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Weekly Market Spatial Flow Patterns of Foodstuffs and Its Impacts on Traders' Livelihoods in Mountain Regions: The Case of Mt Rungwe Region, Tanzania

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Abstract

This paper examines the weekly market spatial flow patterns of foodstuffs and its impact on traders' livelihoods in Mt. Rungwe Region. The data were collected using questionnaires, in depth interviews and observations in June 2010 and June 2011. The findings show that there are two major spatial flow patterns of foodstuffs at weekly markets based on the complementarity principle. The first one is from food producing areas to a weekly market. The second one is from weekly markets to another weekly market, immediate hinterland areas, urban areas within the country and areas outside the country. Motorised transport was the major means of moving foodstuffs. It was used by 68.5% of the respondents. The χ^2 test indicated that there was a statistical significant relationship at 0.05 level between distance travelled and the amount of income earned at $p< 0.05$. Those who travelled longer earned more income. Also χ^2 findings showed that there was a statistical significant relationship at 0.05 level between the type of foodstuffs sold and the time when they were sold. Most of the fruits and vegetables started to be sold in 2000s while staples started to be sold at weekly market in the 1980s. Among the many challenges that the weekly market traders faced were the many taxes that were charged at different levels (45.6%), lack of capital (23.7%), lack of customers (14%) and transport problems (11.4%). Hence the need for the government to support market traders with credits and improved roads particularly from rural areas to weekly markets so as to improve accessibility of the foodstuffs in highland regions.

1. Background to the Study

Mountain regions in East Africa have fertile volcanic soils, moderate temperatures and heavy rainfalls that support a variety of foodstuffs and dense population. Thus, weekly markets have served as centres for collection and local exchange of produce originating in the immediate hinterland such as foodstuffs, livestock and craft articles. They have also served as bulking points for goods to be exported from the local region, and distribution points for goods imported from other areas of a country and

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abroad. This paper examines the spatial flow patterns of foodstuffs in a mountain region, and looks at the socio-economic structure of traders and how the weekly market trade has affected their livelihoods.

1.1 Statement of the Problem

Foodstuffs are essential for human existence. They have often been moved from areas of surplus to areas of deficit by both middlemen and producers. This has been particularly the case because different ecological regions tend to support different types of foodstuffs. While some foodstuffs such as bananas are highly suited to highland ecological areas, others such as rice are suited to lowland ecological areas; making spatial interaction necessary between mountain regions and other areas. However, spatial flows of foodstuffs have not been well documented, and their problems and impact on the traders' livelihoods have not been well examined. Some of the spatial flows of foodstuffs have been examined in relation to informal cross-border trade (ICBT), where non-perishable food stuffs such as maize, beans and rice have been moved through informal trade across the border (OECD 2012; Mijere, 2006; Ackello-Ogutu et al., 1998). Hence the need to examine the weekly market spatial flow patterns of foodstuffs in mountain regions, and the challenges and opportunities of weekly market traders.

1.2 Conceptual Framework

Spatial interaction is the flow of people, freight or information between origins and destinations. It is a demand/supply relationship expressed over a geographical space (Ulman, 1980). The simple fact that a movement occurs between origin and destination underlies the fact that the costs incurred by a spatial interaction are lower than the benefits derived from such an interaction. Thus spatial interaction is fundamental to understanding the development of distinctive regional geographies. It takes place at local, national and international levels, with different impacts on the traders' involved.

Ullman (1980) notes that spatial interaction is a result of three major factors: complementarity, transferability, and intervening opportunity. By complementarity it is meant that a deficit of a good or product in one area and a surplus in another makes a good move from surplus area to a deficit area. Transferability, on the other hand, is the possibility of transporting a good or product at a cost that the market will bear from an origin to a destination. Hence, the transportation costs need to be lower than the price of the product so that the trader may realize some profit. Intervening opportunity is the location in between origin and destination of another destination that diverts goods or products that were meant for the former destination. It should be noted that the greater the distance between trip

origin and trip destination, the less the likelihood of spatial interaction between the two locations, and the lower the frequency of trips. Thus in most of the weekly markets in Mt. Rungwe region, traders came from within the region, with a few coming from outside the region. However, even within the region the distances were not uniform: some traders travelled for a short distance less than 5km, other for a medium distance of less than 10km, and the rest travelled long distances of more than 10km. The foodstuffs are moved from rural areas of surplus to rural areas of deficit at local level, and from rural areas of surplus to urban areas of deficit at national level, as well as from rural or urban areas of surplus across international borders. The flows are made possible by the availability of passable roads, particularly between urban areas and across borders.

These flows are shown in the conceptual framework provided in Fig. 1. Producers of foodstuffs in rural areas supply foodstuffs to weekly markets that have been established within their hinterlands. The foodstuffs exchanged at the weekly market are taken to rural or urban areas that are located inside as well as outside the country. The income they receive enable them improve their livelihoods.

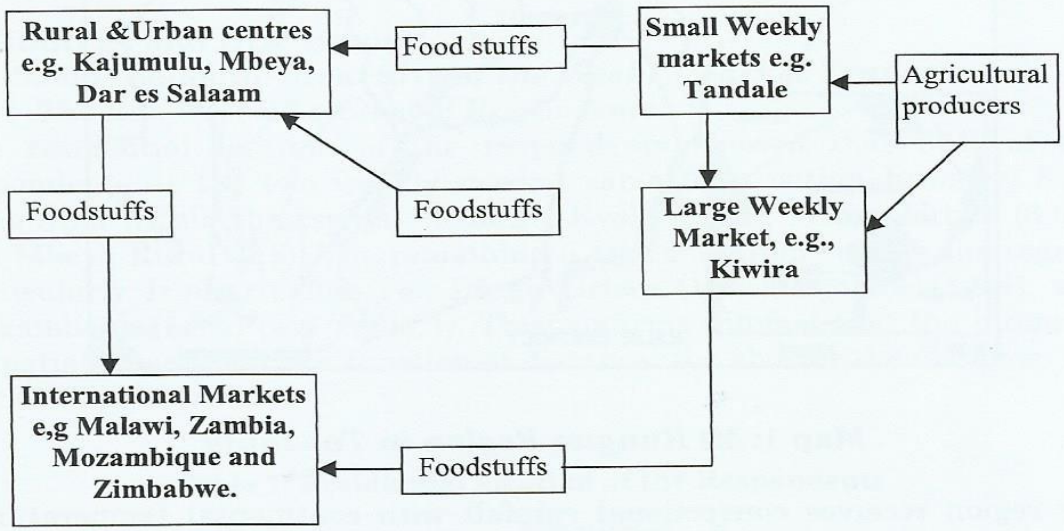


Figure 1: ***Spatial flow pattern of foodstuffs at various levels***

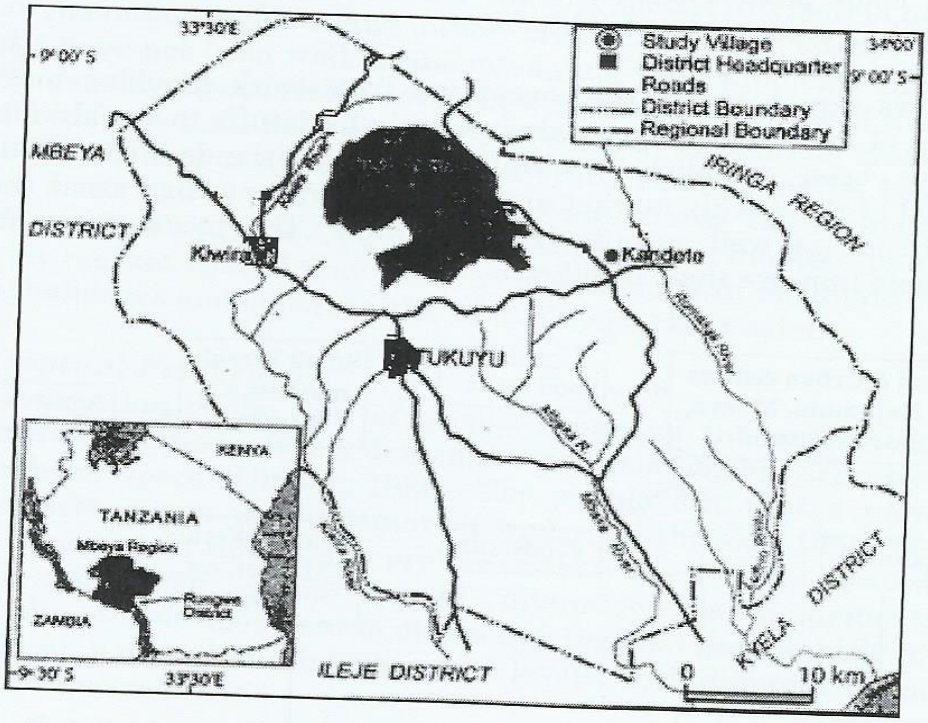
1.3 Objective of the Study

The objective of the study was to examine the weekly market spatial flow patterns of foodstuffs in mountain regions the socio-economic structure of the weekly market traders and the way the weekly market trade affect their livelihoods.

2. Methods and Materials

2.1 The Study Area

Mt Rungwe is located in Rungwe district in Mbeya Region in Tanzania (Map 1). It is a dormant volcano. Its topography varies from hilly to steeply dissected, with elevation ranging from 1500m to 2960m at the summit. The mountain and its surrounding regions (herein referred to as the Mount Rungwe region) are well-drained with low bulk density sandy loams to loamy sands. The topsoil is black to brownish-gray, and the subsoil consists of alternating layers of pumice-gravel and soil. The parent material is volcanic ash and pumice.



Map 1: ***Mt Rungwe Region in Tanzania***

The region receives convectional rainfall with continental temperatures. The amount of rainfall is heavy ranging between 1550 and 1850mm per year. This environment enables the production of a variety of foodstuffs that are mostly marketed at the weekly markets. There are fourteen registered weekly markets, but the largest ones according to the population size are six. These include Kiwira, with a population of about 4500 people; followed by Ntaba with a population of about 2000 people; Tandale and Mbambo with a population of about 1500 people each; Ikuti with a population of 800 people; and Kyimo with about 600 people.

2.2 Sampling Design

Both probability an non-probability sampling techniques were used in the study so as to benefit from the advantages of both technique (Krishnaswami et al., 2005). Kiwira and Tandale markets were selected among the major weekly markets in the Rungwe region by simple random probability sampling technique.

Purposive sampling was used to identify traders according to the type of foodstuffs they sold. All the foodstuffs were categorized into four major groups, namely, staples, fruits, vegetables and proteins. Staples included crops such as green bananas, maize, beans, rice and wheat. Fruits included oranges and avocados. Vegetables included cabbages, tomatoes, onions; and proteins included fish and groundnuts. Other sources of protein such as beef, pork were not available at the weekly market. Respondents were stratified according to sex. A total of 114 respondents were interviewed from the two weekly markets guided by a detailed questionnaire. Moreover, in-depth interviews were carried out with key informants such as the district trade officer and weekly market tax collectors. Also observations of the various foodstuffs in terms of types and quantity were made, and photographs were taken for some of the foodstuffs and means of transportation.

3. Findings and Discussions

3.1 Socio-economic Structure of the Weekly Market Traders

3.1.1 The Residential Location of Respondents

The residential location of the respondents showed that 86% of the respondents at the two weekly market came from within Rungwe; 8.8% came from within the region, including Kyela (3.5%), Mbeya Urban (3.5%) and Mbeya Rural (1.8). The remaining 5.4% came from outside the region, particularly Iringa region, i.e., Iringa Urban (1.8%), Njombe (1.8%), and Makambako (1.8%) (see Table 1). This confirms the fact that the intensity of spatial interaction is a function of distance: the shorter the distance, the higher the interaction.

Table 1: Residential location of the Respondents

	Frequency	%
Iringa	2	1.8
Kyela	4	3.5
Makambako	2	1.8
Mbeya Rural	2	1.8
Mbeya Urban	4	3.5
Njombe	2	1.8
Rungwe	98	86
Total	**114**	**100**

3.1.2 Timing of the Weekly Market Trade

Table 2 shows that 73.7% of the respondents began weekly market trade between 2001 and 2011; while 17.5% began trading activities between 1991 and 2000; and 8.8% began trading activities between 1981 and 1990. This shows that traders involvement in weekly market trading activities tend to decline with increased age. The older one becomes, the less likelihood for him/her to be involved in weekly market activities. This is particularly the case because the traders are also involved in loading and unloading of foodstuffs, travelling far and wide to collect foodstuffs. These activities are more suited to the youth. It also shows further that the percentage of those who sold staples between 2001 and 2011 was higher (65.8%). Fruits were sold only between 2001 and 2011. However, over the years 90.9% of those who sold vegetables and 70% of those who sold proteins conducted their activities between 2001 and 2011.

Table 2: Relationship between entry point of Traders and the Type of foodstuffs

	1981 - 1990	1991 - 2000	2001 - 2011	Total	1981 – 1990 %	1991 – 2000 %	2001 – 2011 %	Total %
Staples	7	18	48	73	9.6	24.7	65.8	100
Fruits	0	0	9	9	0	0	100	100
vegetables	0	2	20	22	0	9.1	90.9	100
Proteins	3	0	7	10	30	0	70.0	100
Total	10	20	84	114	8.8	17.5	73.7	100
Pearson Chi-Square	Value 16.620	df 6	Asymptotic significance 0.011	P< 0.05				

Thus the χ^2 test indicated that there was a statistical significant relationship at 0.05 level between the type of foodstuffs sold and the time when it was sold with $p < 0.05$.

3.1.3 Weekly Market Traders and Their Education

The weekly market traders had various levels of education. However, the majority (86%) had primary education, 12.3% had secondary education, and 1.6% had post-primary education (Table 3). Hence, weekly market trading was one of the important livelihoods option for primary school leavers as their chances for formal employment were very minimal.

Table 3 shows that 86.3% of those who sold staples, 55.6% of those who sold fruits, 90% of those who sold vegetables and 100% of those who sold proteins had primary education. However, the highest percentage of those who sold fruits (44.4%) had secondary school education.

Table 3: Relationship between Education and the Type of Foodstuffs Sold

	Primary	Post Primary	Secondary	Total	Primary %	Post Primary %	Secondary %	Total %
Staples	63	2	8	73	86.3	2.7	11.0	100
Fruits	5	0	4	9	55.6	0	44.4	100
Vegetables	20	0	2	22	90.9	0	9.1	100
Proteins	10	0	0	10	100	0	0	100
Total	**98**	**2**	**14**	**114**	**86.0**	**1.8**	**12.2**	**100**

3.1.4 Weekly Market Traders and Their Age

The majority of the respondents (77.2%) were aged between 21 and 40 years; 7.0% were aged between 1 and 20 years, and 15.8% were aged 41 and above. However, 82.2% of those who sold staples, 55.6% of those who sold fruits, 72.7% of those who sold vegetable, and 70% of those who sold protein belonged to the 21 to 40 years age group (Table 4).

Table 4: Weekly Market traders and their Age

Type of foodstuffs/ Age	1 – 20 years	21 – 40 years	41 and above	Total	1 – 20 Years %	21 – 40 years %	41 and above %	Total %
Staples	4	60	9	73	5.5	82.2	12.3	100
Fruits	2	5	2	9	22.2	55.6	22.2	100
vegetables	2	16	4	22	9.1	72.7	18.2	100
Proteins	0	7	3	10	0	70.0	30.0	100
Total	**8**	**88**	**18**	**114**	**7.0**	**77.2**	**15.8**	**100**

3.1.5 Weekly Market Traders and their Marital Status

Most weekly market traders were married people (77.2% of the respondents). The remaining were single (14%), and 8.8% divorced and widows. They formed 80.8%, 44.4%, 81.8% and 70% of those who sold staples, fruits, vegetables and protein, respectively (Table 5). This is understandable as married people tend to require increased incomes so as to support their families.

Table 5: Relationship between Marital Status and the Type of Foodstuffs Sold

	Single	Married	Divorced & Widows	Single %	Married %	Divorced & Widows %	
Staples	8	59	6	73	11	80.8	8.2	100
Fruits	3	4	2	9	33.3	44.4	22.2	100
vegetables	2	18	2	22	9.1	81.8	9.1	100
Proteins	3	7	0	10	30.0	70.0	0.0	100
Total	**16**	**88**	**10**	**114**	**14.0**	**77.2**	**8.8**	**100**

3.1.6 Relationship Between Sex and Weekly Market Traders

The findings showed that women were dominating in the weekly market trade with 60.3% of those who were selling staples, 81.8% of those who were selling vegetables, and 70% of those who were selling protein, and 33.3% of those who were selling fruits. The χ^2 test showed that there was a statistical significant relationship at 0:05 level between weekly market traders and sex $p < 0.05$.

Table 6: Relationship between Sex and Weekly Market traders

	Females	Males	Total	Females	Males	Total
Staples	44	29	73	60.3	39.7	100
Fruits	3	6	9	33.3	66.7	100
vegetables	18	4	22	81.8	18.2	100
Proteins	7	3	10	70.0	30.0	100
Total	**72**	**42**	**114**	**63.2**	**36.8**	**100**
Pearson Chi-Square	Value	df	Asymptotic Significance	P<0.05		
	8.006	3	0.046			

4. Weekly Market Spatial Flow Pattern of Foodstuffs

4.1 Origins of Foodstuffs in mount Rungwe Region

In terms of weekly market spatial flow patterns, the findings showed that there were two major weekly market spatial flow pattern of foodstuffs based on the complementarity principle—i.e., demand in one area and surplus in another—although sometimes the need for money motivated producers to sell their foodstuffs even if it was not surplus food. The first one was from different foodstuff producing areas to a weekly market. The second one was from a weekly market to immediate hinterland areas, urban areas within the country, and areas outside the country. Agricultural producers and/or middlemen brought foodstuffs to the weekly markets. These foodstuffs were then bought by middlemen wholesalers, as well as retailers, who took them to the surrounding hinterland, as well as urban areas and abroad. Thus weekly market enabled producers and middlemen to exchange foodstuffs easily within convenient distances. As such retailers and wholesalers bought foodstuffs and sold them at kiosks, streets, as well as other local markets. It is important to note that some agricultural producers who supplied foodstuffs at the weekly markets also bought other kinds of foodstuffs and consumer goods such as shoes and clothes.

The variety of foodstuffs that were traded at the weekly market included beans, rice, green and ripe bananas, tomatoes, cabbages, livestock, sugarcane, sweet potatoes, soya beans, cassava, and passion fruits. Some of these foodstuffs originated from areas outside the Mt Rungwe region. These

included rice from Kyela, which is a lowland area; and groundnuts from Mbozi. Some maize were brought from Sumbawanga region, and oranges from Morogoro. Avocados were brought to Kiwira market from Ileje. Mbeya Rural produces vegetables such as cabbages, onions, tomatoes. Fig. 1 shows the origin of foodstuffs in the study area as found out at the Kiwira and Tandale weekly markets in Mt. Rungwe region.

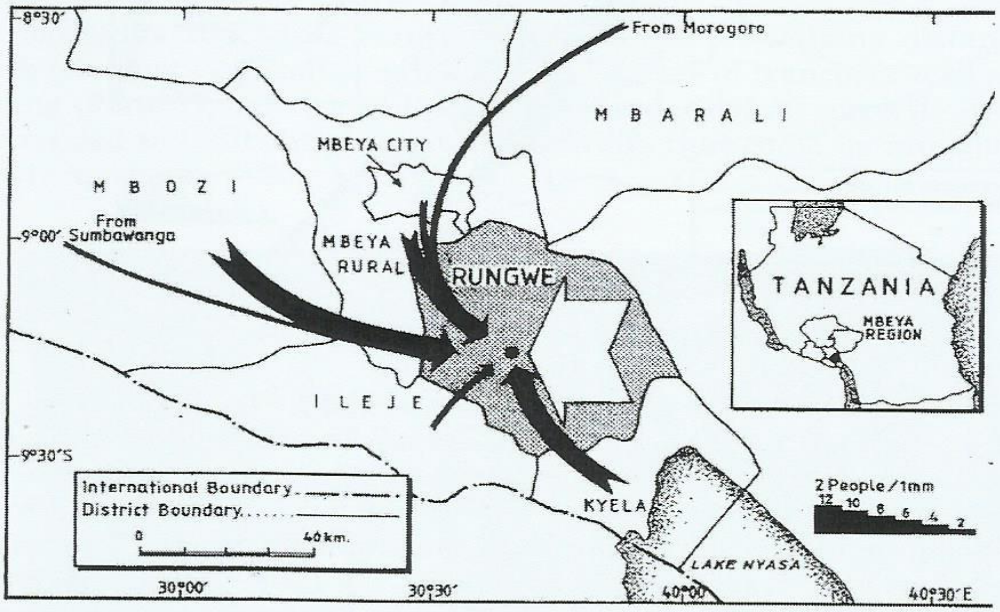


Figure 1: ***Origins of Foodstuffs in mount Rungwe Region***

Thus, one of the divorced female weekly market trader remarked:

> Currently avocadoes are very rare. I had to go as far as Ileje District to buy them from the producers I am forced to do this business because I need to pay school fees for my children who are studying at a nearby Bulyaga secondary school

4.2 Destination of Foodstuff in Mount Rungwe Region

As foodstuffs such as green bananas, avocadoes, cabbages from the weekly markets were bought at the local or regional weekly market, they were transported to urban centres such as Dar es Salaam, Iringa, Kyela, Makambako, Mbeya Urban, Njombe (Fig. 2).

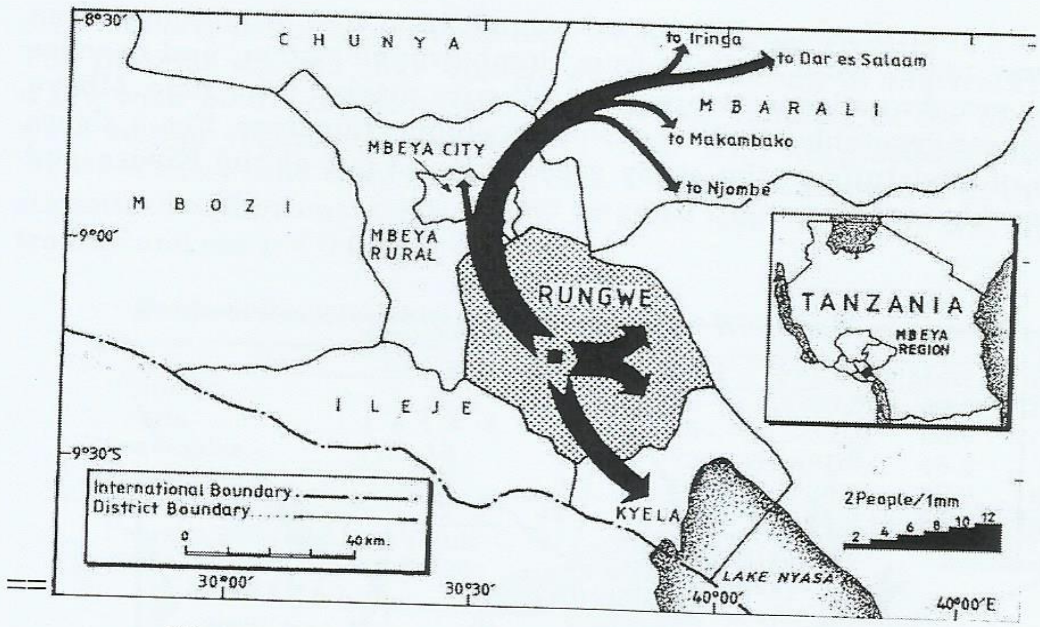


Figure 2: ***Destination of weekly market foodstuffs,***

Some of the weekly market foodstuffs were moved across the border, such as Malawi, through the border town of Kajumulu. These foodstuffs were purchased in bulk from a local or regional weekly market, and were sold informally outside the country. This was motivated by the demand in the neighbouring countries, and surpluses in the producing areas. The common foodstuffs that were traded across the border were mainly green bananas, maize, rice and beans. It was learned from key informants that traders from Malawi who visited Kiwira market bought rice, bananas and beans. Those from Mozambique bought bananas, and those from Zambia and Zimbabwe bought green bananas, beans and rice.

4.3 Means and Modes of Transport

4.3.1 Means of Transport

The different spatial flow patterns were made possible by the availability of means and modes of transport (transferability) between origins and destinations. There was a paved road from both Tandale and Kiwira markets to Iringa and Dar es Salaam, and to Kajumulu. There was also a paved road to Zambia through Mbozi and Tunduma, a border town. In addition, there were also boats that ferried foodstuffs to Mozambique. Table 7 shows that 68.5%, 88.9%, 54.5% and 70% of staples, fruits, vegetables, and proteins were transported by motorized transport, respectively. Hoggart (1995) notes that spatial interaction, which is facilitated by the existence of good transport and communication networks, makes it possible to transport goods, as well as movement of people from rural to urban areas, or abroad.

Table 7: Relationship Between Means of Transport and Type of Foodstuffs

	Motorised Transport	Non-Motorised Transport	Total	Motorised Transport	Non Motorised Transport	
Staples	50	23	73	68.5	31.5	100
Fruits	8	1	9	88.9	11.1	100
vegetables	12	10	22	54.5	45.5	100
Proteins	7	3	10	70.0	30.0	100
Total	**77**	**37**	**114**	**67.5**	**32.5**	**100**

For foodstuffs that were transported from within walking distance, and which were not very bulky, non-motorized means of transport such as head-loading (Plate 1), bicycles and pushcarts were used. As correctly points out this tended to limit the amount of foodstuffs that could be brought at the weekly markets.

Who?

Plate 1: Head-loading as practiced in Kiwira weekly market.

Motorized transport was the major mode of transport for long distances. This included 4 to 7 tons trucks, popularly known as Fuso or Canter, as well as Landrovers and pick-ups (Plates 2 and 3). A number of retailers or middlemen would hire a Fuso, a pick-up, or a Landrover, and fill it with their foodstuffs; and each would pay according to his or her amount of foodstuffs that s/he had on the carrier. However, one of the key informants noted, in relation to foodstuffs that were transported to Malawi, that:

> Some traders would take their foodstuffs such as green bananas to Mbeya city and wait for trucks that brought goods from Malawi, and used the trucks to carry their foodstuffs to Kajumulu so as to reduce transportation costs.

Plate 2: *A pick up loaded with green bananas to Kajumulu a border town between Malawi and Tanzania.*

Plate 3: *A Landover loaded with cabbages from a weekly market in Mount Rungwe region.*

However, the χ^2 test indicated that there was statistically significant relationship between the distance travelled and the income status of the traders at 0.05 level. Traders who travelled long distances of over 10km tended to experience increased income compared to those who travelled short distances—i.e., less than 10km—probably because they sold the foodstuffs at a much higher price in distant places; enabling them to realize increased profits (Table 8).

Table 8: Relationship Between Distance Travelled and Income status

	Short Distance	Medium Distance	Long Distance	Total	Short Distance	Medium Distance	Long Distance	Total
Decreased	18	4	o	22	81.8	18.2	0	100
Increased	24	16	18	58	41.4	27.6	31.0	100
The Same	18	6	10	34	52.6	17.6	29.4	100
Total	**60**	**26**	**28**	**114**	**52.6**	**22.8**	**24.6**	**100**
Pearson Chi-Square	Value 12.859	df 4	Asymptotic. significance 0.012	P< 0.05				

5. Government Revenue

In Mt Rungwe region, the government collected revenue from the sale of foodstuffs. For example, every stall was charged TAS 300 to 500 at Kiwira weekly market. A Fuso lorry paid TAS 30,000 per trip. Also, agricultural producers who brought foodstuffs at the weekly market paid tax, e.g., a bunch of green bananas would be charged TAS 100. However, it should be noted that the kind of activities that are conducted at the weekly markets were largely informal trade activities as the buyers who bought goods for selling abroad did not have the necessary documents that allowed them to export foodstuffs.

However, one middleman complained thus about the taxes:

> When I sell my foodstuffs I pay producer tax at my village, and when I come at the weekly market I have to pay another tax for the same product. Also, in case a middleman buys the product, s/he has also to pay another tax for the same product. This reduces our profit.

6. The Impact of Weekly Market on Traders' Livelihoods

From the study, about 50.7% of the respondents indicated that their income had increased since the time they started trading at the weekly markets; 29.8% indicated that their income was the same; and 19.3% pointed out that their income had gone down (Table 9). Small capital and the presence of many taxes at the village and weekly markets were pointed out as some of the challenges facing traders.

Table 9: Relationship between income changes and type of foodstuffs

	Increased	Same	Decreased	Total	Increased %	Same %	Decreased %	Total %
Staples	37	20	16	73	50.7	27.4	21.9	100
Fruits	8	1	0	9	88.9	11.1	0	100
vegetables	10	8	4	22	45.5	36.4	18.2	100
Proteins	3	5	2	10	30.0	50.0	20.0	100
Total	**58**	**34**	**22**	**114**	**50.9**	**29.8**	**19.3**	**100**

Some of the respondents (50.7%) indicated that their income had increased and that they used the income to pay for school fees for their children and health services, and to acquire natural assets such as land and physical assets like cattle and houses.

7. Challenges Facing Weekly Market Traders

Table 10 shows that 45.6% of the respondents complained about the many taxes that are charged by the village and town councils at the village and weekly market; wanting them to be reduced. Also, 23.7% pointed out that they had a shortage of capital.

Table 10: Challenges facing weekly market traders

	Frequency	%
Many taxes	52	45.6
Lack of capital	27	23.7
Few customers	16	14.0
Transport problems	13	11.4
Eviction	4	3.5
None	2	1.8
Total	**114**	**100**

8. Implications to Peoples Livelihoods

Weekly market spatial flow pattern of foodstuffs tended to benefit traders at the expense of the producers as the former sometimes bought foodstuffs at a throw-away price since producers were sometimes desperately in need of cash. Although the prices of most commodities were negotiable, it was clear that from the in-depth interviews that producers who were in need of cash were forced to sell foodstuffs at a price set by the middlemen.

The income derived from the sale of foodstuff by both producers as well as middlemen tended to alleviate poverty in the short-term by enabling them to purchase land, pay school fees, and pay for health services. On the other hand it led to food insecurity as some producers sold all their foodstuffs to earn cash.

9. Conclusion and Recommendations

The weekly market spatial flow patterns of foodstuffs in Mt Rungwe Region is very essential as it provides an efficient centre of exchange of foodstuffs between urban and rural areas, and areas across the borders. It contributes greatly towards food security as food moves from food surplus areas to food deficit areas. It also enhances income earnings and employment opportunities for producers and middlemen as they gain financial, physical, natural and human assets they needed for their livelihoods. Thus, it is important that rural roads be improved to enable foodstuffs flow efficiently and effectively in large quantities from and to weekly markets.

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