater Accra?
2. What is the impact of urban agriculture on food and livelihood security and nutritional status at the household and individual level?

3. What are the impacts of urban agriculture on the environment and vice versa?
4. Given production conditions, what are the impacts of urban agriculture on health?
5. How is the rapid growth of the city changing land use, property rights, and livelihoods on the peri-urban fringe?

The first part of this paper rapidly summarizes the major findings of the urban agriculture component of the overall study, as they relate to the research questions stated. The second part is a brief self-assessment by the two principal investigators of lessons learned during the study that can be usefully extrapolated to other studies or interventions into urban agriculture. An appendix summarizes the findings of the overall AUFNS report.

Part 1: Summary of major findings

Distribution of urban agriculture

The Accra Urban Food and Nutrition Study drew a sample of 559 households in sixteen enumeration areas for its household survey. A total of 88 households reported a member engaging in some form of agriculture, and eleven reported fishing as a livelihood. Of those engaged in agriculture (including livestock keeping), 12 farmed in their home villages, which were well outside the city, and therefore outside the study area. That left 76 households, or some 13.6 percent of the total sample, engaged in agriculture in the immediate urban or peri-urban area.³ Of these, 19 were engaged in crop production, 49 in livestock production, and eight in both.

Food crops were the major agricultural activity. Among livestock keepers, poultry was the most common. Seven different categories of farming systems emerged from an analysis of the urban agriculture found within the city of Accra. Each of the seven was then investigated in detail through a series of case studies with individual farmers or farming households. The seven systems are described in detail by Zakariah, Lamptey and Maxwell (1998). Briefly, these systems are:

Seasonal crop farming Rainfed, seasonal agriculture, relying on informal land access, with most produce for home consumption.

Customary land rights systems Rainfed agriculture with some dry-season irrigation, on La stool land between Labadi and Teshie, by La residents for both market and home consumption. "Stool land" is owned by local communities under the trusteeship of chiefs. (Chieftaincies in

³In terms of location, urban or peri-urban meant that the respondent lived in one of the enumeration areas, and could reach the location of their farm, carry out their farming activity, and return home the same day. In two households, there were two separate enterprises. Thus, when the analysis is presented in terms of enterprises, the total comes to 78, whereas if the analysis is at the household level, the total is 76.

southern Ghana are referred to as "stools," meaning throne.)

Vegetable growing systems Irrigated, market-oriented production of vegetables, relying on informal land access, usually along main drains and streams in Accra.

Small ruminants and poultry Raising small livestock in densely populated areas, sometimes with a market orientation, but more frequently as an investment or asset strategy.

Backyard gardening Small-scale gardening on own land or rented compound, usually for home consumption.

Commercial livestock Usually poultry, with a few examples of pigs, raised on medium to large scale for sale to urban market.

Miscellaneous Export crop production, micro-livestock, snail farming, bee-keeping, large ruminants, etc.

Table 1 presents data on the frequency of farming, livestock keeping, and fishing by enumeration area for the entire survey sample. These activities are heavily concentrated in the two least populated enumeration areas, which are both adjacent to open spaces. Several findings stand out from others. While urban agriculture is predominantly a woman's activity in many Sub-Saharan African cities, over 60 percent of those actively engaged in agriculture in Accra are men, and most of the women engage in keeping small livestock. There are significant differences between men and women in terms of levels of education. The female heads of household, in particular, have a very low level of education – only 2.1 years. Farming is fairly evenly spread across income groups, particularly the keeping of small livestock. In most cases, farming was a secondary or tertiary economic activity at the individual and household level. Only among vegetable growers and peri-urban farmers was farming the main activity. Much of the farming activity in the city is on land that the individual or household owns, but with informal access to land also an important category. Farming is done primarily for three sets of reasons. The first is for a cash income (particularly the vegetable growers and commercial livestock group); the second is for subsistence food (the seasonal farmer group, the customary land rights group, and backyard gardeners); the third is to have some assets that can be readily liquidated in case of an emergency need for cash (especially the small ruminants and poultry group).

Table 1. Households engaging in crop production, livestock-keeping or fishing in Accra by enumeration area

EA No.	EA Name	EA Category	Crop Production	Livestock Production	Urban Agriculture	Total HH's in EA	Percentage in Urban Agriculture	Farm Far Away	Fishing
01	Pokoase	LI/LD/(Mix)	15	12	20	38	52.5%	0	0
02	Dansoman	HI/MD/(M)	1	4	5	32	15.6%	0	0
03	Korle-Gonno	LI/MD(I)	0	3	3	34	8.8%	0	1
04	Lartebiokorshie	MI/HD(Mix)	0	5	5	37	13.5%	1	0
05	Odorkor	LI/HD(Mix)	2	1	3	35	8.6%	0	0
06	Bubiashie	LI/MD(Mix)	1	3	4	34	11.8%	0	0
07	Jamestown	LI/HD(I)	0	1	1	35	2.8%	1	0
08	Osu	LI/HD(I)	0	0	0	38	0.0%	0	0
09	Adabraka	MI/HD(Mix)	0	2	2	33	6.0%	1	0
10	Teshie	LI/HD(I)	0	2	2	34	5.8%	0	1
11	Labadi	LI/HD(I)	1	2	3	37	8.1%	4	0
12	Nima	LI/HD(M)	1	0	1	36	2.7%	3	1
13	Accra New Town	LI/HD(M)	0	3	3	33	9.1%	1	0
14	Maamobi	LI/HD(M)	2	1	3	34	8.8%	1	0
15	Tema New Town	LI/MD(M)	2	17	18	37	48.6%	0	8
16	Ashiaman	LI/HD(M)	2	1	3	32	9.4%	0	0
	TOTAL		27	57	76	559	13.6%	12	11

Key: HI = High Income LD = Low Density (I) = Primarily Indigenous Population
MI = Middle Income MD = Medium Density (M) = Primarily Migrant Population
LI = Low Income HD = High Density (Mix) = Mixed Indigenous/Migrant Population

Thus: HI/LD(M) = High Income, Low Density, Migrant Population, etc.

Impact on food and nutrition security

In several African cities, urban agriculture has been shown to have a significant, positive association with improved food security and nutritional status. In Accra, there was little evidence of this association at the level of the entire sample surveyed. Food availability at the household level was measured by source of acquisition for the week prior to the survey. Overall, only about one percent of the food at the household level comes from direct production in urban agriculture. Among farming households, the total food available (in both monetary and caloric value) from UA was about 7.5 percent. Cash income from urban agriculture varies from as little as \$US20-30 per year up to as much as several hundred dollars per month. However, the number of people involved in the more lucrative forms of urban agriculture is small. Overall, the impact of urban agriculture on household food security is relatively small, although specific impacts were noted from case studies in terms of direct access to food. Particularly among the seasonal farming and customary land rights farming groups, enough staple food (usually maize) can be harvested to provide as much as two-thirds of the households' annual needs. For the survey sample, however, there was no positive association of urban farming with child nutritional status in either bivariate or multivariate analysis; in fact, farming households had a higher prevalence of stunting among children under five years of age than did non-farming households. There is no clear indication that farming was the cause of this difference, however.

Several reasons can be suggested for the limited impact of urban agriculture on household food security and nutritional status in Accra. First, the number of households engaged in urban agriculture are relatively few, compared with other African cities. Second, even among the households that do engage in some form of agriculture or livestock keeping, it is often in the form of an "assets strategy," particularly the keeping of small livestock. Small livestock provide a source of storing assets, which can provide cash through sales in an emergency, or a source of food for consumption at special times. It is not surprising that this kind of strategy has relatively little impact on consumption or nutritional status. A third element to explain the relationship between UA and food security is the timing of data collection. In this study, data collection did not occur at the time that cash income or consumption from agriculture would have been at its peak. Rather, the data collection period was calculated to represent a time of year when the impact of seasonality would be average over the year. Lastly, unlike in many other African cities, most of the agriculture carried out in Accra is done by men. While some of the produce is consumed within the household, income from urban agriculture is less distinguishable from other forms of male income in terms of its impact on food and nutrition security.

Environmental impacts

An environmental assessment was prepared as part of the study (Anku, Doe and Tetteh 1998). Among beneficial impacts of urban agriculture, they note the potential to recycle urban waste products. In fact, a waste processing plant has been set up in Accra for this very purpose, but to date the output is small, and the cost of the compost is sufficiently high that many farmers do not want to use it. Also, there is fear that trash has not been sorted properly and poses a danger of polluting the soil if the compost were used on land for vegetable production. The authors also

note that urban agriculture produces a good supply of vegetables for the urban market without incurring the cost, congestion, and pollution of long-distance transport of perishable vegetables to the city from up-country.

Among adverse impacts, the assessment notes the improper use of agricultural chemicals in the densely populated area, creating run-off hazards and the potential poisoning of city waterways. Since many waterways are already contaminated with industrial and human waste, urban agriculture is clearly not the only potential offender. But agro-chemicals are a special cause of concern, given their potency and the fact that many users are unaware of their potentially harmful impact. The assessment also discusses run-off from livestock keeping, the use of wetlands, and other environmentally sensitive areas. A last point made by the authors is the potentially harmful impact on human health of growing vegetables in the urban environment -- both through irrigation water contaminated with human waste, and through the potential plant uptake of industrial pollutants in the soil, water, or air. The issue of using water contaminated with human waste for irrigation is taken up in the next section of this paper.

Anku, Doe and Tetteh (1998) note a variety of actors at the policy and programmatic levels who are situated to follow up on both educational outreach and policy implementation. Efforts in this regard could protect the urban environment from potentially harmful effects of farming and livestock keeping in a densely populated area and promote the recycling of urban waste products in Accra.

Contamination of food for human consumption

Vegetables are grown along the banks of Accra's streams and along the drains that carry much of the city's wastewater. There is little question that this water is polluted, with both industrial and human waste. For lack of an alternative, vegetable producers use this water to irrigate their crops. For this reason, city health authorities fear that vegetables produced in the city are a risk to public health, and have banned the practice of irrigated vegetable production under such circumstances. However, the by-laws are virtually never enforced. The farmers, on the other hand, blame the city for not controlling the levels of pollution in public waterways in the first place, and say they are being victimized for a problem not of their making.

In terms of policy, the desired objective is to prevent the contamination of food for human consumption. The question to be addressed, therefore, is the source of contamination and how best to control it. If contamination is occurring mainly in the vegetable production process, then the city policy of banning the use of drainwater for irrigation would make sense. If, however, food from other production sources were also contaminated with human waste by the time it reached the consumer, then the effort to control food contamination should occur more at the level of the consumer, and it would not make sense to penalize producers.

To check for sources of contamination, samples of vegetables grown under irrigation using water from drains in the city were compared with vegetables grown with tapwater and vegetables purchased in the major markets, where neither the production location (urban or rural) nor

conditions of production (irrigated or rainfed) could be ascertained. The preliminary results of the comparative analysis suggest that, as expected, lettuce samples obtained at the farm gate, grown under irrigation with tapwater have significantly lower bacteria counts than do lettuce samples bought at the farm gate grown under irrigation with drainwater. However, both farm gate samples had significantly lower counts of all categories of bacteria than do samples purchased in the major wholesale markets.

The implication of these laboratory results is that while food contamination is a serious concern, the major sources of contamination appear to be in the marketing, handling, and distribution system, not in the production system. Given that some level of contamination can take place in both production and distribution, the implied intervention to prevent the spread of gastrointestinal infection is better education about food hygiene at the level of the consumer household.

Impact of urbanization on peri-urban land rights and livelihoods

Contending perspectives have interpreted the impact of rapid growth in peri-urban areas in very different ways. One school of thought characterizes peri-urban growth as leading to the development of new markets and the conversion of property rights in such a way as to transform the local economy, leading to greater entrepreneurialism. Another sees the destruction of agricultural livelihoods without these necessarily being replaced by any alternative form of economic activity.

While the relative numbers of households within the city itself engaged in urban agriculture are fairly low, agriculture continues to be the backbone of the economy in the peri-urban areas in the immediate hinterland. However, Accra is sprawling outward at a very rapid rate, spurred primarily by a booming demand for housing that is often only for the wealthiest strata of society. Maxwell and Larbi et al. (1998) review the research that traces the conversion of land from customary to lease-hold tenure in the Greater Accra area, then compare four cases within the peri-urban periphery of Greater Accra to assess the impact of rapid urban sprawl on the area immediately surrounding the city. Cases examined include the loss of land to housing, the protection of agricultural land from urban sprawl, environmental degradation as a result of urbanization, and the commercialization of peri-urban agricultural production as a result of changing market demand.

The rate of land-use conversion from agriculture to housing is in the range of 2,600 hectares per year in the peri-urban periphery of Accra, and the rate of population growth in some of the communities to the North and West of Accra is on the order of 10 percent per year. This pattern places enormous strains on subsistence agriculture as the primary livelihood of the indigenous (and, in some cases, migrant stranger) populations living in the area. Demand for sand and top soil for construction and landscaping in the booming housing industry is putting further strains on peri-urban agriculture as sand contractors dig up huge swathes of land, but are not obliged to reclaim degraded land. These factors are contributing to emergent landlessness in Ga District in particular. Yet the District authorities, on their own, are relatively powerless to control the practice since it is the national Ministry of Mines and Energy that licenses the operations, and it

is individual chiefs that enter into the deals with the sand contractors.

Some village leaders have taken the initiative to preserve some land in agriculture in perpetuity, although such cases are few. In areas somewhat farther away from the city, and in slightly higher potential areas, the proximity to the city and especially to the international airport have led to an agricultural export boom. The main crop grown for export is pineapples, but other cash crops are also exported. This proximity to the city and to international markets has increased the incomes of people and raised general community welfare without, at least so far, causing any landlessness in these communities. However, the positive stories from the peri-urban periphery are relatively few, and the negative stories of widespread loss of livelihood are many. Specific policies are required to control the rapid sprawl of housing, and ensure that some of the proceeds from land sales are re-invested in ways that allow people to shift from a rural, agricultural livelihood to more urbanized wage labour or self-employed livelihood without experiencing impoverishment as an immediate result.

Part II: Self reporting on lessons learned

The agreement with IDRC called for specific attention to several areas of impact in this paper, areas not addressed by the project technical report. These include human resource development by the project, institutional capacity strengthening, the effectiveness of local partnerships, gender-sensitive analysis, the added value of a multi-disciplinary approach, scientific advances, utilization of results by other institutions, and leverage of non-IDRC funds. These aspects are reported on below. It is not always possible to state which impacts result from the overall Accra Urban Food and Nutrition Study and which are strictly the result of the IDRC grant for the urban agriculture component of the larger study.

Human resource development

Two research assistants, who are included as authors of several of the papers in this report, underwent significant training in various aspects of research, and are well on their way to becoming competent researchers in their own rights. Both are currently applying for post-graduate studies at the University of Ghana. Although no post-graduate training was funded in the course of the AUFNS (of which the urban agriculture study was one component), many people were trained for various jobs. The person trained to be in charge of data entry/systems analysis is still working for Noguchi Memorial Institute as an independent consultant in this area. Six persons were trained as anthropometrists, seven as field supervisors for the survey, and some 20 individuals as enumerators. Of these, several have found similar jobs on other research projects after leaving AUFNS.

Institutional capacity strengthening

As a result of the overall study, the research capabilities of the Nutrition Unit of the NMIMR have been expanded to include a variety of field methodologies, with specific emphasis on

participatory rapid appraisal methodologies and survey data collection. At the institutional level, the whole institute's data management and analysis capacity has been strengthened immensely. This was not only the result of the urban agriculture component of the study, but of the main study as well. There is also stronger capacity for interdisciplinary research, for collaborative work with other research and policy agencies, and continued work with other units within NMIMR. Stronger links have been established with policy making bodies in Ghana and with donor organizations.

Local partnerships

This aspect has been a particularly strong point of the overall study, and especially of the urban agriculture component. The urban and peri-urban agriculture component of the study included partnerships with the Accra Metropolitan Assembly; the Tema Municipal Assembly; the Lands Commission; the Ga District Assembly (the peri-urban district to the north of the main urban centre where much of the urban sprawl is taking place); Ministry of Food and Agriculture (particularly the Women in Agricultural Development Programme); the Accra Sustainable Cities Programme (responsible for environmental planning in the Greater Accra Metropolitan Area); CENCOSAD (Centre for Community Studies, Action and Development, a Ghanaian NGO with long experience in low-income areas of Accra); May Day Rural Project (a Ghanaian NGO working in the peri-urban districts of Ga and South Akwapim), the La Farmers Association; the Accra Vegetable Growers Association; the Greater Accra Poultry Farmers' Association; the Departments of Agricultural Economics, Plant Science, and Geography at the University of Ghana; the Animal Research Institute; and the Bacteriology Unit of NMIMR. The overall study included a somewhat expanded list of local partners. These partnerships enhanced the analytical ability of the study, made the list of research topics undertaken more relevant, and created a constituency to receive the findings of the study.

Several of these organizations are in an excellent position to apply the results of the study through both policy changes and programmatic interventions. In particular, the Accra Metropolitan Authority, the Accra Sustainable Cities Project, the various farmers' Associations, CENCOSAD, and the Lands Commission are in excellent positions to make use of the study findings. Many more organizations than are noted above participated in the final presentation of results of the AUFNS.

Gender analysis

Somewhat contrary to expectations, farming in Accra turned out to be mainly a male occupation. This finding created substantially more field work, because the research team wanted to ensure it was not getting biased results. The high male participation may also be one of the reasons for a limited association of urban agriculture with food security and nutritional outcomes. Although the role of women and intra-household dynamics did not turn out to be a major determinant of participation in urban agriculture, female-headed households, and certain occupations dominated by women (especially petty trade and street food vending), are among the most vulnerable groups in the AUFNS sample, and among the priority groups identified for intervention in the

main AUFNS report.

Multi-disciplinary approach

The topic of urban agriculture is an inherently interdisciplinary one. The study team included a nutritionist, several social scientists, a land economist, an agricultural economist, a bacteriologist, agricultural extension workers, farmers, city planners, environmentalists, and municipal officials. The multi-disciplinary analysis of the study's main report are the result. The study encompasses a holistic view of urban agriculture, including: the factors that lead to participation in agricultural livelihoods in the urban and peri-urban area; the threats to those livelihoods; the impact of the practice of urban agriculture on the urban environment; the impact of the practice of urban agriculture on the household food security and nutritional status of pre-school aged children; and the impact of production under urban conditions on food contamination, compared with other sources of food contamination.

Scientific advances and results utilization

This project was a research study that has only recently been completed. Although a solid network has been put in place to digest the results of the study, it is too early to discuss results utilization. Also, the major hypothesis of the study -- a strong association between urban agriculture and food security/nutrition -- was rejected. Therefore a major intended policy outcome did not turn out as expected. In effect, this means focusing post-study policy attention more in the area of peri-urban livelihoods, rather than urban food and nutrition security.

Leverage of non-Centre funds

This study had financial support from a number of donors, including, in addition to IDRC, the Rockefeller Foundation, the World Health Organization, the Canadian International Development Agency, and the International Food Policy Research Institute. Although the grant raised from IDRC was the last major grant received by the study, each of the grants enabled the study to take a more comprehensive look at the overall situation of livelihoods, food and nutrition security in the Greater Accra area. Total funds raised for the overall AUFNS are as follows:

Table 2. Fund leverage

Donor	Amount (\$US)
WHO	60,000
Rockefeller Foundation	80,000
IFPRI	50,000
IDRC	30,000

Donor	Amount (\$US)
CIDA	2,650
Total	222,650

Other impacts

The study had at least two other unique impacts: the collaboration with the Lands Commission, and the participatory stakeholders' approach utilized to plan, develop, and disseminate findings of the study.

The collaboration with the Lands Commission was unique in that at the time of the study on peri-urban land rights and changes in livelihoods, a new national land policy formulation exercise was in progress. One of the principal researchers for the AUFNS was directly involved in this policy exercise as a chief government technical officer. The policy document addresses some of the problems identified in this study. This is a major, cabinet-level initiative on a thorny development issue in Ghana. Peri-urban land issues are of major concern since they are the site of the stiffest competition for land and the most rampant conflict over land. The development of a land use policy and guidelines for dealing with land tenure transformation in peri-urban areas are major contributions of the study. This study also brought to light several other key issues, including emergent landlessness on the peri-urban periphery, and the impact on both indigenous and stranger communities living there.

The entire AUFNS study relied heavily on a participatory, stakeholders' process to help guide the project. A roundtable workshop held at the outset was attended by some fifty people from the research community; national, local, and municipal government; donors and development agencies; NGOs; and urban community groups. In fact, the idea to include an urban agriculture component in the study emerged from this roundtable workshop. The urban agriculture component then held its own planning workshop, to which were invited as many stakeholders in urban agriculture as possible. Again, these included the metropolitan and peri-urban district authorities; farmer's associations; officials from the ministries of food and agriculture, and local government; the Town and Country Planning Office; Accra Sustainable Cities Project; the Environmental Protection Agency, NGOs and CBOs, and the research community.

The study concluded with a one-day national seminar to present the results of the entire AUFNS study, including the major findings of the urban agriculture component. Some 100 people attended from among the above-mentioned stakeholders as well as numerous community leaders, elected assembly members, and individual women who had participated in the study in one way or another. Follow-up meetings were held in each of the sixteen enumeration areas where the AUFNS survey had been carried out. These meetings provided some feedback to participants, leaders, and other members of the community on the major findings of the study and the implications for their neighbourhoods or individual livelihoods. Lastly, private meetings were held with a number of influential policy makers to solicit their input to the recommendations of

the study. In this way, the research team hoped the recommendations would be more likely to be implemented by the key players in policy making and program planning arenas in the city.

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Appendix

Background and introduction to the study “Urban Livelihoods, Food and Nutrition Security in Greater Accra”

Background to Study

To date, relatively little attention has been paid to the questions of urban poverty, food insecurity and malnutrition, which have all been viewed as predominantly rural problems. But rapid urban growth, and an increase in urban poverty have forced policy makers, program planners, and activists to take another look at urban problems. Yet, to date, specific policies or programs to deal with urban food insecurity and malnutrition are few.

Urban life affects all the major determinants of food security and nutritional status: urban livelihoods are different and characterized by dependence of cash income and a high proportion of women working away from the household; urban diets are different from rural diets; and environmental conditions, sanitation, levels of crowding, and health may also be different in cities.

Structural Adjustment is widely believed to have had a negative impact on urban populations: including increased prices, lower wages, redeployment and the loss of jobs, and cutting social expenditures on public welfare. Evidence on these questions is mixed, but there is little question that more and more urban workers are able to find employment or self-employment only in the informal economy, where incomes are low, jobs are unprotected, and formal safety nets virtually non-existent.

Nearly 40 percent of the population of Sub-Saharan Africa now lives in cities. By early in the 21st century the urban population is expected to pass the 50 percent figure. The recently published West Africa Long-Term Perspectives Report (OECD 1995) notes that population in the region will double by 2020, and two-thirds of this growth will take place in cities. Social inequalities will increase, “nowhere more so than in the large cities.”

Greater Accra is growing at 4.7 percent per year. The population is now about 2.4 million. By 2020, the population will be 5.5 million.

Between 1988 and 1993, poverty in Accra rose from 8.5 percent to 23.0 percent. This increase in poverty in Accra took place at a time when poverty declined in the rest of Ghana. Levels of poverty are still higher in rural areas, but generally declining. In Accra, the level of poverty is increasing, apparently rather rapidly. In a city where a high proportion of the household budget is devoted to purchasing food, poverty is manifested as food insecurity.

To understand these trends, and the forces causing them, the Accra Urban Food and Nutrition Study was a two-year research project with the objectives of understanding the linkages of livelihoods, income, women’s work to food security and nutrition; to understand urban coping

strategies, and to outline policy and programmatic alternatives to address urban poverty, food insecurity, and malnutrition.

The study used combined conceptual frameworks for livelihoods security and for child nutritional status. Livelihoods consist of “the capabilities, activities and assets required to earn an adequate income.” Child nutritional status is determined by food intake, health, and care -- and income affects all three of these.

Introduction/description of sample

The study consisted of participatory community studies, household case studies, a household survey, and follow-up interviews and focus groups. The sixteen enumeration areas of the survey constituted a representative sample of Greater Accra, with households including a child under the age of three years as the primary unit of analysis (n=559). All households selected into the sample had a child under age three.

The overall sex ratio in the sample is 76 males to 100 females. Female headed households constitute 35 percent of the sample, and the sex ratio in those households is even more skewed towards females. Among children under age three, the ratio is even.

Male-headed households tend to be larger (5.2 persons) than female-headed households (4.8) persons. Male heads tend to be better educated (12.2 years) than female heads (7.5 years). And the dependency ratio (ratio of non-working age to working age members) is higher in female-headed households (1.5:1) than in male-headed households (1.1:1). The overall dependency ratio is 1.2:1, meaning 120 dependents for every 100 working-age people.

Over 40 percent of the total live in family compound houses, particularly in the indigenous communities, and particularly female-headed households.

80 percent of primary care-givers for children under three years of age are their biological mothers. Others include grandmothers, other relatives, and in a few cases, fathers. Sixty-four percent of all primary care-givers had basic education. Two-thirds of primary care-givers are married and the only wife; 11 percent are in polygamous unions; 16 percent are not married. In terms of ethnic origin, 35 percent are Ga-Adangbe; 27 percent are Akan; 24 percent are Ewe; and 13 percent are other migrants, mainly from the North of Ghana.

10 percent of households in Accra own the house in which they live; 47 percent rent; 39 percent live in family houses and mostly do not pay rent. Toilet facilities are mainly public latrines (54 percent), 20 percent use private KVIP latrines; 16 percent do not use any particular toilet facility; few have flush toilets. Hygiene in public toilets was poor throughout the city.

Water comes from vendors in 54 percent of Accra households; 38 percent use public taps, and 7 percent have piped water in their houses. The cost of a bucket of water in February-March 1997 varied from 420 to 4200, with the cost inevitably being higher in low-income neighbourhoods.

Most households dispose of rubbish by public dumping, or indiscriminate dumping, and waste removal is haphazard in over half the communities surveyed.

Urban and peri-urban livelihoods

Urban Livelihoods

Livelihood strategies in Accra are predominantly production and exchange based. Labour is the most important asset to urban dwellers, and labour-based income generating activities are the most important source of income in the sample, especially among low-income groups. Inter-household transfers of money and goods are very important, especially for low-income households, and for female-headed households.

Individual unemployment is relatively low in the sample, but most people are engaged in unprotected wage labour jobs and self-employed activities that offer little job security and legal protection. Almost 18 percent of all individuals over 10 years old are actively seeking work but unable to find any or to start some form of self employment. Six percent of all households have no employed or self-employed member.

Of those employed, most are in the “informal” sector. The ratio of informal to formal workers in the Accra sample is roughly 7:1, compared to the ratio of 5:1 in 1990 and 2:1 in 1980.

There are significant differences in the major employment activities of men and women. For individuals, women’s income-generating activities are heavily concentrated in petty trading, and preparation and sales of street food. More than two-thirds of women’s primary income-generating strategies fall into these two categories. Over 60 percent of men’s primary income-generating strategies involve wage labour, whereas over 75 percent of women’s primary strategies involve self-employment. Men are three times likely to have a protected wage (civil service or large firm) job as women. However, men and women are equally likely to be engaged in some kind of productive self-employment.

At the household level, there are differences between the number of income-generating activities and the level and source of income between female- and male-headed households. Female-headed households were most likely to have no members engaged in any income-generating activity. In these households the main source of income is through remittances, not through labour. The complete reliance on remittance income makes these households vulnerable.

Female-headed households have a significantly lower number of income-generating activities than male-headed households and a lower number of income-generating activities per household member. The extent of labour utilization is low in female-headed households. Household structure is different in female-headed households: Total labour resources are fewer in female-headed households; households tend to be smaller; the age of the female heads is younger; and the dependency ratio is higher for these households. Average monthly income is significantly

higher for male-headed households. Female-headed households tend to rely more on inter-household transfers.

Overall, inter-household transfers make up 20 percent of household income, and in female-headed households, the figure is over 40 percent of income. The majority of this money is used for consumption purposes. The flow of these transfers tends to be from husbands to wives, from parents to children, and much of the exchange is limited to the urban area, although recently arrived migrants tend to remit to their homes outside the city.

Income diversification is an important strategy to reduce risk in the urban income environment. Individuals diversify income by working more than one job at a given time or moving between different jobs over time. Households diversify income by relying on multiple income earners within the household and obtaining income from both earned and unearned sources, such as from rents, pensions, remittances, sales of goods, gifts and borrowing.

Individuals are not likely to hold more than two income-generating activities at once. Over the course of a year, a given individual may engage in multiple activities. The managing of multiple income-generating activities at different times of the year is more common among young, single men.

Households diversify their total income through a combination of family labour and exchange-based activities. Individuals within a single household are employed in different sectors of the urban economy, contributing to a diversified household income portfolio. Two-thirds of the households in the sample have two or more income-generating activities in which members have engaged in the 30 days prior to being interviewed.

In 75 percent of all households, at least one of the income generating labour-based activities is under the direct control of women. Women are either the main income earners or supplementing the head of the household's main source of income.

Income diversification is a strategy used by households across all income levels. Households with the lowest income (those relying primarily on unskilled labour and petty trading) have the least diversified income portfolios. Better off households are more likely to earn income from multiple sources than poorer households. Poor households with low skill and education levels face limited employment opportunities and find it difficult to initiate other income-generating activities. Higher educations are significantly and positively associated with higher per capita incomes.

Both total and per capita income rise with increased number of income generating activities per household.

Peri-urban livelihoods

Prior to urbanization, peri-urban areas provided good agricultural lands, supplied foodstuffs to

the urban market, and provided stable livelihoods for the inhabitants. This stable economy has been disturbed by rapid urban expansion and sprawl.

In some places, the population displaced out of agriculture by urbanization is absorbed into industrial or commercial activities in the urban area. However, this is not how the situation in peri-urban Accra is characterized.

Planning for agriculture is not a practice of urban land use planning in Ghana. Therefore, no attempt is made by policy makers and urban planners to protect farming lands in the expansion of the city.

The impact of urbanization on land use, property rights, and livelihoods is highly variable. The fate of any given community in the process of urbanization depends on local leadership and the commitment of the leadership to the development of the local community.

Due to rapid urbanization, farmland is being rapidly lost. This may be because of the expansion of land used for housing, or it may be due to environmental destruction in the form of sand winning, stone quarrying, or simply removal of top soil for landscaping. In each case, local residents lose their agricultural livelihoods and become worse off. In some areas, where agriculture has been able to rapidly commercialize, however, access to urban markets has increased income in the community, and led to a higher standard of living. In a few cases, land has been deliberately protected for agricultural use.

Tenure transformation in the peri-urban areas of Accra has created hardships, especially for strangers, and the non-land owning families. Men and women alike lose usufructuary rights, but women have fewer alternative livelihoods outside agriculture, and, therefore, are more vulnerable to impoverishment.

The customary system of land ownership, the process of commodification of property rights, and the use of and accountability over the proceeds from sale of land affects the ability of people to maintain a livelihood in farming. There is thus a link between tenure change, loss of farmland, and loss of livelihoods, with women and strangers the most affected.

Food availability, food and nutritional security

Food availability

Mean total household expenditures for the Accra households was estimated at 41,028,200.00 per person per year (equivalent to \$US390, the national average income reported by the World Bank's World Development Report 1997).

Food is still the single most important commodity in the urban consumer's basket of goods and services. Overall, the average urban Ghanaian household spends 55 percent of total household expenditures on food. Eighteen percent spend more than 70 percent of their budget on food.

The food budget share varies by income level, occupation group, and sex of the head of the household. The mean budget share spent for food for the lowest 20 percent is 61 percent, compared to 41 percent for the households with income in the highest 20 percent. Street food vendors spend 67 percent of their total expenditures on food for own consumption, while professionals spend only 44 percent. Female-headed households spend 60 percent of their budget on food, compared to 52 percent in male-headed households.

Urban food consumption patterns in Accra are characterized by a high dependence on purchased food commodities. For the entire sample, 90 percent of total consumption comes from purchases, indicating a strong reliance on the market to meet food needs.

A substantial share of food comes from foods purchased away from home. Accra households spend one-third of their food budget on street foods and meals prepared away from home. The lowest income group spends almost 40 percent; female-headed households spend 36 percent; petty traders spend 33 percent; the unemployed 37 percent, and street food vendors 42 percent.

Gifts and transfers play an important role in meeting household consumption needs for female-headed households and indigenous households, accounting for 9 percent of the total budget for each group. The unemployed obtain 14 percent of total food outlays from gifts and transfers.

The mean household calorie availability per adult equivalent unit (aeu) for the entire sample is 2640 kcal/aeu/day. Calorie availability increases with income.

The mean price per 1000 calories is 746 cedis, which is equivalent to \$US0.39. At this price, it would cost 2,100 cedis to obtain the minimum caloric requirement for one adult equivalent. The minimum wage during the survey was 2,000 cedis per day.

Although female-headed households have lower mean incomes than male-headed households, their food budget shares and calorie availability are significantly higher than male-headed households.

Urban consumption patterns are diversified. Expenditures on bulk staple food items, such as maize, rice, cassava, and yams do not dominate the total diet. More of the budget is allocated to complementary food groups such as meat and fish, vegetables, fats and oils and dairy products and eggs. However, in terms of calories, staple foods account for the largest share of total calories available to the households. In fact, a large share of total staple food consumption is being met through prepared food and meals purchased away from home.

Urban consumers obtain most of their staple diet from maize, cassava, and rice. Maize accounts for 33 percent; cassava accounts for 24 percent; and rice accounts for 19 percent of all staple foods consumed.

Urban food consumption patterns have shifted toward foods that are easier to prepare and cook, especially among higher-income households. Wealthier households are substituting rice, wheat,

and yam for cheaper staple foods such as maize and cassava.

Low-income households consume both a larger percent of total calories from staple foods and a larger share from foods purchased away from the home than wealthier households. Purchasing food and meals away from home contributes to already high budget shares, since these foods tend to be more expensive than foods prepared at home. The mean calorie price per 1000 kcal was 4422 for grains and 4292 for roots and tubers, compared to 4850 for prepared staple foods (kenkey, banku, fufu, or konkonte) and 41050 for prepared meals.

Food and Nutrition Security

40 percent of households have inadequate calorie availability.

Combining caloric adequacy with food share of household budget reveals that 20.6 percent of Accra households are food secure (adequate caloric availability, low food shares); 23.6 percent are food insecure (inadequate caloric availability, high food shares); 39.2 percent are vulnerable to price or income shocks (adequate caloric availability in short term, but high food shares); 16.6 percent are of questionable status (inadequate caloric availability, low food shares).

Although calorie availability is mostly adequate, a high proportion of female-headed households are in the vulnerable group; and “female” occupation groups (petty trading and street food vending) are also in that group. Street food vendors and unskilled labourers have the highest levels of food insecurity.

When food or money to acquire food is insufficient, Accra residents engage in a variety of coping strategies including dietary change, strategies to increase the amount of food available in the short term, and rationing strategies.

Food insecurity is not only a function of income, but it is associated with the type of employment and household structure. The largest number of food-insecure households are found among the lowest-income groups. Female-headed households tend to have higher levels of caloric adequacy, but expend greater proportions of their budget to acquire food, so female-headed households, and those occupational groups that are predominantly female (petty trading and street food vending), have the highest levels of vulnerability to food price rises or income shocks. Overall, roughly one-fourth of the sample is classified as “food insecure”; about two-fifths fall into the “vulnerable” group. The means of coping with food insecurity varies considerably.

Among children 3-36 months old (of which AUFNS is a statistically representative sample) the mean height-for-age Z-Score is -0.94; weight-for-age is -1.05; weight for height is -0.57 (or roughly one standard deviation below the median expected weight and height for age, and half a standard deviation below the expected weight for height).

The prevalence of stunting (low height for age) is 17.6 percent. The prevalence of wasting (low weight for height) is 5.3 percent.

Growth faltering begins 3-6 months after birth, and is generally most severe between one and two years of age, after which there is some improvement.

Among mothers, 15.7 percent are underweight, 47.8 percent are in the normal range, and 36.5 percent are overweight (25.2 percent are obese).

In comparison with earlier nutritional data on Accra, the period of 1988 to 1993 saw generally improved child nutritional status, but the period from 1993 to 1997 has seen a deterioration in nutritional status, including a significant decline in mean height for age, which is generally taken as the best indicator of long-term human welfare.

Major determinants of child height for age (nutritional status) include the age of the child, the care the child receives, the health of the child, and the height of the mother. The effect of income on child nutritional status is expressed through calorie availability, and access to health care.

Health, nutritional status and household caring capacity

Health

The three most prevalent childhood disease conditions are respiratory infections (46 percent of children had symptoms in past two weeks); fever (37 percent) and diarrhoea (31 percent). Of all morbidity symptoms studied, only fever is related to nutritional status.

Overall child health was evaluated using a Visual Analog Score, which is the primary care-giver's assessment of the overall health of her child, compared to other children, with a potential range of 0-100. The mean child health score was 71.3, but the distribution was skewed to the right, indicating that a majority of mothers considered their children to be healthier than other children. The Visual Analog Scores were correlated with morbidity symptoms, and were significantly associated with all the nutritional status indicators.

In general, child health deteriorates from about 3-6 months after birth to about 21 months of age, after which it begins to improve again.

Maternal behaviour is very important to child health. Ninety-seven percent of all primary care-givers attended pre-natal care -- almost half during the first trimester, and most of the remainder during the second. However, of 35 severely malnourished children (WHZ <-3.00), none had been taken to the nutritional rehabilitation clinic.

During the month preceding the survey, 64 percent of children had been taken for growth monitoring. 85 percent of children had their third DPT immunization and 68 percent had their measles vaccination.

All health and nutrition outcomes were found to have much greater variability within a neighbourhood or enumeration area than between enumeration areas. This means that there is

little spatial homogeneity in human welfare outcomes.

Caring capacity

The nutrition, healthy growth, and development of infants and young children depend not only on sufficient food but also on adequate health care and appropriate caring behaviours. Especially in the conditions of poverty, food insecurity and the deteriorating environment described for Accra, coupled with a significant proportion of women (who are the primary care givers in the household) needing to generate income in addition to their other responsibilities, enhanced care-giving within the household can optimize existing resources to produce good health and nutrition in young children.

Caring capacity is dependent on the availability of resources or an absence of constraints, within the household and the wider community, that will facilitate the translation of knowledge into practice. The resources and constraints to care-giving examined in the study are household wealth and social status and primary care-giver education, health status, work and employment, and access to alternate care and social support. Care-giving behaviours studied are breast/complementary feeding, health seeking and hygiene behaviours as they relate to the index child.

The Accra sample is predominantly low-income and the majority of households lack the basic amenities that ensure quality care-giving; household socio-economic status, assessed by an index incorporating asset ownership (consumer durable items) and housing quality (including water and sanitary facilities) was significantly and positively associated with child health and nutritional status.

Primary care-giver educational status was significantly and positively related to index child nutritional status and diarrhoea but not general child health.

Fifty-five percent of primary care-givers were in full-time employment and 57 percent of working primary care-givers worked and provided childcare simultaneously. Only 28 percent of children who had alternate care were in creches; most had one alternate care-giver. Primary care-giver full-time employment and longer hours of work were associated with poorer child nutritional status; this association is rather complex as full-time employment appeared to coincide with the age when children are in most need of care. More importantly, though, children whose care-givers worked in the markets and on the streets (majority of women are in this category) had the worst nutritional status.

Provision of financial support from the father (78 percent of fathers provided support), regardless of their residential status, was associated with better child nutritional status whilst primary care-giver marital status (67 percent of primary care-givers were in monogamous marriages) was associated with better child health.

Feeding behaviours were less than desirable as current recommendations are not being followed;

breastfeeding is universal, but pre-lacteal feeding and early supplementation are highly prevalent across primary care-giver educational levels. Only 19 percent of babies were breastfed within an hour of birth and 25 percent more than 24 hours after birth. 32 percent of mothers gave various pre-lacteal feeds. The majority of mothers gave a variety of liquids and complementary foods during the first 4 months; these included water and sugar solutions (75 percent), milk or infant formula (37 percent), and weaning foods (56 percent), the most popular being fermented maize porridge or koko (67 percent). Pre-lacteal feeding was associated with long-term poorer nutritional status while supplementation before 4 months was associated with poorer health status.

Health seeking behaviours relating to growth monitoring and immunization appeared to be satisfactory across primary care-giver educational levels; the overwhelming majority of mothers attended a pre-natal clinic and most children had been attending a clinic for growth monitoring and immunizations. Growth monitoring was associated with better nutritional status.

Hygiene behaviour, assessed by spot observations of specific practices, was also generally satisfactory; on a scale of 0 to 6, 30 percent of households had 0 to 3 good practices, 40 percent had 4 or 5 good practices, while the remainder had 6 good practices. Good hygiene behaviour was associated with better nutritional status and health and lower diarrhoea incidence.

More care resources (primary care-giver education, household socio-economic index, and expenditure quintile) were associated with hygiene behaviour. However, only primary care-giver education significantly correlated to general caring capacity, as reflected by a derived care index relating to feeding and health seeking behaviours.

Policy implications of the study

With the rapid pace of urban population growth, and the increase in urban poverty, the problems identified by this study are likely to intensify over the next two decades. While the situation in Accra outlined here does not constitute a crisis or emergency, it is a long-term developing situation that requires increased attention from policy makers and program planners. Rural poverty and rural food crises may be more pressing problems at the moment, but trends indicate that the rural/urban gap is closing. In general, severe child malnutrition is not the major problem in the metropolitan area, and greater expenditure on nutritional rehabilitation is not necessarily the solution. Rather, longer-term efforts to reduce mild to moderate malnutrition is the primary recommendation of this study. This effort relies on indirect means, such as improving the capacity of vulnerable groups to improve their income earning ability, recognizing the special needs of working mothers, and putting in place simple systems that will identify those in special need of assistance.

The urban context is characterized by many actors, interest groups, and stakeholders: There is an urgent need for a central body or “roundtable” where policy issues can be raised, initiatives discussed and coordinated, so that activities are not carried out in isolation or ignorance of other initiatives.

Vulnerable groups identified by the study include very low income group (roughly one fourth of all households in the city; female-headed households; large households with few working members; working women with children below the age of two years; individuals with low education or few salable skills; street children; and certain livelihood groups, including the unemployed, farmers in the peri-urban area, petty traders (particularly those in the central business district who are subject to occasional harassment), women market porters, and unskilled labourers. Where an individual, especially a household head, falls into more than one of these categories, vulnerability is increased.

In terms of policy, employment -- and enhancing the possibilities for self-employment -- has to be the first priority for action at the level of the greater metropolitan area. This action must embrace the attempts of low-income urban residents to diversify their incomes, to gain access to credit, to work in a regulatory environment that is not conducive to harassment by authorities, and where they are taxed at a fair rate. Employment should be encouraged as a criterion for investment in the city. Small entrepreneurs, especially women, should be able to have access to training programs both for technical and management skills, and should be able to get access to credit for productive purposes.

Female-headed households, with fewer labour resources, need training programs to enhance skills, or better access to credit to expand enterprises, or enter small-scale business. The answer is not to increase their labour resources within the household, but to expand their options through improved skills and access to better resources. Investments in human capital, including formal education as well as specific skills training, will provide long-term solutions to improved earning capacity of women.

The special needs of working mothers should be recognized. The increasing necessity of women in the household to generate a cash income in addition to other responsibilities is an important factor for determining food security and children's nutritional status. Women are forced to make trade-offs between income-generating and care roles. While legal reform can help in the formal sector (maternity leave, time allowed for child feeding), such a high proportion of working women in Accra are self-employed outside the formal sector that other approaches must be tried. Alternative forms of day care for small children, especially in the one-two year age group, is one such need.

Policy priority should be given to both the formal and informal education of women. In addition, education messages on child care and child welfare should be more focused and relevant: particularly those concerning exclusive breastfeeding for a minimum of four months (and six if possible), the avoidance of pre-lacteal feeding and the avoidance of water as a breast-milk substitute. These education messages need to be targeted to the health sector in general as much as to individual mothers.

The trend in substituting traditional staple foods such as maize and cassava toward rice and wheat has implications for policy makers concerned with trade-offs of relying on imported foods to meet growing urban demand and increasing the production of basic staple foods in Ghana. As

income increases, urban consumers are shifting consumption to staple foods that are predominantly imported. Part of the changes in consumption patterns are the result of changing tastes and preferences associated with higher incomes. However, part of the shift is also among lower-income households, where increased demands on women's time is associated with increased consumption of foods that are easier to prepare and cook. Continued research and development on processed foods derived from domestically produced foodstuffs -- maize, yam, plantain and cassava -- are important if Ghana's food production is expected to meet the majority of food needs in the years to come. Similarly, domestic rice production, processing and marketing will need to expand and improve rice quality if it is to compete with imports.

Street foods are an important source of food for consumption, an important coping strategy, and an important livelihood for a large number of women in Accra. Households that cannot afford to buy more expensive staple foods such as rice and bread are still substituting between time and labour-intensive foods prepared at home for street foods, including prepared staples and prepared meals, but these are expensive sources of calories. The higher food budget shares being spent on street foods may reduce the amount of money left for other foods, such as eggs, fish, meat, fruits and vegetables. Given that people are spending a large share of their incomes on street foods, efforts should be made to assist street food vendors and consumers of street foods. City authorities are concerned about a threat to public health because of food contamination in the street food vending sector. Promotion of a joint city/vendor association that would ensure food safety regulation, provision of cheaper and more nutritious snacks and meals, and assistance in providing a secure and clean environment for street food vendors to operate, would be good for both business and public health.

In peri-urban areas, landlessness and loss of livelihood require pragmatic solutions from policy makers, including: a land use and housing policy for the peri-urban area based on economic as well as social and ecological criteria; an environmental policy with enforcement capacity on quarrying, sand winning and land reclamation; and compensation for those displaced from agriculture. This compensation need not be in the form of cash, but could also be in skills retraining so that displaced farmers can enter other occupations, or in the form of access to credit and technology that will enable a more commercialized and intensified agriculture on less land.

Given the lack of spatial homogeneity in human welfare outcomes (including income, health and nutritional status of children, and child mortality) any approach to intervention will have to be based on a household targeting approach, not simple geographic area targeting. This calls for a simple kind of food/nutrition security monitoring system in the urban area, both for safety nets and for household-level interventions. The study developed a set of indicators that could be utilized for this purpose.