
**INVESTIGATING BARRIERS FOR INCREASING VEGETABLE
PRODUCTION AND CONSUMPTION AMONG FARMERS IN RURAL
AREAS OF TANZANIA: A CASE OF KISHAPU DISTRICT**

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ABSTRACT

The study investigated barriers for increasing vegetable production and consumption among farmers in Kishapu District of Shinyanga region in Tanzania. Data were gathered through questionnaire administration and focus group discussion. Whereas SPSS was used to process and analyze numerical data to generate descriptive statistics, content analysis was used to analyze qualitative data from focus groups discussion. Findings show that vegetables are abundantly available in the study area during wet season but scarcely available during dry season. Poor division of labor, time management, water shortage, food culture, lack of knowledge, and land shortage are some of the barriers hindering production and consumption of vegetables. Trainings for sensitization of young generation on the importance of traditional ways of preserving vegetables are recommended. The government needs to support communities through dam construction and awareness rising. Commercialization of vegetables is also recommended for improving vegetables production in the study communities.

Keywords: vegetables, kishapu, commercial vegetable, women, food culture.

1.0 INTRODUCTION

Vegetables are known to be important for balancing diet, combating malnutrition and enhancing food security (Ang 2012) especially in rural Africa. Schippers, (1997) commended African indigenous vegetables for the role they play in food security particularly among poor rural dwellers in Africa as they can serve as primary foods. These are especially important during prolonged droughts where food shortage tend to be a common characteristic for most households particularly in arid and semi- arid areas of Africa; they may also serve as secondary condiments

to dishes prepared from domesticated varieties (Schippers, 1997). African vegetables also contribute to sources of energy and micronutrients in the diets of isolated communities (Grivetti and Ogle, 2000). More importantly, vegetables are a source of income and may be marketed or traded locally, regionally, even internationally. Humphry et al., (1993), Smith et al., (1995), and Smith et al., (1996) provide a good narration of the extent to which indigenous vegetables of Africa play an important role during social unrest or war which are common characteristics in such parts of Africa as Somalia, Sudan, Congo DRC, some parts of Nigeria and central Africa; the same was the situation in the recent past for countries like Rwanda and Burundi. The importance of vegetables on dietary in Tanzania rural is appreciated by Mulokozi et al., (2000) in the study that focused at promoting adoption of improved home-based solar dryers as a means to enhance nutritional quality of vitamin A-rich foods and consumption of those foods by young children in Singada region of Tanzania.

Vegetables make an important part of food consumed by people in Shinyanga region. Although the staple food for people in Shinyanga region are mainly grains (cereals and non cereals including maize, rice, Sorghum, beans, groundnuts, etc) and tubers (including cassava and sweet potatoes) these are usually accompanied by soups from a variety of vegetables and meat. However, only a small proportion of households can afford varieties of meat soups due to higher levels of poverty in the region. Although the region is known for keeping cattle, sheep and goats, such live stocks can be slaughtered only during special occasions such as marriage and funeral ceremonies; otherwise, livestock are treated as wealth banks. Hence when speaking of food and dietary issues in the region, vegetables play a great role.

Locals in Shinyanga region divide vegetables into two major categories; first, wild vegetables and secondly modern vegetables. Wild vegetables are gathered (for free) during wet season whereas modern vegetables are cultivated during dry season mainly through irrigation (ibid). A study by Ang (2012) identifies a number of wild vegetables which farmers in Meatu district collect during wet season, process (mostly drying) and store for use during dry season. Such wild vegetables (with Swahili names in brackets) include amaranth wild (*mchicha*), blackjack (*mashonanguo*), home lettuce (*mchungu*), jute mallow (*bunani*) spider plant (*mgagani*), traditional Cucumber (*matango ya kienyeji*), and traditional wild pumpkin (*maboga pori*). Apart from nutritional importance, locals in the region perceive a range of medicinal importance from different wild vegetables including restoring appetite after illness, relief from head, back and stomach aches, wound treatment, constipation treatments, treating malaria, malaria prevention, relief from fever, prevention of eye deterioration, soothing aches in legs, relieving feet, chest, and joint pains, relieving difficulties with breathing, treating diarrhea in children, and sores in the nose and ears; as well as treating infertility in women (Ang 2012). However, it is devastating noting that most indigenous vegetables in Tanzania are experiencing extinction (Weinberger and

Msuya 2004) instead many landraces of vegetables are in the process of being replaced by modern varieties (FAO, 1998). Extinction of such vegetable species means reduced varieties of freely collected vegetables during wet season (by households in Shinyanga region) which may translate into slacking food security and hampering the general welfare of households. For semi arid areas like Shinyanga where water is a scarce resource, replacing indigenous vegetables with modern varieties is a thing to be worried of since opportune for irrigation are narrow. During dry season farmers cultivate modern vegetables. Such modern vegetables (with Swahili names in brackets) include African eggplant (*nyanya chungu*), amaranth maadira I (*mchicha bangi*), cabbage (*kabeji*), cassava leaves (*kisanvu*), onion (*vitunguu*), tomatoes (*nyanya*), spinach (*spinachi*), sweet paper (*pilipili hoho*), and sweet potato leaves (*matembele*) (Ang 2012). In some occasions farmers do intercrop modern vegetables with wild vegetables. Modern vegetables are not only important for households' dietary but also are an important solution for poverty reduction in the region (Ang 2012); vegetables as onions, tomatoes and African eggplant are highly marketable. In this study, 'wild vegetables' is used interchangeably with 'indigenous vegetables' referring to a crop species or variety genuinely native to a region, or to a crop introduced into a region where over a period of time it has evolved, although the species may not be native. In contrast, 'modern vegetables' refer to vegetables imported from somewhere else including vegetables from other regions within Tanzania.

Clearly the narrative above is evidence that vegetables form an important support in diet, food security, and poverty reduction in the region. However, literature on the extent to which households produce vegetables in the country is scanty hence the need for the current study. Available literature is limited to patches of spatial coverage. Weinberger and Msuya (2004) provides a detailed study on nutritional values of selected indigenous vegetables, levels of production and market demands in four regions of northeast Tanzania. This study focuses specially on collection of freely available vegetables for consumption during dry season where fresh vegetables are scantily available. Comparing the results of their study with that of Fleuret (1979), Weinberger and Msuya (2004) conclude that levels of production and consumption of indigenous vegetables in the studied areas have been decreasing over time. Likewise, considering the dynamic nature of human societies, findings by Weinberger and Msuya (2004), may need to be updated. Further, the study by Weinberger and Msuya (2004) was limited to northeast part of Tanzania, the current study focus is in the Lake zone; the two geographical locations are significantly different in terms of culture, economic activities and social aspects. Ang (2012) examined vegetable production in Meatu district only. Generalization of Ang's findings to the whole region would be unrealistic since at local spatial scales communities differ substantially in a number of ways including the physical environment (weather and climate, soils, land, water resources, vegetation cover, topography etc), social environment (including human resources,

perceptions towards food, culture, and levels of illiteracy) as well as economic environment (including main livelihood systems, infrastructural development etc); all these have implications on levels into which vegetables production is attained from one geographical location to the other. However findings from Ang (2012) make a good comparative study to the current study. This study intended to deepen understanding of the range of factors which undermine production and consumption of vegetables in the study area and explore ways to enhance vegetable collection, cultivation, processing and storing for use at times when vegetables are not in abundant supply. Specifically the study intended to answer such questions as; 1. What vegetable varieties available in the study area and what are their perceived nutritional values? 2. What vegetable varieties are abundantly available during wet season? 3. What vegetable varieties are abundantly available during dry season? 4. What are the determinant factors influencing household involvement in collection of vegetables during wet season? 5. What factors influence vegetable cultivation during dry season? 6. What are perceived to be options for addressing vegetable shortage during dry season?

2.0 RESEARCH METHODOLOGY

2.1 The study area

The study was conducted in Kishapu District of Shinyanga Region. Other districts of the Shinyanga region include Kahama district council, Kahama town council, Shinyanga district council, and Shinyanga town council. The district experiences significant population increase over years with an annual growth rate of 2.9 percent (URT 2013). As of 2012 the total population of Kishapu had increased from 192,549 in 1988 to 272,990, out of whom 135,269 were males and 137,721 were females. The district had house hold size averaged at of 6.3 people (URT 2013). The District is administratively divided into 3 divisions namely Kishapu, Mondo and Negezi with a total of 20 wards divided into a total of 114 villages. The major ethnic tribes are Wasukuma, Wanyiramba and Wataturu (Mtae 2015). The study was conducted in two villages namely mwadui Luhumbo, Mwadui utemeini of Mwadui Luhumbo ward. Crops cultivation and livestock keeping dominates livelihood options among Kishapu dwellers; the two economic activities employ 77.2 percent of the total labour force. The main cash crops are cotton, paddy and chickpeas. On the other hand sorghum, sweet potatoes, cassava, legumes, maize and paddy make main food crops in the district. Cattle, goats, sheep, donkey and poultry are the main livestock kept in the district.

2.2 Research design and methods

The study adopted a descriptive research design. Focus groups discussion was used to collect in-depth perceptions of respondents on vegetable production and consumption in the study area. 2

focus groups were conducted, one from each study village. Focus group member selection observed gender balance where each group was composed of 3 women and three men aged above 18+ years and lived in the study villages at least for 18years. A questionnaire was also administered to a sample population to collect numerical data. Observation technique was used to observe different activities related to vegetable cultivation. Notes were taken straight in the field for accuracy recording of the phenomena observed. Documentary review was also used to collect data. Data from focus groups discussion, observation and documentary review was analyzed using content analysis approach. Data from the questionnaire was analyzed using descriptive statistics. Findings from the different data collection tools were later triangulated; this was to enhance validity of the findings. The total number of households in Mwadui Luhumbo village was 698 where as in Mwadui Utemini was 760. 5% of the total number of households was selected to fill up questionnaires where 40 were from Mwadui Utemini and 37 were from Mwadui Luhumbo. Given the nature of the study design and data collection methods, a purposive sampling design was employed. Only those household members willing and vested with information for this study were purposefully selected for questionnaire filling, focus groups and in-depth interviews.

Table 1: Sample Population Mwadui Lohumbo and Mwadui Utemini villages

Name of village	Number of house holds	Sample size	%
Mwadui Luhumbo	698	37	48
Mwadui Utemini	760	40	52
Total	1458	77	100

Source: Mwadui Lyhumbo and Mwadui Utemini Village Offices (2014)

3.0 FINDINGS AND DISCUSSION

3.1 Characteristics of respondents

Table 2 presents respondents of the questionnaire by gender. A total of 30 male and 48female were involved in responding to the questionnaire making a total of 78 respondents; it can be clearly seen that majority of the questionnaire respondents were female.

Table 2: Gender of respondents

Gender	Frequency	Percent	%
Male	30	38.5	38.5
Female	48	61.5	61.5
Total	78	100.0	100.0

Table 3 presents respondents by education. From the table it can be seen that majority of the respondents were primary school leavers (61.5%) followed by those that had informal education (33.3%) and only 3.8% of all respondents attended secondary school. The differences in education strata among respondents can be clearly observed in figure 3.

Table 3: Education level of respondent

	Education level	Frequency	Percent
Valid	Informal education	26	33.3
	Primary school	48	61.5
	Secondary school	3	3.8
	Total	77	98.7
Missing	999	1	1.3
Total		78	100.0

From figure 1 it is clear that majority of the respondents (86.5%) depend on agriculture for their livelihoods, followed by those that depend on daily casual labor (5.4%), vendor (4.1%), livestock keeping (2.7%) and formal employment (1.4%). Table 4 on the other hand shows marital status of respondent where majority of the respondents (88.5) were married, followed by those who lived single (10.3%) and widowed (1.3%). Majority of the respondents (83.3) were aged between 18-35, followed by ones aged between 35-55 (16.7%).

Figure 1: Major economic activities of respondents

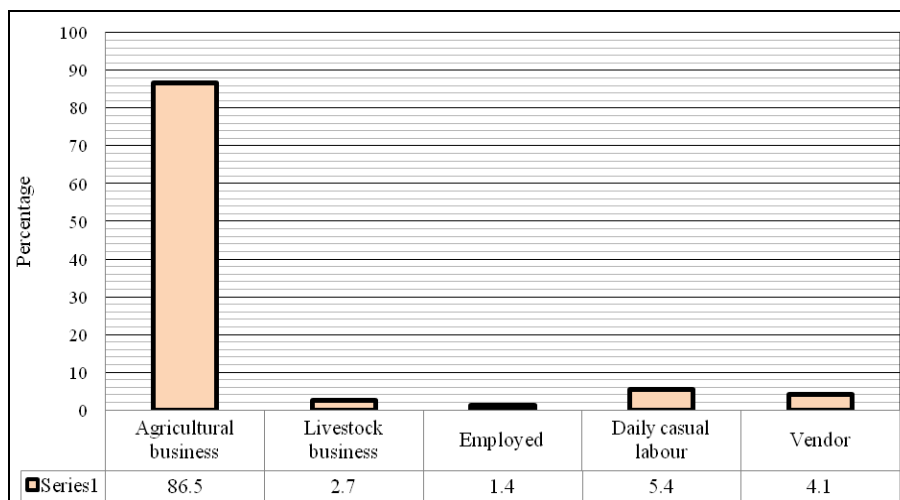


Table 4: Marital status of respondent

status	Frequency	Percent
Married	69	88.5
Widow	1	1.3
Single	8	10.3
Total	78	100.0

Table 5: Age of respondent

Age (Years)	Frequency	Percent
18-35	65	83.3
35-55	13	16.7
Total	78	100.0

3.2 Vegetable varieties and respective perceived nutritional values

There are varieties of vegetables in the study area as presented in Table 6, these include (names in swahili language) *Mchicha pori*, *mashona nguo*, *mchungga*, *bunani/ibambe*, *kwanzaa*, *ukwaju*, *mbigili*, *masongha*, *mgagani* and *majani ya matango*. From the table one may also note the different perceived nutritional values attached to each vegetable, such nutritional values were summarized into food, medicine and poison. 100% of all respondents indicated *mchicha pori* as

food followed by *Masongha* and *majani ya matango* (96.1%), *Bunani/ibambe* and *mgagani* (93%), *kwanzaa* (91%), *mbigili* (85%), *mchungga* (79%), and *ukwaju* (75.3%). Less people indicated to use *mkole* (47.4%) and *mashona nguo* (14%) as food. The most used vegetables as medicine in descending order are *mashona nguo* (88%), *kwanzaa* (87%), *matango* (85%), *mkole* (83%), *ukwaju* (74%), *mchungga* (71%), *mchicha pori* (64%), *mgagani* (55.4%) and *mbigili* (54.5%). *Masongha* (29.9%) and *bunani/ibambe* (14.1) are least used vegetables for food. The most poisonous vegetables are *mbigili* (33.8%), *ukwaju* and *matango* (9.1%), *kwanzaa* (6.4%), *mkole* (3.9), *mchungga* (2.6%), and *mashonanguo* (1.3%) and *bunani/ibambe* (1.3%). No one indicated *mchicha pori*, *masogha* and *mgagani* to be poisonous. Therefore it is clear that vegetables in the study area are used with clear purposes among users.

3.3 Availability of local vegetables during rainy season

Respondents explained that most vegetables are available during rainy season as indicated in Table 7. Except for *ukwaju*, over 96% of all respondents indicated that the rest of the vegetables are abundantly available during rainy season; these are *mchicha pori* (96.2%), *mashona nguo*(98.7%), *mchungu*(100.0%), *bunani/Ibambe*(98.7%), *kwanzaa*(98.7%), *mbigili*(97.3%), *masongha*(98.7%), *mgagani* (98.7%), *mkole*(96.9%) and *matango*(100.0%).

Table 6: Vegetables and their uses in the study area

Local Vegetables	Food		Medicine		Poisonous	
	YES	NO	YES	NO	YES	NO
<i>Mchicha Pori</i>	(100.0%)	(0.0%)	(64.1%)	(35.9%)	(0.0%)	(100.0%)
<i>Mashona Nguo</i>	(14.3%)	(85.7%)	(88.5%)	(11.5%)	(1.3%)	(98.7%)
<i>Mchungu</i>	(79.2%)	(20.8%)	(71.4%)	(28.6%)	(2.6%)	(97.4%)
<i>Bunani/Ibambe</i>	(93.6%)	(6.4%)	(14.1%)	(85.9%)	(1.3%)	(98.7%)
<i>Kwanzaa</i>	(91.0%)	(9.0%)	(87.2%)	(12.8%)	(6.4%)	(93.6%)
<i>Mkwaju</i>	(75.3%)	(24.7%)	(74.0%)	(26.0%)	(9.1%)	(90.9%)
<i>Mbigili</i>	(85.7%)	(14.3%)	(54.5%)	(45.5%)	(33.8%)	(66.2%)
<i>Masongha</i>	(96.1%)	(3.9%)	(29.9%)	(70.1%)	(0.0%)	(100.0%)
<i>Mgagani</i>	(93.2%)	(6.8%)	(55.4%)	(44.6%)	(0.0%)	(100.0%)
<i>Mkole</i>	(47.4%)	(52.6%)	(83.1%)	(16.9%)	(3.9%)	(96.1%)
<i>Majani ya matango</i>	(96.1%)	(3.9%)	(85.7%)	(14.3%)	(9.1%)	(90.9%)

Table 7: Availability of vegetables during rainy season

Local Vegetables	Abundant	Less Abundant	Not Available	Total
<i>Mchicha Pori</i>	75 (96.2%)	3 (3.8%)	0 (0.0%)	78 (100%)
<i>Mashona Nguo</i>	77 (98.7%)	0 (0.0%)	1 (1.3%)	78 (100%)
<i>Mchungu</i>	78 (100.0%)	0 (0.0%)	0 (0.0%)	78 (100%)
<i>Bunani/Ibambe</i>	76 (98.7%)	1 (1.3%)	0 (0.0%)	77 (100%)
<i>Kwanzaa</i>	76 (98.7%)	1 (1.3%)	0 (0.0%)	77 (100%)
<i>Ukwaju</i>	47 (67.1%)	21 (30%)	2 (2.9%)	70 (100%)

<i>Mbigili</i>	72 (97.3%)	2 (2.7%)	0 (0.0%)	74 (100%)
<i>Masongha</i>	75 (98.7%)	1 (1.3%)	0 (0.0%)	76 (100%)
<i>Mgagani</i>	74 (98.7%)	1 (1.3%)	0 (0.0%)	75 (100%)
<i>Mkole</i>	62 (96.9%)	2 (3.1%)	0 (0.0%)	64 (100%)
<i>Matango</i>	78 (100.0%)	0 (0.0%)	0 (0.0%)	78 (100%)

Source: Field data 2013

As for *ukwaju* only 67.1% of all respondents indicated that the vegetable is available during rainy season while the rest were of the opinion that either *ukwaju* was less abundant during rainy season (30%) and that *ukwaju* is not available during rainy season (2.9%). With these findings one would not expect a household going without fresh vegetables during this season. Not only that, but also the findings suggest that if almost all vegetables are available abundantly during rainy season then all households have the potential of preserving vegetables for use during dry season assuming that the rest of the variables are constant.

3.4 Availability of local vegetables during dry season

Table 8 presents levels of vegetables availability during dry season. From the table it can be clearly seen that except for *mkole* and *ukwaju*, all vegetables are either less available or not available at all during dry season.

Table8: Vegetables availability during dry season

Local Vegetables	Abundant	Less Abundant	Not Available	Total
<i>Mchicha Pori</i>	3 (6.4%)	0 (0.0%)	44 (93.6%)	47 (100%)
<i>Mashona Nguo</i>	0 (0.0%)	0 (0.0%)	44 (100.0%)	44 (100%)
<i>Mchunga</i>	4 (8.3%)	1 (2.1%)	43 (100.0%)	44 (100%)
<i>Bunani/Ibambe</i>	0 (0.0%)	0 (0.0%)	44 (100.0%)	44 (100%)
<i>Kwanzaa</i>	6 (12.2%)	4 (8.2%)	39 (79.6%)	49 (100%)
<i>Ukwaju</i>	30	2	16	48

	(62.5%)	(4.2%)	(33.3%)	(100%)
<i>Mbigili</i>	2 (4.3%)	1 (2.2%)	43 (93.5%)	46 (100%)
<i>Masongha</i>	2 (4.3%)	2 (4.3%)	42 (91.3%)	46 (100%)
<i>Mgagani</i>	2 (4.4%)	0 (0.0%)	43 (95.6%)	45 (100%)
<i>Mkole</i>	30 (68.2%)	5 (11.4%)	9 (20.5%)	44 (100%)
<i>Majani ya matango</i>	15 (23.8%)	3 (4.8%)	45 (71.4%)	63 (100%)

68.2% of all respondents indicated that *mkole* is abundantly available during dry season whereas 62.5% of all respondents indicated that *ukwaju* is abundantly available during dry season. As for the rest of the vegetables respondents indicated that they are not available during dry season as follows; *mchicha pori*(93.6%), *mashona nguo*(100.0%), *mchunga*(100.0%), *bunani/Ibambe*(100.0%), *kwanzaa*(79.6%), *mbigili*(93.5%), *masongha*(91.3%), *mgagani*(95.6%), and *matango*(71.4%). These findings show that *mkole* and *ukwaju* are the only vegetables that can be found throughout the year even though during wet season they are relatively less available compared to the rest of the vegetables. But during dry season these are the only vegetables that local people perceive to be abundantly available than any of the rest of the vegetables. The findings therefore confirm people in the study area experience difficulties in accessing fresh vegetables during dry season. As pointed earlier, since most vegetables tend to be abundantly available during rainy season, one could expect that household could preserve such vegetables for use during dry season where fresh vegetables are less available or not available at all.

3.5 Factors influencing collection of vegetables during wet season

3.5.1 Division of labor and time management

Findings show that women are more involved in vegetable production than men. 93.8% of all respondents strongly agreed on the statement that Women are more involved in local vegetables production than men (Table 9); at the same time these women are involved in other activities as a result they fail to collect vegetables during wet season. Box 1 presents a summary of findings from a focus discussion.

3.5.2 Lack of knowledge among young generation

More than 80% of all respondents were in agreement with the statement that the young generation is less knowledgeable in vegetable preservation (Table 9). This is one reason why some households do not collect and preserve vegetables nowadays. One focus group member from Mwadui utemini village pointed out that *“recently vegetable collection and preservation is not common compared to previous times, this is because this generation is less knowledgeable in processing and storing such vegetables as opposed to the old generation...in fact daughters of nowadays are lazy they prefer easily obtained food stuffs such as sardines...”*

3.5.3 Food Culture

Another factor that influences collection of vegetables during wet season is food culture. Generally, vegetables are perceived to be food for poor people (81.2%) (Table 9). Table 9 also shows that vegetables are also perceived to be less superior over meat (82.5%) and other sources of soups including fish and sardines as per focus group discussion. Also according to the same table, people in the study area perceive that vegetables are important only during food shortage (82.5%). Furthermore, during focus group discussion members explained that most people in the study area would prefer consuming fresh vegetables over dry ones; this is also confirmed with findings from the questionnaire presented in Table 9 where all respondents (100.0%) indicated that they prefer eating fresh over dried vegetables.

Table 9: Influencing factors for vegetable collection during wet season

Statement	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	Total
Women are more involved in local vegetables production than men	60 (93.8%)	2 (3.1%)	1 (1.3%)	0 (0.0%)	1 (1.3%)	64 (100%)
Vegetables are important only during food shortage	52 (82.5%)	6 (9.5%)	1 (1.6%)	0 (0.0%)	4 (6.3%)	63 (100%)
Vegetables are less superior to meat	52 (82.5%)	6 (9.5%)	1 (1.6%)	0 (0.0%)	4 (6.3%)	63 (100%)
Local vegetables are for poor people	52 (81.2%)	1 (1.6%)	0 (0.0%)	3 (4.7%)	8 (12.5%)	64 (100%)
The young generation is less knowledgeable in vegetable preservation	32 (49.2%)	22 (33.8%)	8 (12.3%)	1 (1.5%)	2 (3.1%)	65 (100%)
I prefer fresh vegetables over dry vegetables	76 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	76 (100%)

This might be attributed to the fact that majority of the respondents (98.6%) perceive that fresh vegetables are more nutritious compared to dried vegetables (Table 9).

Box 1: Factors affecting collection of vegetables during wet season

Vegetable collection and cultivation in the study area is a women thing, men are less involved in vegetable collection and cultivation except when this is for business. However, these women most of the time are preoccupied with many activities than the case is for men. Farming, for example, is the main livelihood option in the study area; major crops grown include crops as maize, millet, rice, groundnuts, *njugu*, choroko, kunde, sunflower, sweet potatoes, ground nuts and cotton. Women are involved in farming of such crops in the same manner as men. At the same time, women are responsible for all domestic chores. During focus groups in both Utemini and Luhumbo villages, farmers explained that one of the main stumbling blocks for collection of wild vegetables during wet season is time. Vegetables collection and processing can be done well between April and May where wet season is getting towards the end. Ideally, this is to free vegetables from been contaminated with sands and mud. But also during this season vegetables can be dried with less hassle from rains since drying relies on sunshine only. The problem is that during this time harvesting of leguminous crops including groundnuts and *njugu* (which are perceived more important for food and income generation than vegetables) is at peak, hence there is less time available for vegetable collection. Beyond May vegetables are no longer tender enough to suit the needs; but also vegetables from end May onwards tends to be less available. The situation is even worse when it comes to women since apart from farming activities they also have to take care of domestic chores as usual. Although women are fully involved in farming of major crops yet they have to find means to get soups for their families. Those who fail to collect enough vegetables during wet season and preserve it turn into beggars to neighbors who happen to have enough preserved vegetables. This not only embarrasses such women but also it exposes their families into food shortage and malnutrition. Further, although women participate fully in cultivation of main crops they are not decision makers when it comes to income expenditure. Thus they cannot decide to sell some of the main crops so as to generate money to buy vegetables or any other sources of soup for their families.

3.6 Determinant factors for cultivation of vegetables during dry season

3.6.1 Food culture

Table 12 also shows that 85.2% of all respondents strongly agreed that most families eat local vegetables when there is food shortage or hunger. This may mean that eating vegetables indicates food problems in the community. Therefore cultivation of vegetables is not a priority under normal circumstances where food is plenty. Furthermore Table 12 indicates that 82.5% of all respondents strongly agreed that vegetables are less superior to meat; this kind of perception

suggests that vegetables are less valued compared to meat in the study area hence collection of vegetables may not be a priority. Findings from focus groups discussion as summarized in box 2 also support this. The same table indicates that of all respondents (81.2%) indicated that vegetables is food for poor people.

3.6.2 Access to other sources of food

But also recently transport network between Shinyanga region and Mwanza Region has been improved where tarmac road has been constructed. Nowadays it takes hardly three hours for one to get to Mwanza from Shinyanga and vice versa. Hence exchange of commodities has been easy between the two regions. It is now easy to access Sardines from Mwanza than it was before. One focus group member argued that *“Nowadays it is easy to access sardines from Mwanza why should we waste our time cultivating vegetables?”* 81.2% of all respondents indicated that Local vegetables are for poor people.

3.6.3 Water shortage, soil type and land shortage

93.8% of all respondents indicated that water scarcity discourages farmers to cultivate vegetables during dry season (Table 10). This tallies with what was pointed out earlier that the Shinyanga region experiences frequent droughts. Water for domestic use is mainly from water holes which are also not reliable. There are no major river streams nearby the study area that would otherwise support irrigation during dry season. Most river streams are seasonal; they get dried off during dry season. There are also no pumping or running water. In Mwadui utemini there is a dam which is dedicated for livestock only and not for irrigation; this is another indicator that meat is superior to vegetables in the study area. Focus group members agreed that several vegetables could be cultivated during dry season if water was available, such vegetables would include *msusa (mayoba)*, *majani ya kunde (mashili)*, *majani ya matango (limbe)*, and *metembele*. Focus group members in both villages insisted that if only water supply can be in place most women would engage in vegetable cultivation for both household consumption and for income generation. One of the women from Nyenze village said: *“water is a big problem...we suffer a lot, we have no water ...the dam that was constructed for us by Mwadui mining company has been restricted from use...”*

81.2% of all respondents indicated that in some farms soil is not supportive to vegetable cultivation (Table 10). The study area is extremely dry during dry season. From focus group discussion farmers explained that soils in the study area are of four main types namely, *ibambasi*, *mbuga*, *kikungu*, and *ibushi*. Focus group members perceive that not all soil types can support vegetable cultivation in the study area. According to members of the focus groups, vegetables can grow well on *kikungu* and *ibushi* soils only. As a result not every house hold can grow

vegetables. Such households have no alternative than buying and/or begging from friends or going without vegetable. 82.5% of all respondents strongly agreed that land shortage is one of the hindrances towards cultivation of vegetables in the study area (Table 10).

3.6.4 Other factors

Table 10 indicates that only 7.8% of the respondents agreed that they prefer buying vegetable than cultivating while majority of them (92.2%) disagreed; this may be closely associated to poverty levels in the community. Table 10 also indicates that 81.2% of all respondents strongly agreed that to depend on local vegetables is a laziness indicator. Majority of the respondents (49.2%) indicated that the young generation is less knowledgeable in vegetable preservation. There was an agreement that seeds are not available (81.2%) and this is why there is no cultivation of vegetables in the study villages (Table 10).

Table 10: Determinant factors for production of local vegetables

Statement	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	Total
Local vegetables are only important during food shortage and hunger	52 (82.5%)	6 (9.5%)	1 (1.6%)	0 (0.0%)	4 (6.3%)	63 (100%)
Vegetables are less superior to meat	52 (82.5%)	6 (9.5%)	1 (1.6%)	0 (0.0%)	4 (6.3%)	63 (100%)
Local vegetables are for poor households	52 (81.2%)	1 (1.6%)	0 (0.0%)	3 (4.7%)	8 (12.5%)	64 (100%)
To depend on local vegetables is a laziness indicator	52 (81.2%)	1 (1.6%)	0 (0.0%)	3 (4.7%)	8 (12.5%)	64 (100%)
I prefer buying vegetables than cultivation	0 (0.0%)	5 (7.8%)	0 (0.0%)	59 (92.2%)	0 (0.0%)	64 (100%)
In some farms soil is not supportive to vegetable cultivation	52 (81.2%)	1 (1.6%)	0 (0.0%)	3 (4.7%)	8 (12.5%)	64 (100%)
The young generation is less knowledgeable in vegetable preservation	32 (49.2%)	22 (33.8%)	8 (12.3%)	2 (3.1%)	1 (1.5%)	65 (100%)
Water scarcity discourages farmers to cultivate vegetables during dry season	60 (93.8%)	2 (3.1%)	1 (1.3%)	0 (0.0%)	1 (1.3%)	64 (100%)
Land shortage is a hindrance to vegetable production	52 (82.5%)	6 (9.5%)	1 (1.6%)	0 (0.0%)	4 (6.3%)	63 (100%)
Seeds are not available	52 (81.2%)	1 (1.6%)	0 (0.0%)	3 (4.7%)	8 (12.5%)	64 (100%)

Culturally women are expected to prepare vegetable seeds locally from vegetable fruits during wet seasons ready for growing such vegetables next season. What they do is that they cut such vegetable fruits into pieces to get seeds and they dry such seeds using sunshine/solar energy. Once seeds are properly dried that are kept in tins and any other safe containers ready for cultivation during the next season. Seeds that are commonly prepared locally include of such vegetables as mayoba/maboga (pumpkin), limbe (cucumber), mchicha, and kunde. During focus groups however it was noted that most women nowadays do not take time to prepare seeds as women did in the past. As a result in order to cultivate vegetables one has to buy seeds. But it was also noted that most households cannot afford buying such vegetable seeds due to higher levels of poverty in the community.

3.7 Perceived options for addressing vegetable shortage

Respondents were asked to indicate levels of agreement or disagreement on three options for addressing vegetable shortage during dry season as indicated in Table 11. Of all respondents, 98.7% strongly agreed that collecting and processing local vegetables that are freely available during wet season is one of the best options for getting away with vegetable shortage during dry season. (88.2%) Of all respondents strongly agreed that cultivating vegetables on own farms during dry seasons is one option for getting away with vegetable shortage during dry season. Majority of the respondents (61.5%) were not sure whether buying vegetables from others would make a good option for getting away with vegetable shortage that is usually experienced during dry season; a good number of respondents (36.9%) agreed on the same (Table 10).

Table 11: Options for addressing local vegetable shortage

Statement	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	Total
Gathering and processing local vegetables freely available during wet season	48 (82.8%)	4 (6.9%)	0 (0.0%)	2 (3.4%)	4 (6.9%)	58 (100%)
Cultivating vegetables from own land during dry season	60 (88.2%)	8 (11.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	68 (100%)
Buying vegetables from others	1 (1.3%)	24 (36.9%)	40 (61.5%)	0 (0.0%)	0 (0.0%)	65 (100%)
Eating meat	22 (33.8%)	32 (49.2%)	8 (12.3%)	1 (1.5%)	2 (3.1%)	65 (100%)

Box 2: Perceptions on nutrition value of vegetables

Non vegetable soups especially those from meat and fish are perceived to be superior over vegetable soups. FGDs reported that nowadays with good transport network sardines are easily available all year around hence there is no pressure of soup during dry season. This results into households not bothering vegetable collection and cultivation during both wet and dry seasons. Households that consume meat (beef, mutton, lamb, chicken, etc.) as well as fish soups regularly are perceived to be economically well off and superior over households that consume vegetables. Further from FGDs point of view meat is perceived superior over vegetables as far as nutrition values is concerned. Members of the FGDs perceives that vegetables and meat substitutes one another in terms of nutrition e.g. if one has meat soup she/he does not need to eat vegetables. It is important to establish the extent to which this kind of perception is objective. The literature on nutrition however informs that human beings need to consume a balanced diet that includes a variety of food including vegetables and meat among other things. There was also no clear definition of nutrition value available in vegetables; FGDs members referred vegetables to have protein.

4.0 DISCUSSION

Clearly vegetables are abundantly available in the study area during wet season in different varieties (as presented in Table 7). It is also clear that people in the study village have clear perceived nutrition value of the different vegetables present in the study area. With that one would expect that people in the study village would do their best to ensure that they have access to vegetables throughout the year. However, the findings show that there are barriers to achieving access to vegetables and these range from poor division of labour where women who are responsible for ensuring households have access to vegetables are overburdened with other responsibilities including cultivation of other crops than vegetables and house chores. The other factors include lack of knowledge among young generation, food culture, access to other sources of soup including access to sardines, water shortages, unsuitable soil type, and land shortage. However people in the study villages strongly agree that given the fact that vegetables are available for free during wet season, collecting and reserving such vegetables for use during dry season is of paramount importance.

The findings, therefore, imply that the study communities need assistance in a number of areas in order for them to address hindrances towards accessing vegetables especially during dry season. First, mass education is required to enlighten more people on the importance of eating balanced diet where vegetables are important. This will address the perception that meat is superior to

vegetables and that vegetables are for poor people. But also issues of water shortage need higher levels intervention where the government needs to intervene accordingly; one way is through dam construction and education on rain water harvesting. Agricultural extension officers need to assist farmers to identify right soils for vegetables cultivation. But also communities have a role to educate and train the young generation on traditional ways of preserving vegetables that have worked for decades if not centuries in the study area. However, the government needs to assist through shortening walking distances for collection of such vegetables. Specific communal areas need to be dedicated for vegetables cultivation and tending; this would save time as women would collect enough vegetables with a short period of time.

Unavailability of vegetable seeds was mentioned as one of the factors hindering cultivation of vegetables in the study area partly due to lack of time and knowledge among women as well as due to poverty; more sensitization is required on the importance of preserving seeds locally. But also there is a need for the government to make initiatives that will enhance vegetable seeds availability in the study area.

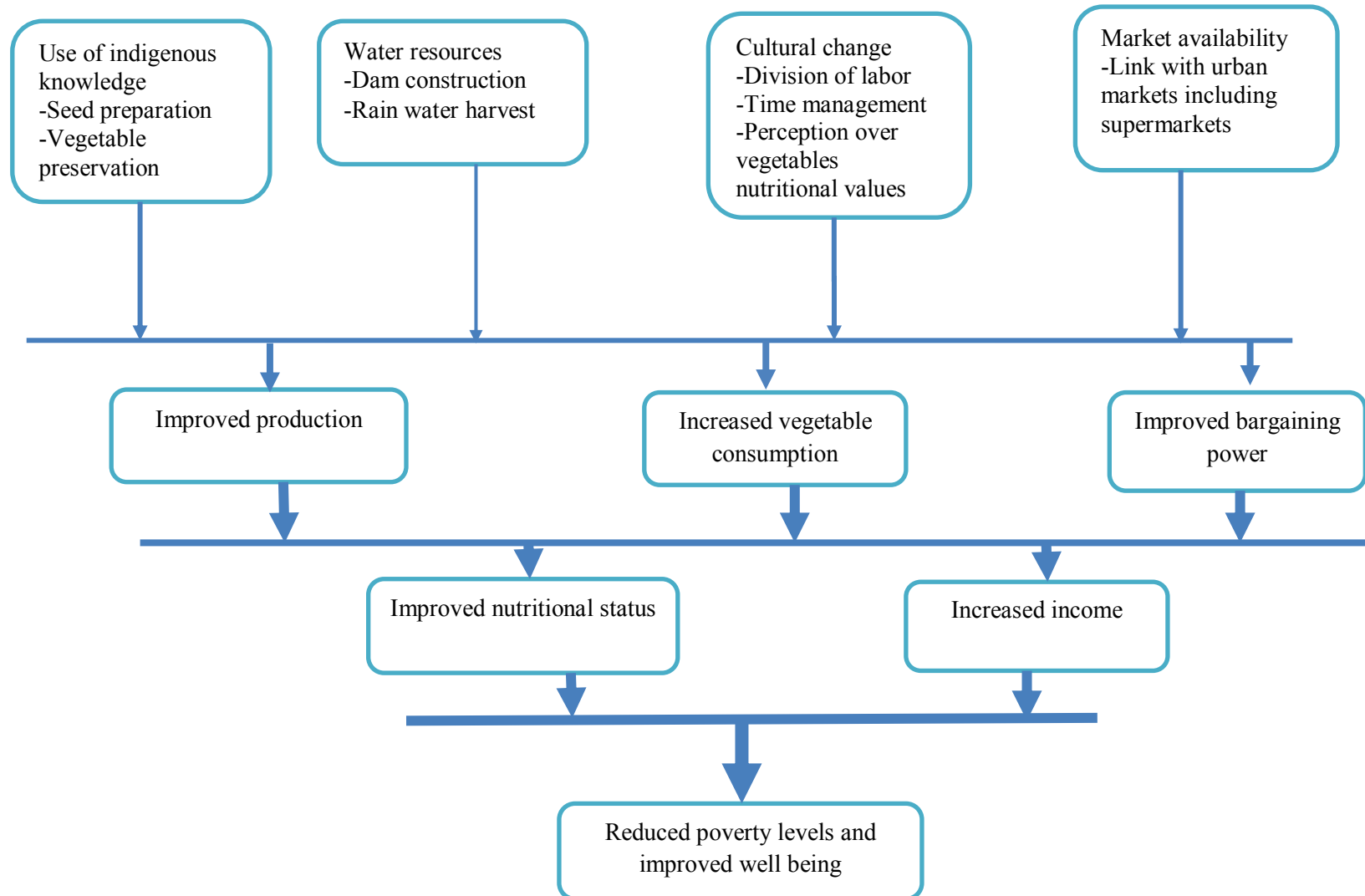
From the finding there is an emerging model pertaining to improving vegetables production and consumption among households in the study villages. The model suggests that the key determinant factors for improved vegetable production are improving indigenous knowledge on vegetable seed preparation during wet season. This will improve seed availability and in turn it will solve the problem of seed unavailability. So young generation need to be well engaged on this. But also the society need to engage young generation on indigenous knowledge pertaining processing and preservation of vegetables during wet season for consumption during dry season.

The model also suggests that production of vegetables will improve only where water resource availability will be available; hence dam construction and rain water harvest may solve the problem. Also maximum utilization of land available for vegetable cultivation is important since not all land available in the study villages is suitable for vegetable cultivation. Timely harvest/collection of vegetables is important so that tender vegetables that suits needs can be collected abundantly. This is only possible if there will be proper division of labour among community members.

Change of altitude and perceptions towards vegetable consumption is required. Community members must distinguish nutrition values available in vegetable soups against other soups; this will motivate farmers to grow more vegetables. Finally turning vegetables into a commercial crop may motivate farmers to cultivate vegetables especially during dry season. However that will be possible with a reliable market. If farmers are assured of the market they are likely to cultivate vegetables massively. Figure one presents the emerging model pertaining vegetable growing in

the study area. Cultivation of vegetables on own land during dry season allows households to have access to fresh vegetables during dry season.

Figure 1: Model for Improving vegetable production and consumption in Kishapu District



5.0 CONCLUSION

Despite the identified hindrances towards collection and cultivation of vegetables in the study villages, still vegetables consumption is important for proper nutrition in the study area. It should be appreciated however that some of the barrier are within the reach of the communities where if for example young generation is educated on how to preserve vegetables using traditional methods and also sensitized on consumption of vegetables (both fresh and processed ones), then access to and consumption levels of vegetables would be improved a big deal. But also some barrier are out of reach of the farmers; the government has to play its role and ensure that it addresses such issues related to water shortage, soils issues, land shortage and education on vegetables cultivation and consumption. Dam construction for vegetable irrigation schemes, rain water harvesting projects, and farm extension services, use of manure, seminars and awareness campaign may all greatly facilitate improving vegetable production and consumption in the study area. Finally commercializing vegetables is one approach that may improve vegetable production and consumption in Kishapu District. Once vegetables are a source of income, then not only women will be left with the task of producing vegetables but also men will likely want to produce such vegetables. Improving nutritional values in processed vegetables which are mainly consumed during dry season remains to be a challenge. Food scientists need to advice proper ways of processing and preserving such vegetables as *mkalango* to minimize loss of vitamins. Future studies should follow up on the extent to which households with big cattle herds are involved in vegetable collection in comparison to those with less or none cattle herds.

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