

Smallholder Farmers Perception of Rural-Rural Migration and its Contribution to Food Security in Kigoma Rural District, Tanzania

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Received date: January 10, 2018; Accepted date: January 17, 2018; Published date: January 24, 2018

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Abstract

Food insecurity is a major issue in Tanzania and varies across regions and seasons. This study assessed the contribution of smallholder farmer's rural-rural migration to household food security using people's perception. Kidea Village of Kigoma Rural District was chosen as case study to represent other villages which were established by and have been receiving smallholder farmer migrants from other hunger-stricken villages. Land ownership status, types of crops, food availability and access, post-harvest food management practices, the amount of food harvested and length of time it lasted were used as determinants of food security. Household questionnaire, focus group discussion, physical observation and key informant interviews were employed in data collection. The findings show that all respondents had security of land tenure, allowing more food production. Investment in multiple cropping helped to accommodate risks and uncertainties from unforeseen poor climatic conditions. The reported post-harvest food management practices including food donations and brewing did not contribute to food insecurity since their frequencies and amounts were occasional and small, respectively. A high proportion of respondents reporting adequate and affordable food in the village market imply that exchange between food-surplus and food-deficit households was made possible. In addition, majority of respondents reporting better production of crops at destination than in their villages of origin implies that migrant households were food secure. However, it was noted that migration to Kidea is more of subsistence than long term investment in economic development.

Keywords: Food security; Peasant migration; Livelihood diversification

Introduction

State of the art literature

There is limited information on the contribution of smallholder farmers' rural-rural migration to household food security, particularly in Tanzania and the world at large because most studies regarding rural-rural migration and food security grossly neglected this aspect. Instead, more emphasis has been placed on rural-urban consequences migration and its associated socio-economic [1-3]. Whereas this is the case, households and individuals in many parts of the world are gradually seeking options outside their home areas to meet their food and income requirements [2,4-6]. Rural-rural migration is the movement of people from one rural area to another within the same country. Depending on the conditions existing at sending areas, rural-rural migration can be either voluntary or forced. Seasonal migration of labourers to agricultural, forestry or fishing areas is an example of voluntary rural-rural migration [7]. Forced rural-rural migration occurs when social, economic or environmental conditions in the sending area become unbearable, forcing people to look for an alternative location for securing their livelihoods [8]. In this respect, rural-rural migration is used as an important livelihood strategy by the rural families to increase their food security [9]. Increasing population pressure, land conflicts, agriculture commercialization and cultural factors can act as drivers for rural-rural migration [2].

Studies conducted in India, Nepal, Vietnam, Western Kenya and Southern Tanzania indicate that migration involves individuals and households moving to other rural areas either permanently, temporarily or by keeping part of the their families in the areas of origin. The current rural-rural and rural-urban migration in Tanzania as reported by Kurji, Mbonile, Madulu, Mung'ong'o and Mwamfupe and Mung'ong'o [10-14] is taken as a survival and income earning strategy involving herders, farmers and labour migrants following the breakdown of livelihood base in the areas of origin. In poor rural societies prone to food insecurity and limited income generating opportunities, labour migration, either in a rural-rural or rural-urban migration pattern, mostly carried by adult males, becomes a stabilizing component in the overall livelihood security to ensure food security especially of those left behind [15].

A Household Food Economy Survey on the role of migration in livelihood in Tanzania, which was carried out in the semi-arid regions of Dodoma and Singida discovered that in years when the food availability is significantly below the usual levels, labour migration for paid jobs to plantations in Iringa, Morogoro and Arusha Regions is the only strategy that can meet a significant percentage of the food gap. The amount of money earned from sale of labour in plantations is remitted to the migrants' areas of origin for sustaining the rest of the family members [16]. Although the available literature indicates smallholder farmer rural-rural and even rural-urban migration as a livelihood strategy [8,17,18] majority of them have not assessed the extent to which this mobility behaviour contributes to food security among the migrant households.

Since the late 1980s many areas in Kigoma Rural District experienced migration of smallholder farmers, which originated from

land-shortage and food-insufficient villages to food-surplus areas [19]. Driven largely by food shortage, the hunger-stricken smallholder farmer households could move as far as 200 km to areas where land is still more productive (especially unoccupied/forest) within and outside the district. Most of these migrants originate from the Ujamaa (socialist) villages formed in the early 1970s as part of villagization of production, which in essence collectivized all forms of local productive capacity. In these migrations, migrants aimed at improving household food security through food production and income generation upon settling in the area of destination. Among the targeted areas in and outside the district include areas located in and near the Malagarasi-Moyovosi Ramsar Site and the low-lying areas along Lake Tanganyika both in western Tanzania. Since then, about 135 new villages have been established by rural-rural migrants in Kigoma Rural District. Kidea is one of the targeted villages by migrants in the district. Since its establishment in 1990, the village has been receiving migrants from other villages experiencing food shortage in and outside the district. To date, no study has been conducted in the district to assess the extent to which migration offers solution to food insecurity, which faces many smallholder farmers in Kigoma Rural District. The basic question this study attempts to answer is: To what extent is rural-rural migration a solution to food insecurity in Kigoma Rural District Tanzania?

According to FAO and Pinstrup-Andersen [20,21] food security exists when all people, at all times, have physical, social and economic access to sufficient amounts of safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. As such, food security can be measured by four basic dimensions, namely availability, access, stability and utilization. Availability (at household level) refers to amount of food available in a household through all forms of production, purchase, and donation [22]. Access refers to ability of households to access food, which is determined by physical, economic/financial and socio-cultural conditions existing in the society [22,23].

Stability encompasses those situations in which households are vulnerable to either temporary or permanent loss of access to resources, factor inputs, social capital or livelihoods due to extreme weather events, economic or market failure, civil and natural resource conflicts or environmental degradation [24]. Utilization refers to people's ability to absorb nutrients and may also cover factors such as safe drinking water and adequate sanitation to avoid the spread of diseases. The concept is based on how food is used, prepared, stored, or processed. It also includes cultural practices that negatively affect consumption of enough nutritious food. The factors considered in this paper may fall in one or more of the four dimensions of food security.

Research gaps

Studies on food security in Tanzania and Kigoma Rural District in particular are very limited, and those that exist have largely focused on indicators such as ethnicity, household wealth and social support [25], maternal anxiety and depression [26], food intake and food quality [27,28], maize varieties [29], and Radimer/Cornell measure [30] in assessing household food security. However, it has been established that other determinants such as land tenure security [31-34], types of crops farmers grow and their purpose [35-37], how food is managed after harvest [38,39], amount of food produced and how long it lasts after harvest [40], household income [41,42] and availability of food and access in the local or international market can influence household food security [43]. Unfortunately, these determinants have not been

adequately applied in food security determination in the aforementioned studies.

Research objectives

Based on the shortfalls inherent in the food security research in Tanzania and elsewhere, the present study aimed to assess the contribution of smallholder farmers' rural-rural migration to household food security using people's perception. Using locally-based indicators, the present study aimed to specifically assess land ownership status and its modes of acquisition in the study village, identify the types of crops grown and their purposes, assess the post-harvest food management practices and implications on food security, assess the amount of food produced and length of time it lasted after harvest, identify the sources and approximate household income per year, and assess food availability and access in the local market.

Importance of the study

Findings from this study are expected to offer baseline data on rural-rural migration and related issues in the district in particular and Tanzania in general. It also sheds light on whether or not rural-rural migration is a viable solution to food insecurity among smallholder farmer households. It also offers basis for planning and community mobilization geared to enable food insufficient households generate income and actively engage in rural self-employment schemes through ranges of capacity building activities in their villages. The study evokes the sustainability issues related to rural-rural migration as a survival strategy to achieve household food security. It is anticipated that prolonged cultivation on a limited area coupled with increasing population in the study village is likely to degrade the soil. Depletion of soil fertility is likely to induce movements to other places which are still virgin. If unchecked, food production can be achieved at the expense of the environment.

The study has an immense contribution on achievement of some Sustainable Development Goals, to which Tanzania is a signatory. Goals 1, 2 and 15: poverty reduction, reducing food insecurity, and sustainable management of forest and other resources, respectively. It is relevant to the Tanzania Development Vision 2025: enhancing environmental conservation and food security and reducing abject poverty and the Tanzania Agriculture Climate Resilience Plan 2014-2019: enhancing crop productivity and food security. Relevant to this study are also the National Climate Change Strategy 2013: addressing problems of rural-urban and rural-rural migration, the Tanzania Agricultural Sector Development Programmes ASDP 2013-2017 and Climate Smart Agriculture Programme 2015-2025: achieving sustainable agricultural sector through mobilization of private sector investments and partnership. It also contributes to implementation of the National Food Security Policy 1997, which recognises food availability, accessibility and utilization as three major pillars of food security.

Materials and Methods

Study area

This study was conducted in Kidea Village, located in Kandaga Ward in Kigoma Rural District (Figure 1). The village is located at an altitude of 1,200 m a.s.l., with its terrain largely dominated by plains, hills especially on its south and south-eastern parts, and a few valleys and swamps especially in areas near the Malagarasi River. The soil is

predominantly loamy and clay, with alluvial soils predominant in most places especially near Malagarasi River. A large part of this village is poorly drained except for the southern part which is drained by Malagarasi River. All the villagers are smallholder farmers who depend on rain-fed agriculture. Other activities such as fishing, livestock keeping, bee keeping and honey collection, business, charcoal making are common in the area. The commonly grown food crops are cassava, paddy, beans, maize, sweet potatoes, bananas and peas. Maize, banana, sweet potatoes and cassava are the major staple food and have highest per capital consumption rate in the local diet in the study area [19].

The selection of this study village was based on the fact that it is one of the new villages established by rural-rural migrants, mainly in search of arable land. More interestingly, the village receives migrants from four main villages experiencing three major push factors namely land shortage, loss of soil productivity and unemployment. For example, between 1990 and 1994 migration to the study area started at a low pace, but the number of immigrants increased tremendously and peaked in the period between 1995 and 1999 and was almost maintained constant in the period between 2000 and 2004 [44].

It is worth noting that, apart from immigration, the general increase in village population as presented above was also influenced by birth. However, the rate of immigration to the village declined by 20% between 2005 and 2010. Based on this trend, it was thought that with 20 years of its existence, the village could provide enough and more relevant data to answer the research objectives.

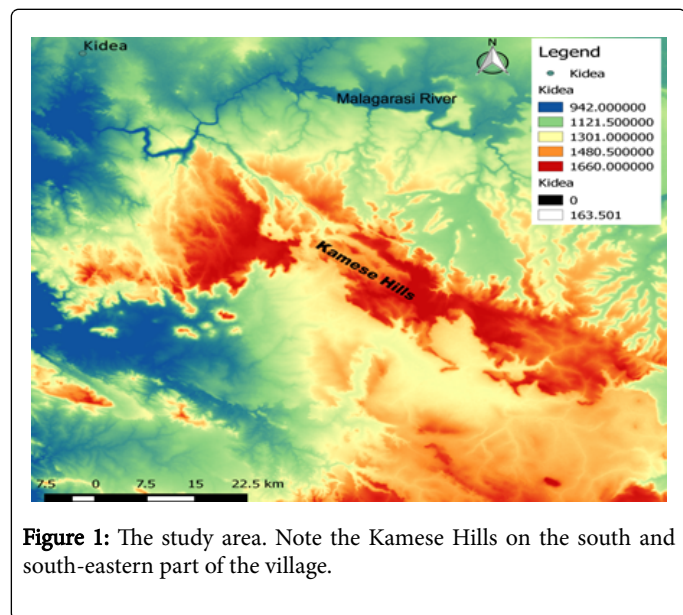


Figure 1: The study area. Note the Kameese Hills on the south and south-eastern part of the village.

Data collection

Data collection involved the use of household questionnaire consisting of open and close ended questions. House-to-house visit

Sub-villages	Total households	Sample size	% of Total
Mazungwe	212	275/885 × 212=66	24
Kidea Kati	224	275/885 × 224=70	25
Kamutumbu	118	275/885 × 118=37	13

was made to sampled households where heads of targeted households were requested to respond to the survey questions. All the heads of sampled households responded to the administered questionnaire, making 100% response rate. In addition to incorporating the most important socioeconomic and demographic information of the respondents, the questions focused on eliciting information on trends and causes of rural-rural migration, nature of livelihood activities and the contribution of rural-rural migration on household food and income security in the study area. This method was chosen because it yields quality data as the same questions are asked across all respondents [45].

These questions were administered to sampled heads of households who migrated to the study village since 1990 when it was established. Purposive sampling and proportionate random sampling were employed to obtain the sample for administering a household questionnaire. All the 5 sub-villages (Mazungwe, Kidea Kati, Bakwata, Kamtumbu and Mibangani, with different number of households) were purposively included in the study (based on their size and geographical distribution). The total number of migrants' households for the whole village was 885. Proportionate random sampling was employed to obtain representative heads of households using the Slovin's formula [46], which is:

$$n = \frac{N}{1 + Ne^2}$$

Where; n=number of sampled households in the whole village, N=number of households in the whole village, and e=the desired level of precision or sampling error at a stated confidence level. Using a confidence level of 95%, the sampling error becomes 5% or 0.05.

$$\text{Therefore: } n = 885 / (1 + 885 \times (0.05)^2)$$

$$n = 885 / (1 + 885 \times 0.0025)$$

$$n = 885 / (1 + 2.2125)$$

$$n = 276$$

Based on Slovin's formula, and at the 95% confidence level, the study sampled a total of 276 households and considered representative of the 885 households. To ensure that the number of sampled households in a particular sub-village is proportional to the total number of households in that sub-village, a proportionate stratified random sampling was applied using the following formula:

$$n = \frac{n}{N \times b}$$

Where; a=sample size for each sub-village, n=number of sampled households for the whole village, N=number of households in the whole village and b=number of households in each sub-village. The number of sampled households in each sub-village is presented in Table 1.

Bakwata	95	$275/885 \times 95=30$	11
Mibangani	236	$275/885 \times 236=73$	27
Grand total	885	276	100%

Table 1: Number of households in each sub-village in Kidea Village

Focus group discussion (guided by a checklist of questions) was held with 10 purposively selected villagers. Included in the discussion were villagers with different occupations (farmers, employees, pastoralists, charcoal makers, traders, hunters) with due consideration of gender and age of respondents. The discussion with selected villagers focused on general trends of migration to the study village, factors for their migration, difference in food and income security between Kidea Village and villages of their origin, and their overall perception of migration as a livelihood diversification strategy.

The method was chosen because it generally provides personal and group feelings, perceptions and opinions about a research topic under question [47]. Key informant interviews involved the District Agricultural and Livestock Development Officer, 3 food traders in the village market, 5 farmers and 3 pastoralists. Guided by village leaders, these informants were purposively selected based on the understanding that they had specific information relevant to this study.

Key questions in these interview included time they moved to the study village, the status food and cash crop production and their market prices including affordability, coping strategies to food and income insecurities and their overall perception of migration as food and income security strategy. These methods enabled acquisition of information about knowledge, perspectives and attitudes of people and free exchange of ideas and getting more detailed response about the impact of migration decision to food security [48].

The main sources of secondary information were the University of Dar es Salaam (UDSM) Central Library and internet, from which relevant information related to rural-rural migration and food security were obtained. The Kigoma Rural District Agricultural and Livestock Development Department was consulted to provide data and information on food production status and trend in the district. The data for this study was analysed using MS Excel 2007 where descriptive statistic such as percentages were generated and results presented in histograms.

Findings

The smallholder farmers' perception of rural-rural migration and its contribution to household food security is presented in the following sections using five factors, which are hereby considered to be measures of food security.

Land ownership status and its modes of acquisition in the study village

This study found that all respondents owned land, with about 76%

of them owning between 0.5 and 19 acres, and 24% owning between 20 and 79 acres (Figures 2a and 2b). Land acquisition took several forms, including land purchase (53.3%), allocation by government (21.3%), acquiring unoccupied land (12.0%), inheritance (5.3%), renting (5.3%) and land sharecropping (2.7%). Land renters include new migrants to the village and financially unable to purchase land by the time of this study.

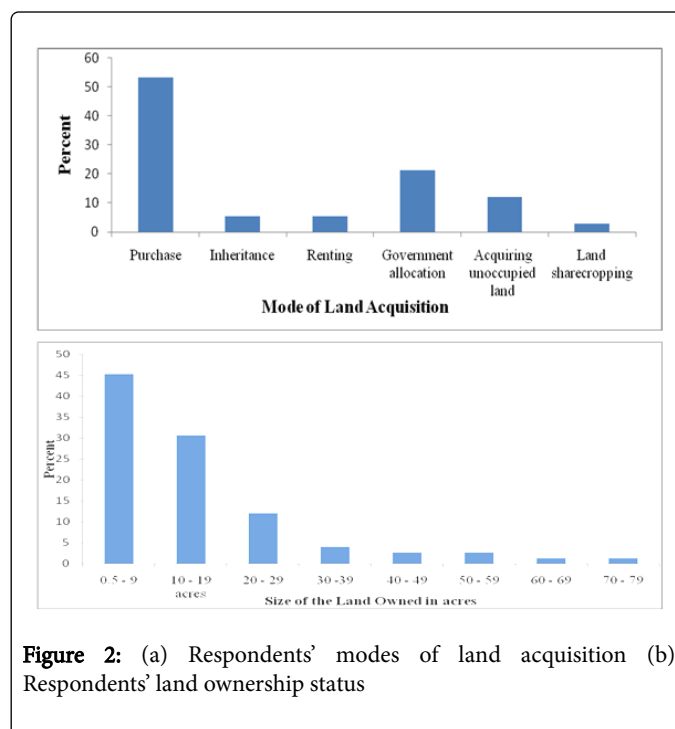


Figure 2: (a) Respondents' modes of land acquisition (b) Respondents' land ownership status

Types of crops grown and their purposes

All respondents grew a combination of crops, with maize, cassava, beans, groundnuts and potatoes being the commonly grown crops. Of the 276 respondents interviewed, 84.0% grew maize, 65.3% cassava and 66.7% grew beans for food and cash purposes (Figures 3 and 4). While about 84% of the households reported to grow potatoes, 8.0% and 2.7% of the respondents reported to grow sunflower and tobacco, respectively

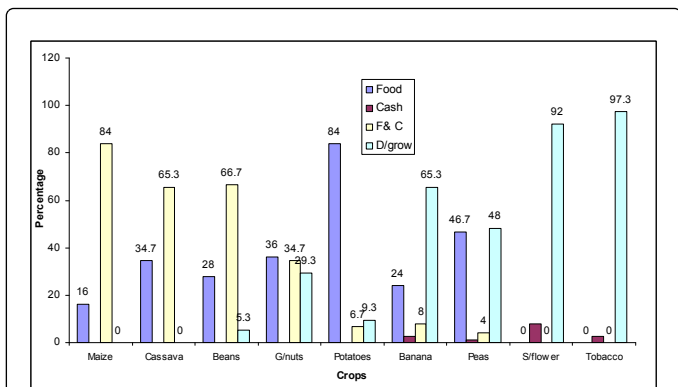


Figure 3: Types and purposes of crops grown by respondents (%) Key: F & C=Food & Cash; D/grow=don't grow; G/nuts=groundnuts; S/flower=sunflower



Figure 4: Cassava, maize and tobacco fields in Kidea village. Note the intercropping practice which is common in the area.

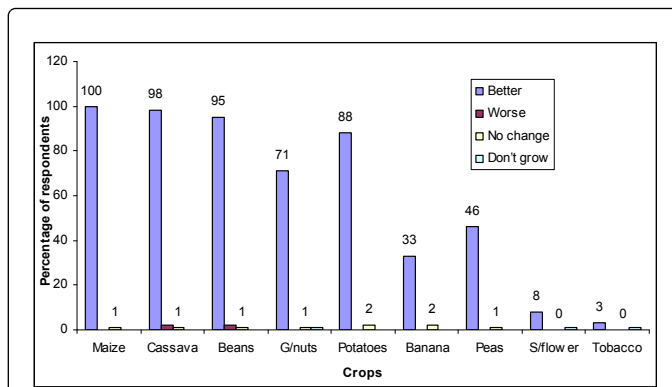


Figure 5: Situation of crop production at migrants' destination

Of all the respondents, 177 (64%) reported to produce food lasting to the next harvest while the remaining 99 (36%) produced food that did not last to the next harvest. Of the latter case, 20% had food lasting for three quarters of a year, 12% for half a year and 4.0% for quarter of a year (Figure 6). Majority of households reporting to run short of food before the next harvest are those who sold part of it to cater for household requirements (e.g. education and medication) and those who owned small farmland (1-2 acres). These had recently migrated to the village and, by that time, had not acquired adequate land. Households reporting to sell food depended largely on farm produce and had limited income generating activities to supplement the on-farm income.

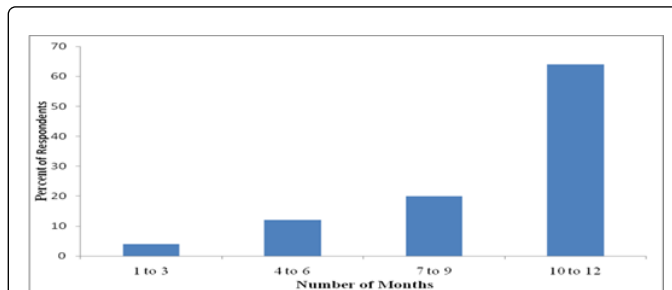


Figure 6: Length of time food lasts after harvest. It is a commonly used measure of food security (Ala and Bello) [49].

Post-harvest food management practices

With regards to how food crops are used after harvest, this study found that household consumption was the main use of food crops while local brewing was the minor. Of the 276 respondents, 96% of them reported to use crops mainly for food and 3% for food and local brewing. Majority of respondents reported that local brewing is predominantly carried out using certain varieties of banana which are not suitable and preferred for consumption. In addition, almost all respondents reported occasional incidences of food donations to neighbours and relatives to cater for wedding, funeral and other ceremonies in and outside the village. However, these constituted less than 1% of all household food consumption. Sunflower and tobacco were the main crops sold for cash. Households reported to sell a portion of food crops in incidences where they either had not grown cash crops or experienced poor harvest thereof.

Amount of food crops produced and length of time food lasted after harvest

Almost all respondents were not able to report the amount of food produced per growing season, partly due to poor record keeping and memory lapses. However, they were able to compare the amount of food production between their areas of origin and destination using unmeasurable qualitative terms such as better or worse. The proportion of respondents reporting better production of maize, cassava, beans, groundnuts and potatoes at the place of destination ranged between 70% and 100%, with maize and cassava accounting for 98% each, beans 95%, groundnuts 71% and potatoes 88% of the total respondents (Figure 5).

Sources and approximated household income per year

Although information on income is usually unreliable, this study tried to document information on the average annual household income from different income generating activities (e.g. sale of crops, charcoal making, sale of labour, petty business, fishing and craftworks) and how households spent their income. This was made on assumption that if food is available in the market and a household is a rationally behaving unit (so that all the income or food available for the household is distributed rationally based on requirements of the different household members), the annual household income earned would determine the extent to which the household is food secure or insecure. Accordingly, the study found that 76% of the households earned a maximum of 500,000 Tshs (USD 600/year (Figure 7) while a small proportion (24%) earned between 1,500,000/- and 3,000,000/- Tshs/year.

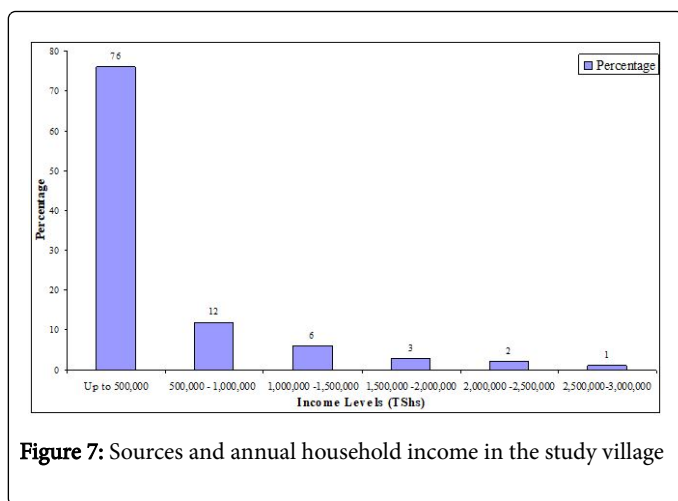


Figure 7: Sources and annual household income in the study village

With respect to sources of income, 91.8% of the households generate income from sale of crops while only 8.2% of the income was from the aforementioned off-farm sources. To substantiate this argument, some respondents reported to engage themselves in running small shops and kiosks, market stalls and restaurants for selling basic household items, food items and traditional local meals, respectively. Additionally, some villagers were also seen selling bites (locally known as vitumbua and maandazi) in the village market and on the streets. Majority of respondents (88%) spent their income on various household requirements (e.g. food, paying for education and health services, buying clothes and other domestic utilities like kerosene and soap). Moreover, 12% of the households reported that apart from spending their income on household requirements, they also invested part of the income on farming through paying casual labourers who help with farm preparation, cultivation, weeding and crop harvesting.

Food availability and access in the local market

Availability of the main staple and non-staple food in the market is hereby considered to be one of the dimensions of food security. Accordingly, respondents were asked to state whether or not there were adequate staple food crops in the markets and whether the prices were affordable or not. About 98.7% of the respondents reported availability of adequate staple food and affordable prices. A field visit to the village market revealed that the price for 1 Kg of un-milled maize ranged from Tanzanian Shillings (Tshs) 150/- to 200/- (USD 0.06 to 0.09). While the price for one bundle of dried cassava (equivalent to 5 Kg of flour when milled) was Tshs.1000/- (USD 0.43). During harvesting period this price could go as low as Tshs. 500/- (USD 0.21) per bundle. Prices for beans followed almost similar patterns. Other crops such as groundnuts were usually sold on wholesale basis.

Discussion

Land ownership status in the study village

Access to, size, and mode of land acquisition are some of the most important indicators of the four dimensions of food security. When land is available in good quantity and if other production factors are available, households will naturally get the opportunity to produce more food for consumption and market [50]. The implication of this finding is that migrants in the study area benefit from possessing secure land tenure. Having secured land tenure, and if other

production factors are kept constant implies that majority of migrants had a greater likelihood of engaging in food production because they could maintain rights over the land for the whole duration of investment. The land tenure system and size of the land owned determine the extent to which an individual or households can access land and the amount of food produced per unit area cultivated. Reduction or outright loss of access to land in an agrarian society, leads directly to a reduction in income and access to food. On the other hand, increased security of tenure in productive resources enables more efficient and productive agricultural production.

Generally, the higher the perception of tenure security, the higher would be the farmers expected returns to the investment. Carter et al. reports similar findings in selected villages in Chiradzulu and Mangochi Districts in Malawi [51]. The recognition that land is the most important resource base of the rural poor from which all other economic systems and activities are generated was also reported by [50].

According to Maxwell and Wiebe [32], a farmer's perception of the probability that he or she could maintain rights over the land for the duration of the investment is an important variable in achieving food security. The higher the perception of tenure security, the higher would be the farmers expected returns to the investment. Whereas reduction or outright loss of access to land leads to a reduction in income and food, increased security of tenure in productive resources enables more efficient and productive agricultural production.

Access, size, as well as mode of land acquisition are some of the most important indicators of household food security. When land is available in good quantity and quality, households will naturally get the opportunity to produce more crops for both household food and market [50]. The study found that all respondents owned enough land. Although a small proportion of respondents rented land but more than ninety two percent had secure land tenure. The implication of this is that migrants in the study area benefit from possessing land. By having secure land tenure, and if other factors were kept constant, majority of migrants had a greater likelihood of being food secure because they could maintain rights over the land for the whole duration of investment.

Farmer's perception of the probability that he or she could maintain rights over the land for the duration of the investment is an important variable in achieving food security. The higher the perception of tenure security, the higher would be the farmers expected returns to the investment [32]. While reduction or outright loss of access to land in an agrarian society leads directly to a reduction in income and food, increased security of tenure in productive resources enables more efficient and productive agricultural production (ibid). Nature of the soil can also contribute to food security. Rural-rural migration of migrants labourers from areas of infertile soils of the Upper West Region in the north to more fertile land of Brong-Ahafo region in the south both in Ghana are reported to ameliorate food security for their families [52]. Conway and Shrestha [53] documented rural-rural migration in the Hill and Tarai regions of Western and Central Nepal prompted by landlessness, low productivity and inability of the households in sustain themselves.

Types of crops grown and their purposes

Owning land cannot by itself guarantee household food security. Household food security is also determined by the types of crops grown and their purposes. Most of the crops grown in the study area

(maize, cassava, beans, groundnuts and potatoes) form a major portion of the staple food and have highest per capita consumption rate in the local diet in the study area in particular and Tanzania in general [19]. In many places, when some or all of these crops fail due to whatever reasons, such as poor rains and pests, most of the households complain that they do not have enough food. This is an indication that these crops are important in sustaining household food security.

To tackle this risk, farmers choose to do multiple cropping. The advantage of multiple cropping with regard to food security is twofold. First, it ensures the harvesting of other crops in the event that the main crops (maize and cassava) fail. In this village, investment in crop diversity is used as a coping strategy to accommodate risks and uncertainties from unanticipated unpleasant climatic conditions by spreading it across a variety of crops with different climatic capabilities. This contributes to creating vigorous food cropping system that can endure a wider range of environmental changes [54]. Secondly, apart from being used as food, part of it can be sold to cater for other household requirements and investment on farming to increase production hence improving food availability at household level.

Post-harvest food management practices

The mere fact that local brewing is predominantly carried out using a certain variety of banana which is not suitable for food implies that local brewing had no negative impact on food availability and access. In view of the fact that the amount of food donated was small and the incidences of food donations were occasional, it can therefore, be argued that local brewing and food donations did not negatively affect household food security. Post-harvest food management (PHFM) practices have great implication on the level of household food security. When food is harvested, it is normally put under different uses depending on the type of food grown, household food requirements and the culture of a place. PHFM practices including food donations and uncontrolled use of food in ceremonies can reduce the amount of food meant for consumption, thus, endangering both availability and sustained access to adequate food by household members [55].

Post-harvest food management (PHFM) practices have great implication on the level of household food security. When food is harvested, it is normally put under different uses depending on the type of food grown, household food requirements and the culture of a place. PHFM practices including uncontrolled use of food in ceremonies can reduce the amount of food meant for household consumption, thus, endangering both availability and sustained access to adequate food by households [55].

This study found that a small proportion of respondents used crops, particularly, banana for local brewing. The mere fact that local brewing is predominantly carried out using a certain species of banana which is not suitable for food implies that local brewing had no negative impact on food availability and access. Although food donation to ceremonies and relatives was reported as one of the PHFM practices, this practice did not contribute to reduction in food availability and access at household level because the donated amount was small and the incidences of food donation were occasional. From the above information, it can, therefore, be argued that local brewing as well as food donation did not negatively affect household food security.

Amount of food produced and length of time it lasted after harvest

The fact that two third of the households produced food that lasted to the next harvest while only one third produced food that did not last to the next harvest is an evidence that majority of households were food secure. Households which produced food that did not last to the next harvest employed a combination of coping strategies including casual labouring, borrowing from neighbours, collection of wild foods, engaging in petty business and handicraft making to bridge food deficit gap. This implies that households can still maintain stable availability of and access to food in spite of low food production [40].

The fact that three quarters of the households produced food that lasted to the next harvest while only one quarter produced food that did not last to the next harvest is an evidence that majority of households were food secure. Among households which produced food that did not last to the next harvest, majority had food lasting for three quarters of the year; very few for half a year and insignificant proportion had food lasting for one quarter of a year. It was also found that some of the households who reported to run short of food before the next harvest arrives are those who sold part of the crops soon after harvest in order to get money for fulfilling other non-food household requirements, including education and medication.

Households which produced food that did not last to the next harvest employed a combination of coping strategies including casual labouring, borrowing from neighbours, collection of wild foods, engaging in petty business and handicraft making to bridge food deficit gap. This implies that households can still maintain stable availability of and access to food, in spite of low food production [40].

Food availability and access in the local market

Availability of the main staple and non-staple food in the market is one of the dimensions of food security. This study found that almost all the required food crops were available in the village market at affordable prices. The prices for maize (150-200 Tshs/kg) and cassava (200 Tshs/kg) in the study area fetched comparatively lower price than the national average price (400 Tshs/kg for maize) and 300 Tshs/kg for cassava) [56].

Depending on the purchasing power, availability of all required food crops in the market ensured individuals and households access to food. When food is available in the markets at an affordable price, the exchange between food-surplus and food-deficit households or individuals is made possible and allows households with different income levels within a livelihood to access adequate quantities and quality of food [57]. Maize and cassava are the main staple foods in Tanzania. The per capita consumption of cassava (157 kg per capita) is more than twice that of maize (73 kg per capita). Owing to its greater calorific density, maize is more important as source of calories, contributing to 33% of the total compared to 15% for cassava [58].

This finding implies that, agriculture, especially crop production, is the major activity that generates income for sustaining general household welfare and food security in particular. This does not deny that fact that households possess other activities that augment the income generated from sale of crops. These may include sale of labour, charcoal making and selling, petty business, timber production, craftwork and fishing.

Similar findings were reported in the agricultural survey done by the Bureau of Statistics in 1986/87. It was reported that, about 41% of

rural households in Tanzania had their main source of income from sale of crops while only 31% of the income was from non-agricultural sources URT, 1989. Furthermore, reported that in Tanzania as well as in other developing countries agriculture is still the main source of rural income and in most cases, most people and households in rural areas engage themselves in both agricultural as well as in non-agricultural activities to complement agricultural production [59].

It has been established that availability of food in the markets at an affordable price makes the exchange between food-surplus and food-deficit households possible, and allows households with different income levels within a livelihood to access adequate food [57,60]. On the other hand, unavailability of and poor access to food can increase the amount of resources necessary for the households to obtain appropriate food for a nutritionally balanced diet, especially among vulnerable groups such as the urban and rural poor, and women and children in developing countries [61].

Conclusion and Recommendations

Migrants' overall perception on the impact of migration on household food security involved comparison of the overall situation of food production, availability and access between areas of origin and destination. Accordingly, a high proportion of respondents applauding improved access to more and productive farmland, better crop harvest and affordable food prices imply that migration to the study area had positive impact on household food security. Better performance of the commonly grown crops in the area of destination than at places of origin, as reported by majority of respondents, is yet another proof of the positive impact of migration on household food security. The observed multiple cropping system for food, cash or both purposes helps in creating a strong food crop system that can endure a broader range of environmental vagaries thus, ensuring crop harvest. Coping strategies including casual labouring and borrowing from neighbours which were adopted by food-deficit households is also an assurance to food security as these practices help to bridge the food deficit gap before the next harvest.

Despite the positive contribution of migration to household food security, prolonged cultivation on a limited area coupled with increasing population in the study village is likely to degrade the soil, especially when proper land management practices such as permaculture are not adhered to. Depletion of soil fertility is likely to induce movements to other places which are still virgin. If unchecked, prolonged cultivation on a limited area coupled with increasing population in the receiving villages is likely to degrade the soil, leading to enhanced food security at the expense of the environment.

When assessing the impacts of rural-rural migration on food security, one should bear in mind that migration can sometimes reallocate household labour associated with productive and reproductive activities in the areas of origin, reduces labour force for food production and increase the work burden of men and women, depending on who is left behind. In view of the above, this study recommends that concerted efforts be taken by the regional or district government to curb the persistent food insecurity in the district. To achieve this purpose, migrants in their destinations as well as non-migrants in their places of origin should embark on strategies geared to maximize crop productivity and achieve both food security and environmental conservation.

Acknowledgements

The author would like to thank all the respondents for devoting their valuable time and provide information that made this study a success. I extend my sincere thanks to my thesis supervisor Professor Claude Gasper Mung'ong'o for his tireless guidance till the completion of this study. I also thank the Tanzania Ministry of Education and Vocational Training for funding this study.

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