Alleviation of Malnutrition and Food Insecurity Using Kitchen Gardening

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Abstract

Small-scale rural-based agricultural intervention were food is grown at the backyard of the compound is an approach that can address food and nutrition security. The study area has characteristic of high population in small area, low life among casual workers working at the factory which prompted social life diseases such as Malaria, Aids and Malnutrition like kwashiorkor and anemia. The study considered the social-economic and health impacts of Kitchen Gardens and their role in environmental conservation in the tea estates at Nandi Hills, Kenya. This research employed a case study at the Nandi Tea Estate Company. Multi stage approach was used in village selection and simple random sampling was used in data collection at household. Structured questionnaires, interviews with key informants, and observations were the main tools for data collection. Excel and SPSS as statistical package was the main software used for data analysis. The result showed above 70 % of waste water generated from the kitchen was used for irrigating the vegetable gardens. Further, results revealed health improvement through reduction of diseases related to food scarcity such as Anemia and Malnutrition in the proportion of 94% and 88% respectively. There was marginal economic improvement from the sale of kitchen garden products and decrease in vegetable expenditure in most of the household practicing Kitchen Garden (KG). In conclusion KG was found to positively impact on the health of the population, improved their economic wellbeing and enabled the conservation of environment by maximizing the organic waste into benefit. It is recommended that introduction of KG should be introduced in places characterized by high concentration of people with small farms to develop kitchen garden to reap its benefit. Research should be conducted to find ways of using borehole waters drawn manually to be used by household to increase kitchen garden benefit.

Key Words: Food Insecurity, Resilience, Recycling, Malnutrition, Diversification

INTRODUCTION

Many definitions of food security have been developed. However, there are some, which have been widely used than others. According to the World Bank (2007), food security implies ―access by all people at all times to enough food for an active, healthy life‖. From the nutrition point of view, Pearce (1986) defines the food security of a country, region or household as its ability to meet up with its ―target consumption levels on a yearly basis‖.

Food insecurity can either be chronic or acute (transitory). According to Pearce (1995) ―transitory food insecurity is a temporary decline or shortage‖ in the food needs of a country, regions or households. The declines may be due to fluctuations in the production of food, changes in incomes and food prices. On the other hand, chronic food insecurity occurs when there is persistence in food declines. Thus food insecurity can be defined as a situation in which households and individuals are neither able to access nor afford food for an active and healthy life.

Despite the diversity in these definitions, most of them evolve around some common themes, which are very important in the measurement and analysis of food insecurity. These themes include availability and accessibility and affordability, otherwise known as the forces of demand and supply or the entitlements at the disposal of individuals and households to produce or command food (Penny, 1989). Food security can either be ensured through production, purchase, and public food distribution from food aid. However, for individuals to have access to this food, they must have the opportunities of either producing the food or purchasing it in the case where they cannot produce. This is why food insecurity does not apply only to food insufficiency and availability but also to accessibility and affordability of the food by the needy.

There are several factors responsible for food insecurity within a region. These can be grouped into natural, economic and socio-cultural factors. The natural causes of food insecurity include, droughts and floods i.e., there is low and irregular rainfall causing droughts or either too much rainfall causing floods. Other causes include the devastating effects of predators such as elephants, insects, migratory birds and predatory weeds. These weeds usually are the first plants to germinate after the planting of crops such that they grow faster and overshadow crops thereby preventing them from germinating and growing normally. Quite often young crops are destroyed before they can attain maturity. The economic causes include income, poverty and the lack of agricultural credit to farmers. Socio-cultural factors include the lack of infrastructure, ethnic exclusion, poor land tenure system, customs and a high demography.

Small land holding with worsening economic conditions in highly demographic areas, many people are turning to vegetable gardening as a supplement to their family's diet. Food grown in the back yard consumes little if any fuel for shipping or maintenance, and the grower can be sure of what exactly was used to grow it. Organic horticulture, or organic gardening, has become increasingly popular for the modern home gardener. Vegetables which are seldom purchased-unless it is because of their high price or scarcity-may not profitably be cultivated in the home garden. But in the case of high-priced products, then the home garden demonstrates its economic value as enabling one to indulge in otherwise unattainable luxuries.

A vegetable garden (also known as a vegetable patch or vegetable plot) is a garden that exists to grow vegetables and other plants useful for human consumption, in contrast to a flower garden that exists for aesthetic purposes. It is a small-scale form of vegetable growing. A vegetable garden typically includes a compost heap, and several plots or divided areas of land, intended to grow one or two types of plant in each plot. It is usually located to the rear of a property in the back garden or back yard. Many families have home kitchen and vegetable gardens that they use to produce food. Due to

escalating cost of living in Kenya, most of the multinational tea companies in western Kenya have allowed their employees to practice Kitchen Gardening (KG) especially surrounding their residential areas. By doing this; the employees' productivity improves leading to an automatic increase in the company's profits and thus contribute to the country's food security programme.

To be food secure, households need access to sufficient, safe and nutritious food. However, nutrition is intrinsically multisectoral and food production alone will have a limited impact on nutritional outcomes. Strategies are therefore needed to maximize the potential impact of agriculture in nutrition. The challenge is to translate increased food production into increased household consumption and individual intakes. This can only be achieved through integrated agricultural-nutrition interventions. In this paper, homegrown or small-scale food production is explored as a feasible contributor to food and nutrition security for the rural poor in a high demographic area like the tea estates in western Kenya, with particular emphasis on contextual and technical factors. By illustrating a few successful home gardening models, the evidence for addressing micronutrient deficiencies in these types of intervention is presented.

MATERIALS AND METHODS

The Study Area

The study was carried in Nandi Tea Estates tea factory in the Nandi County- Kenya. Nandi County is transacted by two main physiographic features: The Nandi Escarpment and Kano Plains at the foot of the escarpment. The topography is apt for growth of natural forest and the forests cover about 26% of the land area acting as catchment area for various rivers and streams.

The soils are sandy and deep-loams where tea is the main crop grown. It has many rugged hills with shallow fragile soils at the highlands while the valley bottoms have clay-loam soils. The altitude ranges from 1,400m along the border with Nyando district to 2,400m above sea level in the highlands, with average temperatures of 18^0C to 25^0C. Precipitation is high and varies from 1,200mm to 2000mm, annually. The month of March marks the onsets of rains which continue to November with no clear-cut distinction between the long and short rains.

Most Tea Estates in Nandi East district are multinational companies; they are situated to the east and west of Nandi hills town. The main business of multinational tea companies is tea farming and manufacture. The made tea is normally for export and a small percentage enters the local market. The companies are jointly owned by locals and international investors. The tea plantations cover 8,067.28 hectares (Kenya Tea Growers Association-KTGA report as at 31st December 2008). The employees' population as at 31st Dec.2008 stood at 12,798 (KTGA labor & dependants census 2008). Together with the dependants, according to KTGA 2008, the population is estimated to be 51,192. Most employees approximately 90% reside in company premises (villages). The village layout is orderly (see plate 1), with almost uniform spacing separating the buildings. These spaces are about 100 m^2 and are currently utilized as kitchen gardens.

Plate 1. Showing typical sample of a kitchen garden in Nandi Tea Estates
Source: Field, 2010.

Sampling

The study used a descriptive research design. Multistage approach was used to select two stage clusters sample units. Division was taken as stage one clusters and stage two clusters were villages at the tea estate. Simple random sampling technique was used in selecting household. Additional information used in this study was obtained from interviews held with medical staffs that were in charge of the company medical facilities in various Divisions. Selected unit (Divisional) managers were purposively interviewed to provide relevant information. Data collection was done by administering structured questionnaires.

Data Type and Collection

Three types of questionnaires were used in the survey. The first type was administered to the household heads. It collected information on the impact of kitchen gardens on the household and the environment. The second type targeted the medical personnel. The third type was used on the management staff at the tea estate. Purposive sampling was used to select the medical staff and the unit managers. The questionnaires were formulated to obtain data regarding socioeconomic characteristics and health impacts of the kitchen.

The socio-economic characteristics from the data collected from the household include; age of household head, gender, income level, type of waste generated in the house, amount of waste generated, mode of waste disposal and household size. While the data on health impact of kitchen Garden collected include, the plot size, types of crops planted, the value and amount of products harvested from the gardens, the value of vegetables purchased from elsewhere, type of inputs used, value of inputs, nutritional disease prevalence at health center and time spend in the garden per day per hour. Secondary data which include the statistics of employees, their income and the health of the workers at tea estates were obtained from the Nandi Tea Estate company offices, Tea

Board and KTGA journals, medical facilities at Nandi tea estate, government environmental offices and Moi University Library.

RESULTS AND DISCUSSIONS

Nutritional Impacts of Kitchen Gardens

The main components of a basic healthy diet are: proteins, fats, carbohydrates, minerals, vitamins and fibre (Neil, 1993). Physicians and Sages in ancient times were well aware of the strong links between food and health, but the coming of modern drug and technology-based medicine has meant that centuries of such nutritional wisdom have evaporated (Penny, 1989). Few people grow their own fruit and vegetables, and even fewer tend their own livestock. There is unprecedented change in eating habits in westernized countries, and developing countries are following suit. The average person eats a diet high in saturated fats, refined sugar and cereal, meat and other animal products, and commercially processed food. Surprisingly, few people consider fresh and even raw vegetables for their daily meals. Nandi Tea Estates as a community is not an exception; most people did not eat health food. However, with the inception of KGs, the situation was being reversed.

Table 2. Impacts of KG on prevalence of diseases related to malnutrition and waste disposal

Disease	2004(Before KG)	2009 (After KG)	Difference	% Change of disease level
Malaria	10608	6176	4432	42
Diarrhea	2441	877	1564	64
Anemia	309	18	291	94
Malnutrition	17	2	15	88
Totals	13,375	7,073	6,302	47%

Table 2 shows the state of illnesses related to Food and Environment before and after introduction of KG in Nandi Tea Estates and the drop of diseases level. The common diseases related to nutrition and environment in Nandi Tea Estates include; HIV/AIDs, Malaria, Diarrhea, Anemia and Malnutrition. The Data on the HIV/AIDs which is prevalent at the tea estate village was not captured in this study due to the nature of the disease in regards to the confidentiality of the information and company policy. The commonest cause of iron-deficiency anaemia especially in women is insufficient iron in the diet to replace menstrual losses. Anaemia can be prevented by eating a variety of fresh, raw vegetables. With the introduction of KGs in NTE, anaemia cases reduced by 94 % (see table 2). This is due to the consistent availability of fresh vegetables on daily basis.

Mosquitoes are a vector agent that carries disease-causing viruses and parasites from person to person without exhibiting symptoms themselves. The principal mosquito borne disease is malaria carried by the genus Anopheles. Though originally a public health concern, HIV is now thought to be almost impossible for mosquitoes to transmit.

Mosquitoes are estimated to transmit disease to more than 700 million people annually in Africa, South America, Central America, Mexico, Russia and much of Asia with millions of resulting deaths. At least 2 million people die annually of these diseases. The introduction of KG in the Tea Estates had a positive impact in the war against Malaria (42% - see table 2). Before KGs were implemented, the compounds were full of grass becoming hiding places for mosquitoes.

Methods used to prevent the spread of disease, or to protect individuals in areas where disease is endemic include Vector control aimed at mosquito eradication, disease prevention, using prophylactic drugs and developing vaccines and prevention of mosquito bites, with insecticides, nets and repellents.

Malnutrition is the condition that results from taking an unbalanced diet in which certain nutrients are lacking, in excess (too high an intake), or in the wrong proportions. A number of different nutrition disorders may arise, depending on which nutrients are under or overabundant in the diet. KGs in NTE have helped reduce malnutrition by 88 % (table 2). Employees obtain most of their varieties food from their own gardens (see Table 3. showing varieties of vegetables Grown at KGs).

It is now recognized that HIV/AIDS and food and nutrition security are complex phenomena entwined in a vicious cycle. Food insecurity increases susceptibility to HIV exposure and infection, while HIV/ AIDS exacerbate vulnerability to food and nutrition insecurity. The disease reduces available labour due to sickness, premature death or caring for the ill. Additionally, less money is available and assets are sold because of medical and funeral costs. This reduces the household‘s ability to buy food. In addition, households affected by HIV/AIDS often switch to a low-labour intensive mono-crop system, producing only one crop, rather than a variety of crops, or shift from labour-intensive crops, such as vegetables, to less labour-intensive crops, such as roots. As a result, the household has less access to a variety of nutritious foods. The long-term effects of HIV/AIDS decrease the household‘s resilience to other shocks, thereby increasing the household‘s vulnerability to food insecurity. Home gardening can be part of a sustainable long-term strategy that complements household food security, nutrition education, and supplementation and food fortification interventions to address the food and nutrition needs of HIV-infected populations. Various interventions to address the deficiency should be used in combination because they each serve a particular target group, and none of them provides 100% coverage, so too does it hold true for interventions targeting the food and nutrition needs of HIV-infected populations.

Table 3. Showing identified vegetables grown in the KG

	Name of the vegetable				
Nutrients	Amaranthus (Terere, Ododo Chepkerta)	Spider Plant (Thageti Saget, Akeyo, Isakiat)	Black Nightshade (Managu, Osuga, Isochot)	Cabbage (Mbuga Kabich, Kobichot)	Role of Nutrients in our bodies
Iron	8.9	6	1	0.7	Builds blood, renews red blood cells.
Protein (gm)	4.6	4.8	4.3	1.7	Builds cells, repairs cells, forms hair, skin etc.
Water Content (%)	84	86.6	87.2	91.4	For healthy body functions
Calories	42	34	38	26	For energy.
Carbohydrates (gm)	8.2	5.2	5.7	6	For energy.
Fiber (gm)	1.8		1.3	1.2	For proper digestion, bowel movements.

The surplus from their income is also used to purchase more food to satisfy their requirements. The World Health Organization cites malnutrition as the greatest single threat to the world's public health. Improving nutrition is widely regarded as the most effective form of aid. Emergency measures include providing deficient micronutrients through fortified sachet powders, such as peanut butter, or directly through supplements. The famine relief model increasingly used by aid groups calls for giving cash or cash vouchers to the hungry to pay local farmers instead of buying food from donor countries, often required by law, as it wastes money on transport costs. Long term measures include investing in modern agriculture in places that lack them, such as fertilizers and irrigation, which largely eradicated hunger in the developed world.

Economic Impact of Kitchen Garden on Food Security

Employees in the Tea Estates earn a reasonable monthly gross salary of about kshs 7,000. This is the main source of income for it contributes to above 85% of the total income (see Fig1). Findings indicated that the net earning per employee per month is ksh 2,642. The greatest challenge however is the household size of above 4 people and the escalating cost of living which make their living deplorable.

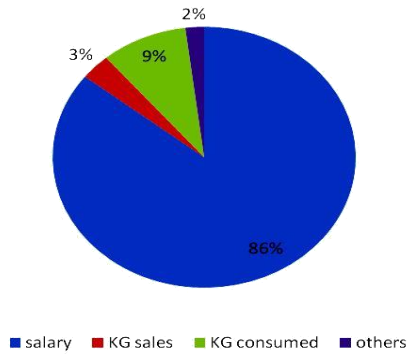

Figure 1. The Contribution of Kitchen Gardens to the Household Gross Income

The World Bank`s operational directive on environmental assessment 2007, states that sustainability is a requirement that Bank projects must meet. Thus sustainability is not one value to be traded off against others in an economic analysis. Rather all options to be compared must be sustainable, so whatever is not sustainable is not even to be included among the options to be ranked economically (World Bank, 2007). Nandi Tea Estate developed a Kitchen Gardens policy by converting lands surrounding homestead into small gardens (Plate 1) that can be planted with vegetables thus improve their livelihood and at the same time conserve the environment. According to the results (Table 4), the KG products have supplemented the household income by up to kshs 1,000 per month which is about 9% of the total income. Income from other sources contributes to about 2 % of total income.

Table 4. Different sources and proportion of income per household

Source of Income per Month	Frequencies	Total Amount (ksh)	Average (Ksh)	%
Salary (Gross)	152	1,132,189	7449	85.6
Kitchen Garden Products	152	43,190	284	3.2
Consumed KG Products	152	121,125	797	9.2
Others	152	26200	172	2.0
Totals		1,322,704	8,702	

Source: Field survey, 2010

Although the focus of homestead food production is on producing food for household consumption, there is the potential for income generation, provided that households produce a surplus and that they have easy access to markets (formal or informal) to sell their produce. Infrastructure such as roads and transport is needed for access to markets, and for households to be able to sell surplus produce, they need access to agricultural inputs, information and technology, reduction of transaction cost, and adequate storage to minimize losses. Economically viable post-harvest products could further enhance market possibilities for locally produced crops. Using a variety of post-harvest products could create a greater demand and potentially enhance the sustainability of local production thereof. For example, planting different types of vegetables which are regular

in the garden and accessible to the market both in the estate and the surrounding villages could result in a sustained market demand.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Through an analysis of kitchen gardening in Nandi Tea Estate, a clear case is made for the contribution of this type of production to food and nutrition security for the rural poor. The evidence for addressing micronutrient deficiencies in these types of intervention is compelling. The case is made for rural-based agricultural interventions as a critical component of a comprehensive approach to address food and nutrition security at the household level.

Although not all households will opt to grow their own vegetables, non-gardening households can potentially benefit from rural-based agricultural interventions. Vegetable gardens are visible, and nutrition education and promotion usually target gardening and non-gardening households.

Interventions to strengthen food and nutrition security must ensure the complementarities and synergies between food availability, access and utilization. These interventions should therefore focus on actions to improve households' environmental, economic, social and physiological access to food. In particular, it is recognized that home gardening projects that aim to produce particularly pro-vitamin rich foods for household consumption, will not eliminate vitamin deficiency, but can help to reduce the risk of vitamin deficiency by increased consumption of home-grown pro-vitamin rich vegetables.

Recommendations

The prospects for nutrition improvements through agricultural interventions are increased if the interventions invest in social, natural, physical, financial and especially human capital. It is imperative that the agricultural component of the intervention be integrated with a comprehensive nutrition education and behavior change component, as the two components work synergistically to increase household consumption of micronutrient-rich foods.

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BIO-DATA

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