
Value Chain Analysis: A Case of Chinese cabbage, Tomatoes and Okra at Swaswa Settlement in Dodoma Municipality

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Abstract

The study about value chain analysis was conducted at Swaswa settlement in Dodoma urban district. The area practices wastewater irrigation as there is Waste stabilization ponds which form a source of reliable, cheap wastewater, rich in nutrients for crops production. This study aimed at analyzing value chain of vegetables in Swaswa settlement. Specifically the study intended to (i) identify the activities involved in producing vegetables (ii) identify actors involved in the vegetable value chain, their roles and linkages, and (iii) analyse distribution of gross value across different linkages in vegetable production chain. The data were collected from both primary and secondary sources. The primary data for this study were collected from 204 respondents using multi-stage random sampling and purposive techniques. Questionnaires and checklists tool were employed to collect data from respondents. Results show that high gross income goes to Agro-vet wholesalers, whole sellers and middlemen (71.4%) followed by collectors who scored 57.1%. Therefore, farmers are forced to capture a lower share (28.6%) of gross value. Besides, results indicate that farmers face lack of knowledge on postharvest losses, limited access to market, low price of product, lack of storage, lack of transport and low quality of product. Therefore, it is recommended that farmers should be provided with knowledge on post-harvest handling techniques, should form groups so as to buildup collective bargaining power to be able to acquire good prices and ensure crops processing for value addition.

Key words: Value chain analysis, vegetables and actors

1. Introduction

The value chain analysis describes the full range of activities which are required to bring a product or service from conception to consumption through the different steps of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers (Kaplinsky and Morris, 2000). According to Gibbon and Ponte (2005), value chain analysis includes a wide range of activities such as ensuring access to the full range of necessary inputs, facilitating access to cheaper and better inputs plus sources of funds, as well as strengthening delivery of business and financial services, enabling the flow of information, facilitating improved market access, and/or increasing access to higher-value markets or value-added products.

The study done by Reddy *et al.* (2010), in Andhra Pradesh India indicated that 18.80 per cent of the gross value goes to farmers, 15.50 per cent goes to Agro-vet, 15.30 per cent goes to wholesalers, 13.30 per cent goes to middlemen, 12.00 per cent goes to commission agent, 14.30 per cent goes to village

merchant, and the remaining 10.80 per cent goes to traditional retailers. Thus, the farmers rank first, followed by Agro-vet and wholesalers. The findings were contrary to a study by FAO, (2003) in Kenya where they found out that farmers receiving gross value (10.6%) from mango production which was low compared to other actors. Evidently, actors were benefiting from vegetable production despite uneven distribution of the benefits.

In Tanzania, wastewater vegetables production is practiced at Msimbazi river valley and Kijitonyama in Dar es Salaam city, Lower Moshi in Kilimanjaro region as well as Them river basin and Lemara in Arusha region (Senzia *et al.*, 2009). Through wastewater irrigation farming, farmers manage to have more than one harvest per year and hence are able to improve wellbeing at household level (Murusuri, 2009). In Dodoma municipality tomatoes, okra and Chinese cabbage are major vegetables produced more than twice a year due to availability of wastewater throughout the year. Despite the available opportunity, farmers who

are main actor in production process gain less compared to whole sellers (Murusuri, 2009). Therefore, this study intended to answer the following questions. Who are actors involved in the vegetable value chain, their roles and linkages? to what extent every actor in production is benefiting from conception to consumption?and what are the problems encountered by farmers in the chain. Therefore, this study analyses value chain of major vegetables produced in Swaswa settlement.

2. Study Area and Methodology

The study was conducted in Dodoma urban district. The basis of selection of the area was the existence of wastewater farmers around Swaswa waste stabilization ponds. For this study, in order to select a representative sample a multi-stage random sampling technique was implemented to select vegetables producer, traders and consumers. In the first stage 60 vegetables consumers and traders were selected purposively in market and business centers respectively. In the second stage, using the household list,

60 sample farmers were selected randomly (Table 1). The formal survey was undertaken through formal interviews with selected farmers, traders and consumers using a pre-tested semi-structured questionnaire for each group. Through interview, secondary data were collected from the key informants. These were District Agriculture and Livestock Development Officer, SACCOS Manager, Ward Executive Officer and Mtaa Executive Officer.

Table 1: Sample size distribution

Actors	Sample size
Vegetable consumers (buyers)	60
Vegetable traders	60
Vegetable producers	60
District Agriculture and Livestock Development Officer	1
Land lords	10
Transporters	5
SACCOS manager	1
Casual labourer	5
Ward Executive Officer	1
Mtaa Executive officer	1
Total	204

Descriptive statistics including cross tabulation and frequency distributions were analysed. During the focus group discussion, the respondents identified different farming activities involved in the production of vegetables. They also identified different actors in vegetables value chain. Every individual was required to choose among the identified

activities the most benefiting activity. Through triangulation methods, data were collected and analysed by using Statistical Package for Social Sciences (SPSS).

3.Results and Discussions

3.1 Activities which are required to Bring Vegetables from Conception to Consumption

Respondents mentioned different activities on tomatoes, okra and Chinese cabbage conception to consumption. These include plot renting, ploughing, harrowing, pesticides, nursery and seeds preparation, nursery care, irrigation, transplanting, weeding, harvesting, transportation, sorting, packing, storing, marketing and consumption as shown in Table 2

Table 2: Conception to consumption activities for vegetables

Activity	Frequency	Percentage
Plot renting	5	2.5
Ploughing	12	5.9
Harrowing	20	9.8
Pesticides spraying	17	8.3
Nursery caring	9	4.4
Seeds preparation	21	10.3
Transplanting	32	15.7
Irrigation and caring of seedlings	26	12.7
Weeding	41	20.1
Harvesting	45	22.1
Sorting	25	12.3
Packing	15	7.4
Transporting	6	2.9
Marketing	12	5.9

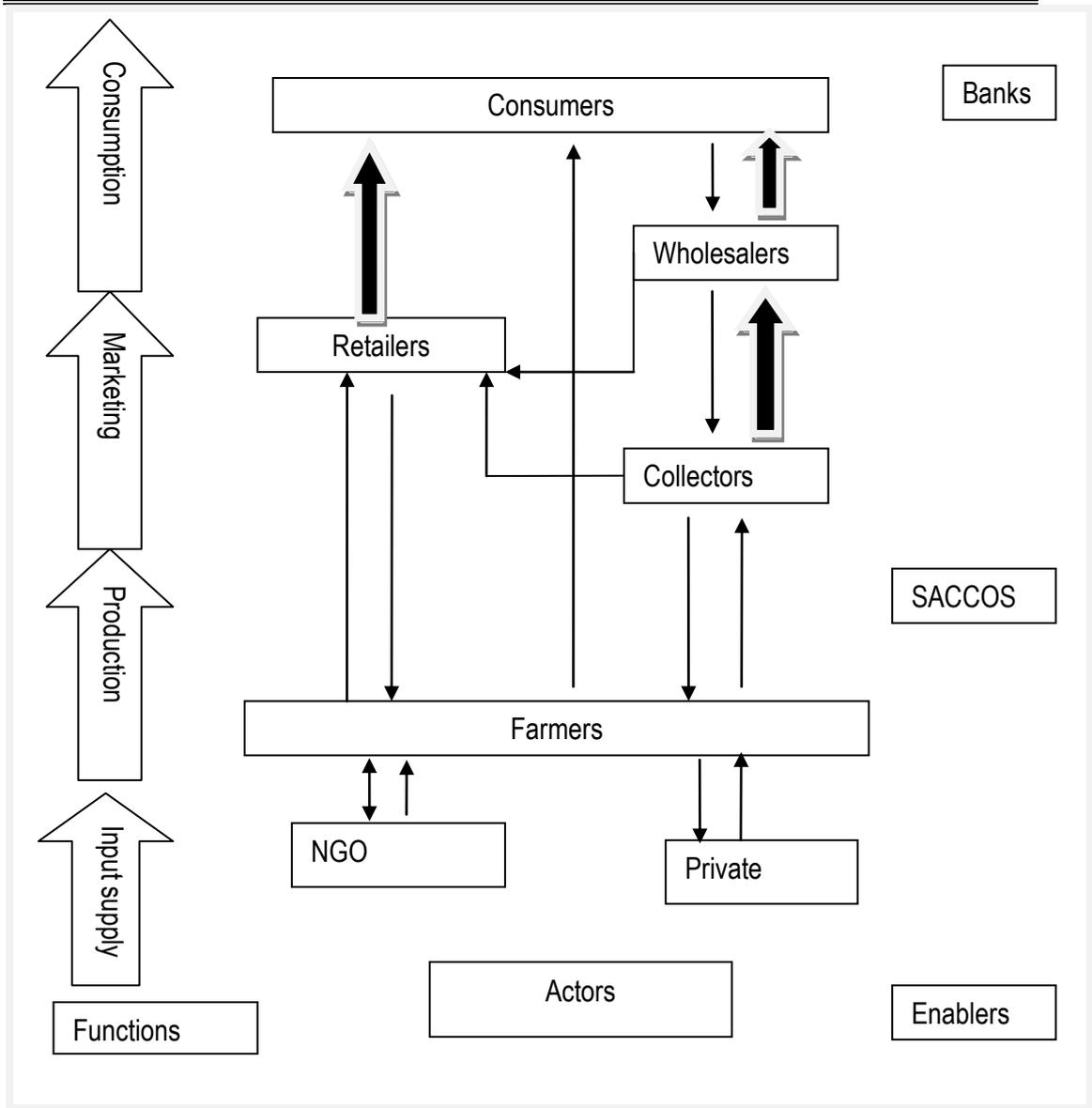
Note, the above table had multiple response

The results in Table 2 reveal that many respondents are involved in harvesting (22.1%), weeding (20.1%) and transplanting (15.7%) which connote farm activities.

3.2 Value Chain Analysis

3.2.1 Value chain map of vegetables

Value chain mapping enables to visualize the flow of the product from conception to end consumer through various actors. It also helps to identify the different actors involved in the vegetable value chain, and to understand their roles and linkages (McCormick and Schmitz, 2002). Consequently, the current value chain map of vegetables in Swaswa settlement is depicted in Figure 1.



- Represents physical flow of input and product
- ↔ Represents two ways of information and technology
- ➔ Represents the flow of much of the products

Figure1: Value chain map of vegetables

3.2.1 Actors and their role in vegetable value chain

The value chain map highlighted the involvement of diverse actors who are participated directly or indirectly in the value chain. The direct actors in this study are those involved in commercial activities in the chain (input suppliers, producers, traders, consumers) and indirect actors are those that provide financial or non-financial support services, such as credit agencies, business service providers and relatives.

Primary actors

The primary actors in vegetable value chain in the study area were seed and other input suppliers, farmers, traders, consumers and exporters. Each of these actors adds value in the process of changing product title. Some functions or roles are performed by more than one actor, and some actors perform more than one role.

Input suppliers

Private input suppliers are the main source of input supply and Vegetables growing. They are responsible to

supply agricultural inputs like improved seed varieties, fertilizers, herbicides, pesticides and farm implements which are essential inputs at the production stage. For major vegetables produced in Swaswa settlement the majority (61.7%) of the sample producers used to buy seeds from Agro vet shops, some are buying from their neighbours (45.0%) and the remaining percentage sort from previous harvest by 43.3% and 38.3% request from neighbors (Table 3). The results revealed that farmers in the study area used improved seeds as well as owned seeds. Regarding to pesticides, the majority (51.7%) of farmers prepare their own pesticides including ashes from dry leaves. The remaining respondents used to buy pesticides from agro-vet and private vendors by 35% and 25% respectively.

Table 3: Source of vegetable seeds for samplerespondents

Source of seeds and pesticides	Score	Percentage (%)
Buying from Agro vet shops	31	61.7
Request from neighbors	23	38.3
Own seedlings sorted from previous harvest	26	43.3
Buying from neighbours	27	45.0

Buying pesticides from agro vet	21	35.0
Buying pesticides from private vendors	15	25.
Use own prepared pesticides (ashes)	31	51.7

* Multiple responses

Producers

Vegetable growers are the major actors who perform most of the value chain functions right from farm inputs preparation on their farms or procurement of the inputs from other sources to post harvest handling and marketing. The major value chain functions that vegetable growers perform include ploughing, planting, irrigating, weeding, pest/disease controlling, harvesting and post harvest handling. Farmers without land used to rent from landlords. However, the result of the sample farmers’ survey shows that 40.68%, 36.27% and 33.33% of tomato, chinese cabbage and okra, respectively were damaged before reaching the market (Table 4). Further, results shows that producers sort and grade vegetables by separating damaged and undamaged vegetables, cleaning and cutting when needed before they take it to the market.

Table 4: Post-harvest loss of vegetables in percent of production

Vegetables	Response (N=204)			
	YES		NO	
	frequency	Percent	Frequency	Percent
Tomatoes	83	40.68	121	59.31
Chinese cabbage	74	36.27	130	63.72
Okra	68	33.33	136	66.67

In Swaswa, most of producers transport their vegetables to the nearby markets. However, traders also go to the farmers’ field and negotiate about price, purchase it and eventually transport mostly vegetable product to urban markets.

Collectors/Assemblers

These are traders in assembly markets who collect vegetables from farmers in village markets and from farms for reselling it to wholesalers and retailers. They use their financial resources and their local knowledge to bulk vegetables from the surrounding area. They play important role and they do know areas of surplus well. Collectors are the key actors in the vegetable value chain, responsible for the trading of 41.2%, 33% and 25.8% of tomato, Chinese cabbage and okra, respectively from production areas to wholesale and

retail markets in the study areas shown in Figure 2. The trading activities of collectors include buying and assembling, repacking, sorting, transporting and selling to wholesale markets.

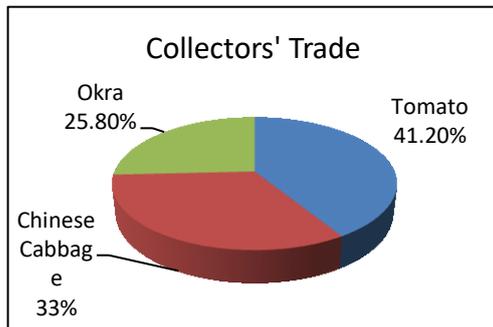


Fig. 2: Collectors role in trading

Brokers/Middle Men

Brokers play an important role in linking farmers to market and other stakeholders of the commodity chain while the ability of market accession of farmers is limited and market demand requires an improvement in quantity amount as well as diversity of products type. The brokers sometimes go beyond facilitation of transaction and tend to control and fix prices, create price symmetry and make extra benefits from the process in addition to convincing the producers to sale their vegetables at the prices set by

wholesalers.

Wholesalers

Wholesalers are mainly involved in buying vegetables from collectors and producers in larger volume than any other actors; and supply those vegetables to exporters, retailers and consumers. They also store product, usually for a maximum of three days. Survey result indicates that wholesale markets are the main assembly centres for vegetables in their respective surrounding areas. They have better storage, transport and communication access than other traders do. Almost all wholesalers have a warehouse in a market either self-owned or rental basis.

Retailers

Retailers' involvement in the chain includes buying of vegetables, transport to retail shops, grading, displaying and selling to consumers. They are the last link between producers and consumers. They mostly buy from wholesalers and sell to urban consumers. Sometimes they could also directly buy from the producers.

Consumers usually buy the product from retailers as they offer according to requirement and purchasing power of the buyers.

Private consumers

Private consumers purchase vegetables directly from producers, retailers and wholesalers though most of the consumers purchase from retailers. Farmers also make important segment of the rural consumers since they consume part of their produces as shown in Table 5.

Table 5: Vegetable consumed by producers

Vegetable	Producer	
	Frequency	Percent
Tomatoes	48	30.0
Okra	67	41.8
Chinese cabbage	76	47.5

*multiple responses

The survey results also showed that, on average, 30% of tomato, 41.8 % of okra and 47.5% of cabbage produced in 2013 and 2014 were consumed by the producers. The study results reflected that 70%, 58.2% and 52.5% of tomatoes, okra and Chinese cabbage

respectively, were consumed by private consumers. Most of those consumed by farmers themselves were the damaged and small size products which are not consumers' preference. Consumers prefer medium, sphere shape, red color and strong tomato; medium size potato with smooth skin and free from damage; and medium size and green Chinese cabbage. Generally, consumers have their own quality criteria to purchase vegetables.

Supporting actors

Such actors are those who provide supportive services including training and extension, information, financial and research services. According to Martijn and Redwood(2005), access to information or knowledge, technology and finance determines the state of success of value chain actors. In Swaswa, supporting actors are micro finance institutions which provide trainings and funds for income generating activities. These are Savings and Credit Cooperative Society (SACCOS) and Small Enterprises Development Agency.

Financial services

In the study area, SACCOS, PRIDE and individual lenders have been identified as a potential source for credit both in kind or on a cash basis. Sources of credit for traders are also the same as producers except some big traders get credit from banks. With regard to credit source sampled respondents took credit from Relatives, SACCOS, PRIDE, More than one source and traders by 27.5%, 24%, 23.5%, 12.7% and 5.9% respectively (Table 6). Most of the respondents' reasons for not acquiring credit market were fear of lending conditions and lack of awareness. This study results concurred to those of Woldesenbet, 2013 who found that in Nigeria few farmers acquire credit in financial Institutions in comparison to traders.

Table 6: Sources of credit in the study area

Sources	Producer	
	Frequency	Percentage
SACCOS	49	24.0
PRIDE	48	23.5
From Traders	12	5.9
From relative	56	27.5
More than one sources	26	12.7

* Based on multiple responses

3.2 Distribution of Gross Value Chain to Actors

The respondents were required to mention the group of actors/stakeholders mostly involved in the chain and their responses are indicated on Table 7. Each actor who had direct relationship to the mentioned activity was given 1 mark and the total score was computed to percentages. The results in Figure 3 show that, high gross income goes to intermediaries and whole seller merchants by 74.1% each. This follows by collectors and vegetable retailers who scored 57.1% each. In the chain, farmers had very minimal score that is 28.6%.

Further analysis was done to investigate why farmers score low in the chain in comparison to their counterparts. The major constraints mentioned by responded are represented in Figure 3.

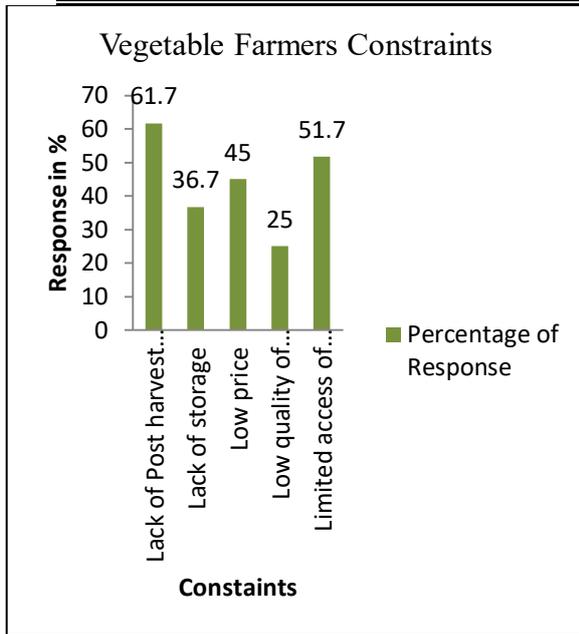


Figure 3: Vegetable farmers' constraints

Results in Figure 3 show that 61.7% reported lack post harvest handling techniques as a major constraint to farmers. This followed by limited access of market (51.7%) and low price of vegetables (45%). Through focus group discussion, it was reported that farmers lack value added knowledge as reported by one member. *"We used to sell our raw crops in farm places with low price. None of us have crop processing knowledge."* Similar results were also reported by Martijn and Redwood (2005), in Andhra Pradesh that 19.8% (the largest percent) of gross income of Chinese

spinach goes to wholesalers and middlemen due to inadequate preservation knowledge.

Table 7: Distribution of Actors' vegetables value chain benefits/ activities

Activity	Benefited with identified activity							Score	(%)
	Collector	Marketing	Transport	Sorting	Packing	Storage	Transportation		
Transporter	X	X	√	X	X	X	√	2	28.6
Land lords	√	X	X	X	X	X	√	2	28.6
Collectors	√	√	X	X	√	X	√	4	57.1
Agro-vet		√	X	X	X	X			
whole seller	√						√	3	42.9
Agro-vet		√	X	X	X		√	3	
Retail seller	√					X			42.9
Crop Retailer	X	√	X	X	√	X	√	4	57.1
Sorting men	√	X	X	√	X	X	√	3	42.9
Middle men	X	√	√	√	√	X	√	5	71.4
Whole seller		√					√		
Merchant	X		√	X	√	√		5	71.4

4. Conclusions and Recommendations

The production stages involves some of activities namely plot renting, ploughing, harrowing, pesticides and herbicides purchases and application, nursery preparation and care, transplanting, irrigation, weeding, harvesting, transportation of seeds and crops, sorting, parking, storage, distribution and marketing. All these activities employed a number of actors including farmers, transporters, casual laborers, agrovert (both retailer and whole sellers) sorting men/women, buyers (middle men/women and wholesalers). Through the analysis, every actor was benefited with the

process. However, high gross income goes to middlemen and whole seller middle (71.4%) followed by collectors and crop retail seller by 57.1% each. Farmers scored very low in the chain compared to their counterparts. This was reported to be due to lack of post harvest handling techniques, limited access of market, lack of storage and low price. Therefore, it is recommended that the farmers should be provided with knowledge on post-harvest handling techniques, to solve the problem of harvest losses, which affect their returns and those of traders. In addition, farmers should form marketing groups to build their collective bargain power over the prices for the inputs they purchase and the crops they sell. Furthermore being in groups will help them to seek for technical and financial support from government, development partners and in financial institutions.

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