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Home to Field Distance in Western Bagamoyo, Tanzania: Lessons for Rural Development Policy and Practice

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Abstract

Long home to field distance and its impact on agricultural productivity attracted concern from researchers after Tanzania's villagisation programme in mid-1970s, but has drawn less attention in recent years. This article establishes the status, causes and implications to rural development, of home to field distance in Western Bagamoyo, Tanzania. Home to field distance has increased as farmers abandon agricultural land near villages that is exhausted due to continuous cultivation without adequate use of external inputs. Land near the village has become scarce and more expensive as is demanded for settlement development. Farmers seek land, which their families had occupied prior to villagisation as well as clear fresh bush land that is farther away from residential areas. To cope with long home to field distance, farmers migrate temporarily to the field where they live in temporary structures for three to six months. These farmers' strategies to alleviate the distance problem are not sustainable as they lead to further land degradation. Policy and practice for rural development need to take into account farmers' needs for agricultural intensification and their temporary mobility.

Keywords: *agricultural production, rural settlements, home to field distance, Bagamoyo District, Tanzania.*

1.0 Introduction

Home to field distance has been a subject of attention in the appraisal of the villagisation programme that reorganised scattered homesteads into nucleated *Ujamaa* villages in Tanzania in mid-1970s. The process created longer distances between homes and fields which impacted negatively on agricultural production (McCall, 1985; Silberfein, 1989). Various changes have occurred during the three decades since villagisation that are likely to have influenced home to field distance. One such change is increase in population size and density in the villages. Change has also happened in policy and legal frameworks for access, use and management of resources as the nation retreats from a state controlled to a more liberal market economy.

Whereas the relative distance from home to centres of services such as health, education and agricultural extension and marketing has attracted research and publicity, home to field distance has received little attention despite being the most critical factor for smallholder agricultural production. The aim of this article is to analyse the status of home to field distance and discuss its implication for socio-economic development in Western Bagamoyo, Tanzania and to draw lessons for rural development policy and practice.

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2.0 The factor of 'distance' in the organisation of rural space

Distance is a key element in the organisation of space. Von Thunen's (1783-1850) theory suggests that distance influences the organisation of agricultural land uses away from a central market. As the distance increases from a central market farmers use the land to produce products that are less profitable but much easier to transport. Agricultural production involves spatial interactions in which *distance decay* and *friction of distance* are key elements. Distance decay is the effect of distance on spatial interaction. The distance decay function is the principle that states that interaction between two places declines as distance between them increases. However, advance in technology reduces the hindrances to spatial interactions that relate to friction of distance.

In consideration of the limitation of overcoming physical distance, farmers make decisions on which distance to minimise in order to access, use and manage resources in the most productive way. The choice is often influenced by the local conditions as well as the goals of the production system. Distance is an important element of agricultural production as technical efficiency decreases with increasing distance between home and field (Kassali *et al.*, 2009). The villagisation programme unfortunately has not been supported by adequate measures for supporting agricultural intensification and improvement in technology for overcoming the constraint of physical distance. Consequently, excessive journeys to work are affecting agricultural productivity and socio-cultural and welfare conditions of farmers (McCall, 1985).

Critics of Tanzania's villagisation programme identify a contradiction between the intention of the state to minimise distance between homes and centres of services and markets and that of farmers to reduce distance to production fields (Silberfein, 1989; Kjekshus, 1977). Long home to field distances have negative influence on agricultural production through, for instance, constraining application of manure (Williams, 1999); and reducing time available for farming and transportation of output (McCall, 1985). Although nucleation shortened distance to services, it increased distance to fields and other resources e.g. energy, water, etc. (Lawi, 2007). But as McCall (1985) points out farmers' home to field trips are greater than those to central services.

Fields nearby village centres should have greater fertility than distant farms on the assumption that their use would be more intensive (Dejene *et al.*, 1997). Less walking distance contributed to the easy transporting of manure and other residues to the farm and encouraged more intensive farming. Similarly, strong gradients of decreasing soil fertility are found with increasing distance from the homestead within smallholder African farms (Tittonell, 2005). Although the quality of land of fields nearer to homesteads is expected to be better through greater use of external inputs, the experience of rural Tanzania shows inadequate access and use of external inputs by smallholder farmers such that the expected intensification near the villages is not realised.

The importance of home to field distance to agricultural production among smallholders in Tanzania calls for understanding of its status in the context of changing socio-economic and spatial conditions after villagisation, including increasing commercialisation of land (Sokoni, 2008). Traditional ways of accessing land are giving way to more market based transactions following the ongoing process of formalisation of land property. How rural

households cope with these changes that affect distance between home and fields is an important issue for understanding agricultural production, and deserves attention of the rural development policy makers and practitioners.

3.0 Materials and methods

The article is based on a study conducted in 2009-2010 in five villages in Western Bagamoyo District, Tanzania as part of a broad research project on rural settlement development since villagisation. The quantitative analysis of home to field distance is based on a sample of 232 households from the five villages (Figure 1). Further qualitative data was collected through review of literature, interviews with key informants, and focus group discussions (FGDs). The FGDs were held at ward and village levels and were composed of ward/village government members, and experts in education, agriculture, health, and community development. Interviews were conducted with key informants who included farmers, school teachers, medical doctor in charge of a dispensary, and health officers. The following sections present the study findings.

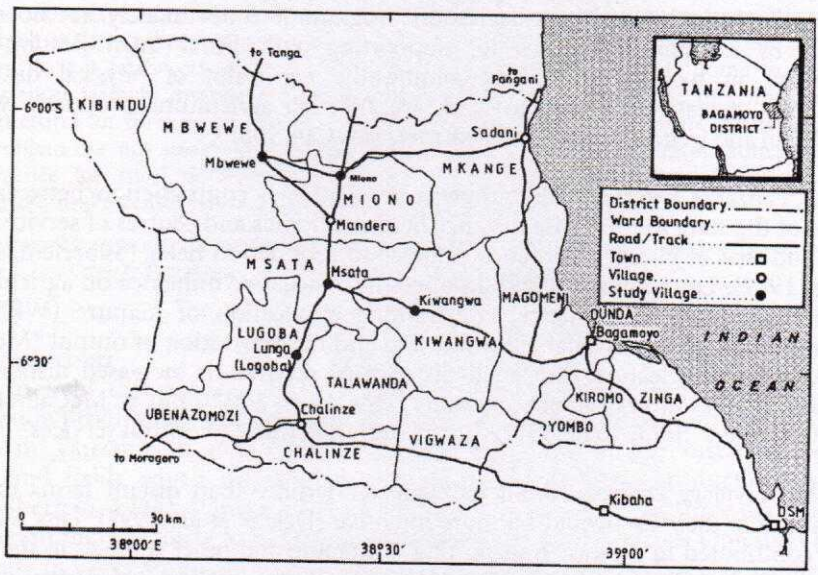

Figure 1: *Location of the study area and sample villages*

4.0 Home to field distance in Western Bagamoyo

Smallholder agricultural production is the main means of livelihood for the rural households in Western Bagamoyo although some households are increasingly diversifying to non-farm occupations. Households own multiple fields located in different areas and intercropping is a common practice. The study assumes that for each field, the farmer identifies the main crop. Table 1 summarises some of the field characteristics in the villages studied. Out of the 232 respondents, 220 provided information on their fields. On average each household had two fields, with the overall average field size of 6.7 acres. Mbwewe has the largest average field size of 12.7 acres while Lunga has the smallest average size of 3.8 acres.

Table 1: Some field characteristics in Western Bagamoyo

Variable		Mbwewe	Miono	Kiwangwa	Msata	Lunga	All
Number of fields (counts)	Mean	1.79	1.65	1.63	2.03	1.57	1.71
	Std. deviation	0.83	.688	.741	.964	.720	.786
Field size (acres)	Mean	12.7	6.2	5.6	4.5	3.8	6.7
	Std. deviation	32.2	10.6	14.4	3.7	5.9	17.5
Distance to fields (minutes)	Mean	63.4	57.1	60.1	69.3	59.3	61.2
	Std. deviation	45.7	39.5	52.9	51.2	53.7	48.1
Means of field acquisition (counts)	Free (Village)	10	7	2	1	8	28
	Free (relative)	16	21	11	3	16	47
	Inherited	24	37	44	21	33	159
	Bought	16	10	9	28	8	71
	Cleared Bush	19	5	4	5	4	37
	Hired	0	2	3	0	1	6
	Total	**85**	**82**	**73**	**58**	**71**	**368**
Period of acquisition (periodisation)	1950 - 1973	1	0	6	3	3	13
	1974 - 1980	10	10	11	5	20	56
	1981 - 1990	14	11	7	8	13	53
	1991 - 2000	12	18	12	12	11	65
	2001 - 2009	30	31	26	29	17	133
	Total	**67**	**70**	**62**	**54**	**66**	**329**

Source: Field data, 2009

Figure 2 depicts variations in ways of acquiring fields, by date of acquisition. Inheritance is the most common means of acquiring land. Most of the landholdings were inherited land *(mashamba ya urithi)*. A great deal of land is still being held under customary tenure. The system is known for ensuring that land is available for the family now and in future. The increasing commercialisation of land in recent times is threatening the sustainability of this system. Some family members have sold land and denied future access to land of the next generation.

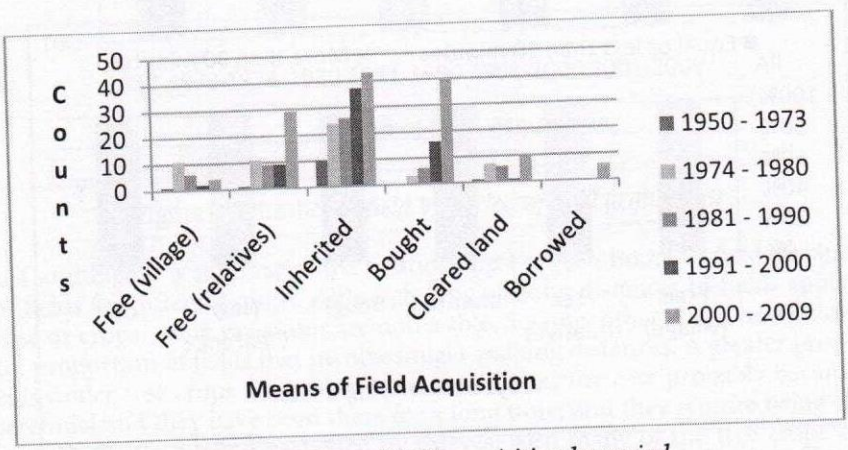

Figure 2: *Ways of field acquisition by period*

In Kiwangwa ward where there is increasing demand for land by urban dwellers for pineapples cultivation, selling of land has become a cause of widespread conflicts over land. Access to land through market transaction is an emerging phenomenon whereas freely given land by village governments is disappearing.

The home to field distance is recorded in walking time (in minutes) as this is the common means of travel. The mean walking distance to the field is about one hour, suggesting that many fields are far from village centres. McCall (1985) estimates that it takes one hour to walk five kilometres, which is the average distance to the fields.

Table 2 and Figure 3 depict the relationship between home to field distance and ways of field acquisition. Inheritance has been the leading means of acquiring land at all times. Purchase accounts for acquisition of about a quarter of the fields, an indication of increasing commercialisation of land. A very low proportion of fields were acquired through the village government an indication that this option is no longer viable. About a half of the fields are located at a walking distance of more than 30 minutes (more than two kilometres).

Table 2: Relationship between distance and ways of field acquisition

Distance (minutes)	Ways of acquiring fields					Total	Percent (n=371)
	Free (village)	*Free (relative)*	*Inherited*	*Bought*	*Cleared bushland*		
1-30	15	22	92	45	14	188	50.7
31-60	6	22	31	26	7	92	24.8
61+	6	20	37	16	12	91	24.5
Total	27	64	160	87	33	371	100
Percent (n=371)	7.3	17.3	43.1	23.4	8.9	100	

Source: Field data, 2009

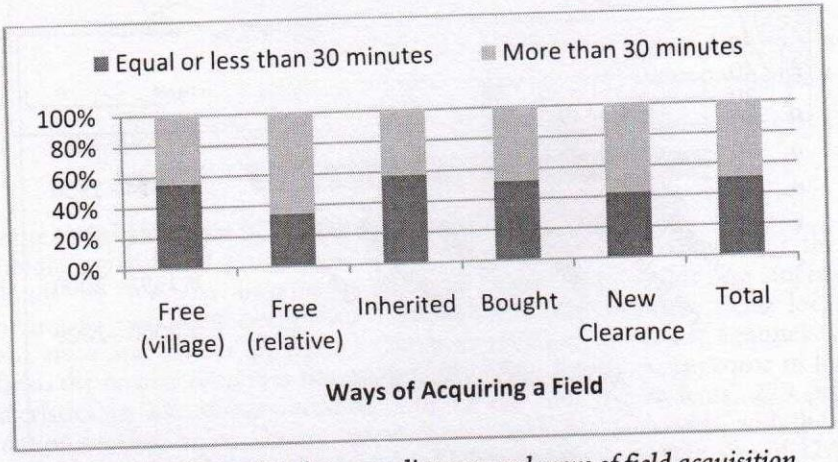

Figure 3: *Relationship between distance and ways of field acquisition*

Table 4: Home to field distance by field crops (counts)

Crops	Distance (minutes)			ALL
	1-30	*32 – 60*	*61 +*	
Maize	77	43	51	171
Sesame	27	21	17	65
Cassava	20	11	6	37
Pineapples	17	8	7	32
Tree crops	13	3	0	16
Other crops	9	4	8	21
Fallow	5	5	3	13
Total	168	95	92	355

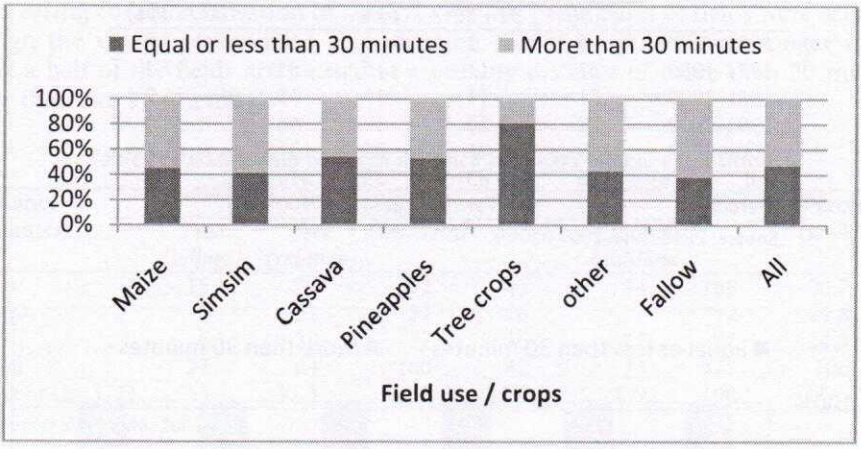

Figure 5: *Home to field distance by field use/crops*

The preceding analysis of home to field distance indicates that long distance from home to field is a reality that farmers face. Acquisition of distant fields has become more pronounced in recent times. In order to tackle the problem of long home to field distance it is important to understand factors that contribute to its persistence and how farmers cope with it.

5.0 Factors inducing increasing home to field distance

Data on home to field distance at the onset of villagisation are not available for a statistical analysis of change. However, FGDs and interviews with key informants suggest that the distance has increased as farmland nearby villages is either not available or too exhausted. Villagers are often compelled to seek land farther from the village centre. The following factors explain the increasing home to field distance in the study villages.

[2] rice, vegetables, bananas, pigeon pea (*mbaazi*), and cow pea (*kunde*)

5.1 Village population increase and expansion of built up areas

During the process of villagisation a household in need was given land for house construction equivalent to an acre (70m x 80m) and some land for cultivation away from the homestead, but near the village. The demand for land for construction of residential houses and premises for service delivery has grown with population increase. Ward level data show a trend of increase in population between the 1988 and 2002 censuses (Table 5). Most of the land within and near villages has been converted into a built-up area, as heads of household subdivide their plots for the needs of the new generation. The villages, such as Lunga, are becoming urban in structure and demand for land for urban services is growing. As Haapanen (2011:92) notes for Lunga village, most fields within the village settlement compounds have been lost through construction of new houses to accommodate the growing population.

Traditionally, the village government gave land to the new generation, but this is no longer practical as land belonging to villages has overtime been privatised through selling or hiring out. Land is also sold to in-migrants to the villages. These are often urban dwellers who seek land for business investment and for own house construction. New occupations for skilled urban workers such as the stone quarries located in the study area have attracted in-migrants. In Kiwangwa, workers in large pineapple farms recruited from Kigoma and Dodoma regions eventually acquire land for housing as well as for farming. Consequently, access to agricultural land in areas nearby villages becomes difficult and more expensive, compelling villagers to seek land farther.

Table 5: Population growth by selected wards

Ward	Area in Hactares	Population size		Population change (%)
		1988	*2002*	1988-2002
Kiwangwa	89,212	11,425	16,094	40.8
Msata	144,350	8,608	9,499	10.3
Miono	71,439	14,115	19,732	39.8
Mbwewe	103,770	13,830	18,543	34.1
Lugoba	52,577	12,912	15,917	23.3

Source: URT, 2008, Bagamoyo District in Brief, 2007, National Bureau of Statistics, Dar es Salaam

5.2 Decline in productivity of agricultural land nearby village settlements

Settlement concentration without provision of supportive technologies for agricultural transformation has undermined the possibility of agricultural intensification. Use of external inputs has been very low in all the study villages (Sendaro, 1992). Despite the good response to liberalisation by the private sector, input supply outlets are often not located in remote rural areas (Sokoni, 2008). Inadequate use of external inputs means that there has been a slow rate of land-use intensification and consequently a decline of natural fertility in the fields. Consequently, fields near village settlements are abandoned due to their low productivity. Instead, bush land (*mapori*) in previously owned fields prior to villagisation is preferred for crop cultivation. Such land requires less labour for preparation and weeding and no external input. Shifting cultivation is a common practice. Farmers believe that sesame cannot be grown on the same field twice in a row without serious decline in yield, although agricultural extension officers disapproved this belief. In any case this has meant that fields are increasingly relocating far away from the village centre.

5.3 Villagers' claim of land owned prior to villagisation

The increasing use of *mapori* for extending agricultural land is made possible as farmers claim land owned by their families prior to joining *Ujamaa* villages. This phenomenon is not peculiar to the study area. As Koda (1998:214-215) reports, farmers in Mtwara reclaimed the clan lands and trees located in areas where they had resided prior to villagisation, due to increasing land scarcity in their villages. Similarly, villagers in this study considered retreating to *mapori* as a way of coping with the problem of limited access to productive land near their villages.

Land is not available nearby villages for families to give to their grown up children. It is a common practice for families to give land to the new generation from *mapori* as it was reported in FGDs held in Mbwewe and Kiwangwa. In principle people are allowed to move back to their original land or re-colonise their abandoned farms (Lerise *et al.*, 2001). Mosha (2008) found that 26% of the households studied in Misungwi district, Mwanza in 2001, returned to lands they had deserted during villagisation. However, this may not be practicable all over Western Bagamoyo as some of the *mapori* land has been reallocated to other villages or to other use by the central or local government.

5.4 Crop diversification

The change from cotton to sesame and pineapples as major cash earning crops has also contributed to increasing distance from farmers' homes to their fields. Most of the fields near villages were previously used for cotton production that has been abandoned following the crop marketing problems of the 1980s. Farms in *mapori* are preferred to those near villages for sesame production. In Kiwangwa, however, pineapple fields are found nearby villages, but as the farms are relatively larger and cultivation of the crop has increased, fields are spreading farther away from the village centre. Production of vegetables through irrigation compels farmers to seek land along Wami River valley irrespective of the long distance they have to travel from home.

6.0 Coping with increasing home to field distance

The most common means of travel between home and field is walking. The use of motorised and/or non-motorised means of transport such as bicycles is a potential option. However, there is a limit in the carrying capacity of such means of transport. Moreover, not all fields would be easily accessible by bicycle. The private sector has responded well by investing in motorcycles for rural transportation, but these require infrastructure and are costly to run for daily home to field visits. For the majority of farmers, carrying loads on the person is the most common means of transporting produce to and from the farm.

To minimise the cost of travel from home to field, farmers save labour for farm activities by opting for land and crop management practices that are less labour demanding. They adopt less or no use of external inputs as these demand more labour. The increasing use of shifting cultivation in sesame cultivation is one of the ways of reducing labour. The system uses fire for clearance, requires less weeding, and uses fewer external inputs.

Elsewhere in Tanzania, farmers have moved permanently back to the land they owned prior to villagisation (Mosha, 2008). This is not common practice in Western Bagamoyo. Villages enjoy some benefits of nucleation such as access to clean piped water, electricity, transport, market, education and health services. Cultivation of mapori land does not

involve permanent change of household's residence. Kambi (a temporary hut) is erected in the field for shelter. The practice is also common among farmers in Liwale and Lindi districts (Lerise et al., 2001). Construction of an on-field shelter is a way of coping with the problem of long distance to field. Rather than make daily home to field visits, farmers live on the farm temporary especially at periods of high demand for labour.

Activities associated with the use of on-field huts vary. Field preparation, planting, weeding and harvesting are common activities. In Western Bagamoyo, occupation of on-field huts for protection of crops from damage by wild animals, a phenomenon locally known as *kiamizi* is a common practice. Household members especially males leave their regular residence to live on distant farms in order to guard their crops against destructive wild animals, including monkeys and warthogs. This practice was reported in Mbwewe, Miono, and Msata villages. Following its abandonment, *mapori* land has regenerated into bush, which has become a suitable habitat for wildlife. The problem is more apparent for villages such as Pongwe-Msungura and Mindu Tulieni that are close to Wami Mbiki forest reserve, and Miono village that is close to Sadani National Park. The duration of *kiamizi* ranges from several weeks to six months depending on the type of crop and local conditions. Maize requires protection from destructive animals right from planting until harvesting. In Miono village, the FGD confirmed that *kiamizi* takes three to six months.

7.0 Socio-economic implications of increasing home to field distance

The transformation of rural settlements from scattered homesteads to nucleated villages, intended to minimise distances to services and markets. Unfortunately the process increased the distance between the new homes and productive fields. Furthermore, village settlement nucleation created localised high population densities that in theory should have led to agricultural intensification. Unfortunately, inadequate access and use of external inputs has led to exhaustion of fields' fertility nearby villages. Farmers have sought better fields farther away from their villages. This is likely to have an adverse effect on agriculture because time available for farming gets reduced. Consequently, an increase in home to field distance has constrained adoption of better land management practices, leading to more land degradation, and reduced agricultural productivity in the longer run.

The long home to field distance compels farmers to sell the produce on-field rather than take the harvest home and sell it later to the market. Whereas this may seem to be a distance cost minimisation for farmers, it seriously puts them at a disadvantage relative to traders who control transportation and dictate the price. The government is encouraging farmers to save their produce for future sale for better off season prices and also for household food security. This requires farmers to transport their harvest from field to home. Long distance and low draft power technology do play a major limitation to this government recommendation.

The agricultural extension system in Tanzania relies on the extension officers reaching farmers and being able to demonstrate through on-farm practices. This is constrained by the increasing distance between home and field. The farmers' strategy of living on field for some months, away from their homes in the village, means they are not easily accessible for service delivery as the model of a nucleated settlement anticipates. The

provision of rural services such as small credit, education, health, etc., by rural development and community based organisations that target rural households in their village homestead may find it difficult to reach their target population during *kiamizi*. Some of these programmes prefer their rural customers to get organised in small groups, in order to qualify for access to the service they provide. This may mean that men who often stay in on-field shelter to practice *kiamizi* are unavailable and unlikely to qualify for the assistance for quite a significant period of the year.

The expectations from the villagisation programme included attainment of improved housing conditions for the rural population. The Nyumba Bora Programme of 1976 intended to achieve this goal. In addition, access to services such as water supply, electricity, education and health serve to improve people's living conditions. Some achievements have been made in the provision of basic services, in the study villages. The use of temporary huts for habitation in distant fields by a significant proportion of farmers and for a significant period of up to six months is a setback, as the occupants are denied access to better habitation and basic services during their absence from the village.

Tanzania's programme against malaria, for example, targets permanent homesteads in nucleated settlements such that the temporary occupation of shelter in the fields is ignored. The size and structure of the huts are not suitable for decent habitation and for the size of the bed-nets promoted for protection against malaria. This suggests that bed-nets are unlikely to be used during occupation of the temporary huts. The health implications of *kiamizi* are similar to observations made by Heggenhougen, *et al.*, (2003) on the vulnerability to malaria by mobile groups such as fishermen, miners, refugees, etc. who have to live in temporary shelter away from their homes. The phenomenon applies also to other groups of temporary labourers in pineapple fields, common in Kiwangwa village.

Although scientific proof is not available, informants in Kiwangwa village associated the occupation of temporary field huts in which clean water provision and sanitation are poor, with the spread of cholera. As farmers stay away from social and health services for a significant period of time, this deserves attention of rural development practitioners. The occupation of field huts involves numerous health risks due to limited access to quality water, good sanitation, and greater exposure to pests such as mosquitoes, and attack by wild animals.

Longer home to field distance influences problems of food supply, health and social dislocation for the household members remaining in the village (McHenry, 1981). The separation of family members as some participate in *kiamizi* may affect nutrition status as food preparation and eating habits of family members change. Also participation in social events and undertakings that take place in village centres is affecting rural development programmes that rely on community participation. It is acknowledged that most of the agricultural work in rural areas of Africa is undertaken by women (Bryceson & Howe, 1993). Increasing distance to fields is likely going to affect, to a greater extent, rural women.

Access to health services is a problem for household members who participate in *kiamizi*. The medical doctor at Mbwewe Village admitted that farmers who were

working and living temporarily in the fields used to plan their visit to the periodic market to coincide with the days they would seek medical services from the village dispensary. This was because they could not afford to make separate visits to the hospital and to the market. There were therefore very many patients at the village dispensary on the days earmarked as market days.

8.0 Lessons for rural development policy and practice in Tanzania

Rural development policy and practice in Tanzania is based on the nucleated settlement model that minimises distance from homesteads to service centres. But the model gives little attention to the more important problem of home to field distance that has been worsening since villagisation. It is increasingly becoming a constraint to agricultural productivity and to community development.

Farmers' efforts to raise production through extension of farmland in *mapori* areas, does not seem to be sustainable. Their limited capacity to intensify land use for higher productivity due to inadequate access and use of external inputs requires greater attention. The environmental deterioration near villages resulting from population growth and increasing density is not a necessary consequence since it can be reversed through improvement of land management practices. Improvement in farmers' access to better agricultural technology and external inputs is essential. Greater effort is required to improve farmers' access and use of external input that would enhance the productivity of agricultural land near villages and hence reduce use of fields located far away from villages.

Village settlement planning that has existed only on paper in Tanzania should be enhanced in order to reduce outward extension of built up areas that take up agricultural land. Improvement in rural infrastructure such as feeder roads will help farmers benefit from the initiative of growing investment in transportation service by the private sector including the operation of mini-buses between the study villages and urban centres and motorcycle services for local transportation of people and goods. Also greater use of bicycles and carts has a potential to alleviate the distance constraint. The local government should devote more resources for rural infrastructure to facilitate private sector investment initiatives.

The wildlife-farmer conflict in *kiamizi* will be reduced with farmers' retreat to agricultural lands near village settlements and away from the regenerating bushland that would allow ecosystem to recover from the deforestation process that has been taking place for decades. Meanwhile, rural policy makers and service providers have to consider the temporary mobility of some family members to distant farms to practice *kiamizi*.

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