

PRODUCTION AND MARKETING OF ORANGE IN TWO VILLAGES IN MUHEZA DISTRICT, TANZANIA

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ABSTRACT This study examines the current situation and challenges in orange production and marketing in Muheza District, Tanga Region, Tanzania. Tanga Region is a major orange production area in Tanzania, and it is estimated that more than 80% of all oranges in Tanga Region are produced in Muheza District. Utilizing field data collected in Mkuzi and Mindu villages in Muheza District, this paper explores the current situation of orange production and marketing. Orange production makes a substantial contribution to the district's economy; 80% of the district council revenue is derived from taxes on orange production and about 75% of household income in 2011 was estimated to be delivered from oranges. Although orange production is extremely important in this district, the real situation regarding production and marketing has not been closely investigated. In this paper, I discuss the present situation regarding orange production and marketing and present an empirical study conducted in two representative villages in Muheza District. It is argued that the marketing chain controls orange production in the two villages because participants higher up the chain can directly control the production process through their interactions with producers. However, at the end, the traders who have control of the orange farms, and the producers are often relegated to mere watchmen of their own plots. To address this issue, an integrated approach is recommended where dependence on orange cultivation is reduced by diversifying into other sources of income, such as planting fast-growing timber trees along the boundaries of farms, to supplement producers' income from orange.

Key Words: Orange production; Marketing; Broker; Advanced payment; Pre-harvest arrangement.

INTRODUCTION

Previous studies on orange production in Tanzania have examined the challenges facing small-scale farmers in their production endeavors (Makange, 2009; Makorere, 2013). Limited services to farmers, unreliable markets, primitive technology, and an inability to use agricultural inputs have been mentioned as some of the common causes of these challenges. Several studies (Mbiha et al., 2004; Mwanakatwe, 2006) have reported factors affecting the development of the citrus industry in Tanzania, particularly in Muheza District, and these factors include a lack of knowledge, the production of orange varieties that do not meet market demand, an overdependence on rain-fed agriculture, and a lack of professional companies or institutions producing seedlings. The lack of a reliable market, low prices, damage from insects and diseases, and post-harvest loss have also been reported as being important challenges facing orange farmers throughout Tanzania

(see Mbiha et al., 2004; Mwanakatwe, 2006; Makange, 2009; Makorere, 2013). However, these previous researches did not examine the socio-economic aspects of orange production nor did they provide detailed field data. The present study fills these knowledge gaps by providing empirical evidence collected from Mkuzi and Mindu villages in Muheza District.

OVERVIEW OF THE RESEARCH SITES AND METHODS

I. Location of the Research Sites

The present case study was conducted among the small-scale orange growers in Mkuzi and Mindu villages in Muheza District, Tanga Region. Muheza District has a total area of 1,974 km². The national census conducted in 2012 indicated that Muheza District had a population of 204,461 people. The district is divided administratively into four divisions (*tarafa*), 33 wards (*kata*), and 135 villages (*kijiji*). The district has two rainfall seasons, one of which is longer than the other, and an average annual rainfall of 1,100 to 1,400 mm. The rainfall is crucial for the success of the agricultural industry, which is the backbone of the economy and the livelihood of many of the district's residents (Muheza District Council, 2007; NBS, 2012).

II. Ethnic Composition of Mkuzi and Mindu villages

In Muheza District, the Bondei people occupy the lowland areas and the Sambia occupy the highland areas. During the colonial era, the Bena and Makonde migrated to Tanga from Njombe and Mtwara Regions to work on sisal estates. The descendant of these migrants are now the second or third generations of their families, so most of their parents and grandparents have passed away. Mkuzi village borders the abandoned Kumburu Sisal Estate (Fig. 1), which was once a place where sisal laborers from across Tanzania were brought to work. Sisal was introduced to Tanzania in 1890 by the German colonial government (Hanan, 2008). Immediately after the introduction of sisal, the colonial government realized that the native inhabitants of Tanga, the Bondei, were not ready to work as sisal cutters because they disliked the hard work at sisal estates. To overcome this labor shortage, the British colonial government recruited sisal workers from other regions who were more committed to the work than the local people, and this approach provided cheap labor for the industry. Sisal workers were usually contracted for 2 or 3 years and then returned to their homeland after their contract expired. However, from the 1970s, some sisal laborers did not return home after their contract expired, and instead chose to settle in nearby villages where they began to engage in agricultural activities. This explains the presence of Bena and Makonde in Mkuzi, Mindu, and other villages in Muheza District. It should be noted that these two groups of people are also engaged in orange production.

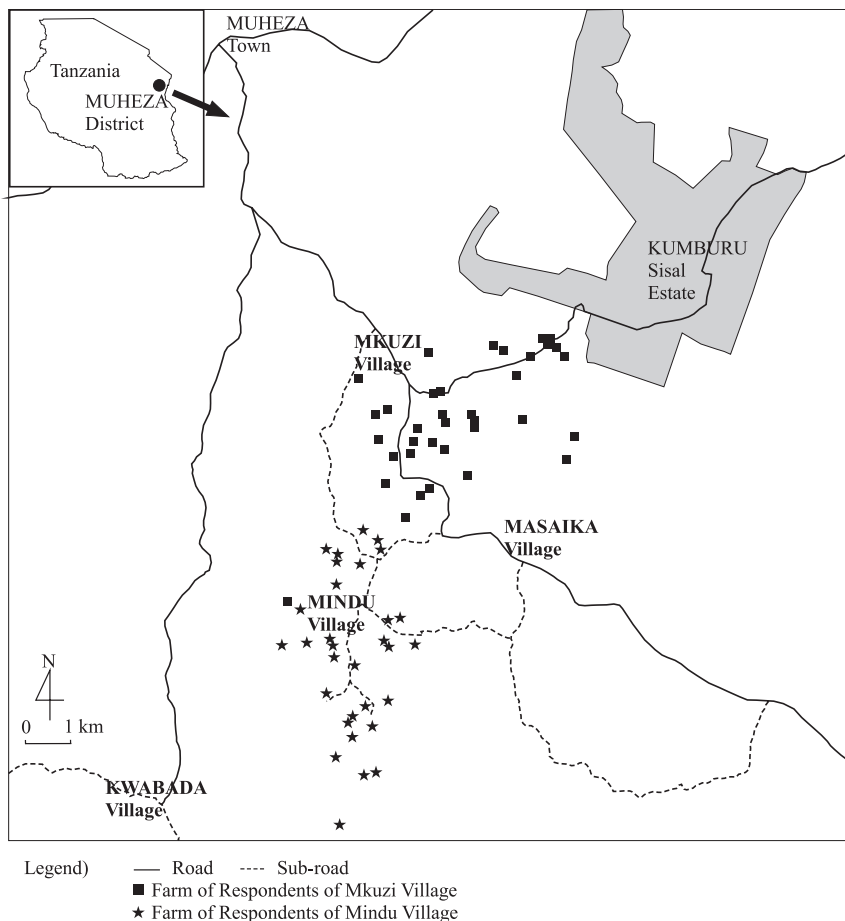


Fig. 1. Location of orange farms of respondents in Mkuzi and Mindu villages

Source) Base map: United Republic of Tanzania, map 1:50,000 (part of Sheet 130/2: Muheza and part of Sheet 130/4: Pangani).

Farms: Field Survey by authors.

III. Sample Selection and Data Collection Methods

Data from the Mkuzi Ward Agricultural Office indicated that there were 230 and 170 households that were actively engaged in orange cultivation in Mkuzi and Mindu village, respectively. The present study took a representative sample of 23 orange producers in Mkuzi village and 19 in Mindu village by using a stratified random sampling method according to the number of orange producers of each sub-village (*kitongoji*) of both villages. The ethnic composition of the respondents in the two villages is shown in Table 1.

A cross-sectional research design was adopted because of the nature of the information required for this study, which allowed data to be collected at one point in time from different groups of respondents. To achieve the objectives of

Table 1. Ethnic composition of respondents in two villages

Ethnic group	No. of respondents		
	Mkuzi	Mindu	Total
Bondei	12	7	19
Sambaa	2	3	5
Pare	1	1	2
Bena	5	6	11
Makonde	1	2	3
Makua	1	0	1
Nyakyusa	1	0	1
Total	23	19	42

Source) Field survey by authors in 2016 & 2017.

Note) It is not rare that the spouses of respondents belong to different ethnic groups.

this study, data was collected regarding the relationships among the challenges faced in the production and marketing of orange. Descriptive survey methods were also adopted, and information was collected by interviewing and administering questionnaires to the respondents. Other study methods included a household survey, a field survey, key informant interviews, and field observation. Primary data was collected through household surveys and interviews that addressed the opportunities and challenges of orange production in the villages. The study findings were analyzed both quantitatively and qualitatively.

PRODUCTION OF ORANGE

I. General Situation

Oranges were introduced to Tanzania by Anglican missionaries in the early 1900s, and were planted first in Tanga Region (Mbiha & Maerere, 2002). After realizing that orange was well suited to the Tanzanian climate, Christian church missionaries introduced oranges to other areas, mostly sisal estates, which acted as agents for distribution. Tanga Region is currently estimated to have more than 840,000 orange trees, which is equivalent to 8,400 hectares of farmland, with more than 80% being found in Muheza District. Muheza District is the largest producer of fruits in Tanga Region (Tanzania, 2004). The current production of citrus in Muheza is estimated at 80,000 tons per annum. It is estimated that 80% of the district council revenue is from taxes on orange cultivation (Muheza District Council, 2015). At the household level, it is estimated that the contribution of orange cultivation to income was about 75% in 2011 (Tanzania, 2012). Despite the importance of orange cultivation, it is estimated that about 32,000 tons of citrus fruits produced in Muheza each year are left to spoil after harvesting (Makange, 2009).

Orange cultivation was introduced to Mkuzi village in the 1970s by Mr. Raphael Ngawasa, who was working at the Mlingano Agricultural Research Centre at Muheza District where he learned the technique of orange budding (Tanzania, 2004). After his retirement, Mr. Ngawasa (who was a Bena) started an orange nursery in Mkuzi village and subsequently orange cultivation spread among the Bena. After a few years, the Bondei (the original inhabitants of the area) realized the benefits accrued by the Bena and decided to start cultivating oranges themselves, and slowly orange cultivation spread throughout the village. Later on, new varieties were introduced and orange cultivation became an important source of income. It was at this time that individual farmers also started distributing plant materials among one another and orange cultivation started (Tanzania, 2004). In the 1970s, the Ministry of Agriculture, through the third five-year national development plan, started efforts to improve fruit production in Tanzania. Nurseries for the production of plant materials were established in several districts, and new cultivars were introduced into mother orchards. New cultivars were budded on lemon rootstocks and distributed to farmers free of charge. However, these nurseries did not operate on a commercial basis and were therefore unsustainable; the nurseries closed down when the government project was ended in 1977. However, smallholder farmers continue to produce orange seedlings by using the knowledge they learned from the project (Tanzania, 2004).

II. Current Situation of Orange Production at Mkuzi and Mindu Villages

Orange cultivation plays an important role in the lives of the farmers in the two villages. Most respondents in the two villages (97.1%) depend on orange as their major source of income, and there is little diversification as far as cash-crop farming is concerned. A large proportion of this agricultural activity is challenged with low productivity, with often low and unstable yields from year to year that generate insufficient income, which in many cases does not meet the cash needs of their households. Mostly, production is done by small-scale farmers whose land is less than 10 acres (see Photo 1). Table 2 shows the size of the orange farms in the study area stratified by size. The average farm in Mkuzi is 1.39 ha, whereas in Mindu it is 2.58 ha; therefore, farmers in Mindu, which is a remote and newly settled area, generally have larger orange farms than do those in Mkuzi.

Orange farms of 11 of the 23 respondents in Mkuzi Village and 9 of 19 respondents in Mindu Village comprise more than one plot. Table 3 shows the sizes of plots dedicated to orange cultivation in the study area. The average plot size in Mkuzi is 0.86 ha, whereas in Mindu it is 1.63 ha; therefore, the plots for orange cultivation in Mindu are twice as large as those in Mkuzi, and this difference is reflected in the farming pattern with more than half of the plots (53%) in Mkuzi village dedicated to orange only, whereas most of the plots (95%) in Mindu are used for the cultivation of other crops such as maize, banana, and cassava. It is likely that due to the small size of the plots in Mkuzi it is not profitable to plant other crops at the expense of reducing orange production capacity.

Orange farmers of both villages depend on a rain-fed agricultural system (100%). There are two major orange seasons: the main season that runs from June to

Table 2. Distribution of size of orange farm in Mkuzi & Mindu villages

Size (ha)	No. of farms		
	Mkuzi	Mindu	Total
<0.40	3	0	3
0.40–0.79	5	0	5
0.80–1.19	5	3	8
1.20–1.59	4	5	9
1.60–1.99	3	1	4
2.00–3.99	2	7	9
≥4.00	1	3	4
Total	23	19	42
Average (ha)	1.39	2.58	1.93

Source) Field survey by authors in 2016 & 2017.

Note) 1) Respondents in Mkuzi village is 23, while 19 in Mindu village.

2) Orange Farms of respondents are sometimes composed of more than one plot.

Table 3. Distribution of size of plot for orange cultivation in Mkuzi and Mindu villages

Size (ha)	No. of plots		
	Mkuzi	Mindu	Total
<0.40	7	0	7
0.40–0.79	15	8	23
0.80–1.19	11	4	15
1.20–1.59	0	6	6
1.60–1.99	2	3	5
2.00–3.99	1	7	8
≥4.00	1	2	3
Total	37	30	67
Av. (ha/plot)	0.86	1.63	1.21

Source) Field survey by authors in 2016 & 2017.

Note) Respondents in Mkuzi village is 23, while 19 in Mindu village.

September and a minor season that runs from October to February. Orange cultivation is organic by default, as most of the producers do not use chemical fertilizers or pesticides. Currently, even though the climate, soil, and seasons are favorable, the potential for orange cultivation in Tanzania is not being fully utilized. There is no agricultural research institution that deals with citrus and therefore most crop varieties are not developed, and even if they are developed, dissemination remains a critical problem. Similarly, attack from insects is one of the challenge facing orange cultivation at the villages (see Photo 2).

Like the orange growers in other areas in Tanzania, farmers in Mkuzi and Mindu villages plant several varieties of oranges: Early Valencia (Msasa), Nairobi,

Late Valencia, Pamba, Jaffa, Washington, and Zanzibar (MMA, 2008). Twenty-one of 23 respondents in Mkuzi village and all 19 in Mindu village cultivate Msasa. In Mkuzi village, the most common varieties are Msasa (91.3%), Late Valencia (73%), Jafa (40%), and Nairobi (8.7%). Msasa is preferred because it matures early and therefore assures producers a quick source of income to pay their debts. In contrast, Late Valencia takes longer to mature, and is sold mostly during the off-season when oranges are at a premium price because of the limited supply of orange; in the off-season, one orange can be sold for 100 to 150 Tanzanian Shillings (TZS) compared with TZS 10 to 20 for one Msasa in the high season. Those who plant Msasa reported that they know that the price of Msasa is much lower than that of Late Valencia, but they prefer that variety because they are assured money early and are able to harvest twice per year (June–August and October–November). Thus, a shortage of cash income most of the year has forced these farmers to choose an option that produces less income compared with those who can wait and maximize profits.

The different orange varieties help farmers extend the seasonality and choose the selling time; however, there are challenges for growers who cultivate off-season varieties (e.g., Late Valencia). For example, they are threatened by orange theft from villagers who have sold their oranges earlier (e.g., Msasa), and most producers financially cannot wait that long for the price to increase. Thus, growers plant orange varieties that help them achieve their goals: selling early at a low price for quick cash or wait until the off-season and sell at a higher price to maximize profits.

All 42 respondents from the two villages obtained their seedlings from friends or produced them themselves by budding new cultivars from orange trees on lemon rootstocks (see Photo 3). During the study period, it was noted that there was no citrus nursery in either village, and likewise, none of the respondents indicated that they obtained seedlings from nurseries located in neighboring villages or elsewhere. The main reason given for why the farmers did not buy seedlings from the nurseries was that a single orange seedling from a nursery costs between TZS 2,500 and 3,500, which was reported by all respondents to be too expensive. To avoid purchasing seedlings from nurseries, farmers produce seedlings themselves. To get improved varieties, farmers start by planting lemon rootstocks, and after three years they bud with orange cultivars, which then proceed as orange seedlings. During the interviews conducted in Mkuzi village, only 5 of 23 respondents reported to have the skills necessary for successful budding. The remaining respondents (18) pay their fellow villagers to do it. Likewise, it was reported that a farmer needs approximately TZS 200 to pay for budding, which is substantially cheaper than purchasing a seedling from a nursery.

MARKETING OF ORANGE

I. Participants in the Orange Marketing Chain in Muheza District

The orange marketing chain in Mindu and Mkuzi villages starts with the pro-

ducers (Fig. 2). The first participants in the marketing chain are the agents who reside in the villages. They are an important part of the chain because they link the producers with the other participants in the chain. The agents determine which producers have oranges and inform the next group of participants, the brokers. The brokers usually reside and conduct their activities in Muheza Town, and sometimes they contact the producers directly, bypassing the agents. The final group of participants are the traders. Some of them are residents of Muheza Town, but it is more common for them to be richer Kenyan traders and residents of other parts of Tanzania. Some of the traders come to Muheza Town, whereas others who have established business contacts with traders in Muheza do not need to come to the village.

The brokers take orders from the traders, which they then take to the villagers, either in Muheza Town or elsewhere, to fulfill. The traders send money to the brokers who will purchase oranges from producers and transport them to the traders. The brokers sometimes do not come to the village, but send agents to buy and collect oranges on their behalf. The traders might come during the counting and loading of the oranges onto the lorries (see Photo 4). Trade regulations direct Kenyan traders to purchase oranges only at markets and not at farm gates or fields in the villages. The traders (both domestic and foreign) purchase oranges and transport them to Mombasa and Nairobi in Kenya or to Dar es Salaam, Arusha, Mbeya, and other regions in Tanzania.

II. Current Situation of Orange Marketing in Mkuzi and Mindu Villages

The majority of respondents (60%) in the two villages harvest oranges during the main season (June to August). The market normally determines production; however, most of the farmers produce without knowledge of where they will sell their produce. Half of the respondents (52%) in Mkuzi village and 21% of respondents in Mindu village are operating without any market information, and therefore depend on the marketing chain. This means that when it comes to selling their produce, there will be pressure to set prices close to actual costs. Farmers often have limited outlets for their produce and are regularly bound in their trading relationships with the other participants in the marketing chain. Some farmers have tried to sell directly to the market but failed; therefore, they depend on traders to purchase their produce. Under such conditions, all respondents in the present study reported that they sell their produce at the farm gate to brokers or agents acting on behalf of Kenyan traders, and the rest is transported to other Tanzanian markets (Dar es Salaam, Mbeya, Arusha, and Mwanza Region).

Orange produced in the two villages is sold in three ways (Fig. 2). The first is through normal sale after the orange has ripened. Traders contact brokers, or agents through the brokers, to purchase their oranges. The brokers/agents search for farms with oranges, which they inspect without seeking permission from the owner. When the brokers/agents are satisfied that the oranges are in good condition, they approach the owner and negotiate a price. Since the brokers/agents themselves are working on behalf of traders, they will negotiate to pay the lowest price so they can secure higher profits for themselves. In Mkuzi and Mindu

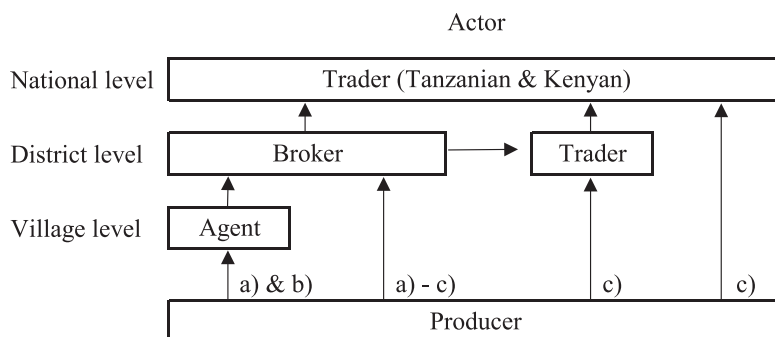


Fig. 2. Marketing Channel of Orange.

Source) Field Survey by authors.

Note) 1) Oranges in big size go to Tanzanian markets in Dar es Salaam and other cities, while medium size go to Kenyan markets in Nairobi and Mombasa.

2) Pattern of orange sale: a) Normal sale after orange ripened. b) Pre-harvest marketing arrangement. c) Advanced payment as a loan.

villages, the brokers/agents come to the production unit or farm to buy oranges and in some cases pick the produce themselves. The normal arrangement is that, after identifying the farm and negotiating a price with the owner of the farm, the brokers bring in hired laborers (mostly from the same village) to pick the oranges. After picking, the oranges are counted either by the hired help or by the farmers themselves. Thus, brokers are usually involved in harvesting, counting, and arranging for transport of the produce from the farm to the market.

When buying, brokers/agents can use various tricks to cheat the orange producers. For example, the counters hired by the brokers/agents can fudge the count by spelling 91 as 61 and stealing 30 out of 130 oranges counted. Or the pickers may hide some of the oranges during collection, which are then collected at night by thieves (usually the pickers themselves). Yet another way of cheating the producers is that the brokers have the upper hand in selecting only the superior quality oranges, which leaves the farmer with only poor quality produce and no knowledge of where best to sell it. While picking, all the oranges on the farm are harvested, marketable oranges are selected (see Photo 5), low prices are offered for the smaller oranges, and the rest are left on the ground. Many oranges are left to spoil, which reduces the farmer's incentive as they fail to cover the cost of production and pay their brokers' debts.

The second way to sell orange is through a pre-harvest marketing arrangement. Sometimes brokers buy the oranges on trees before maturity. A pre-harvest arrangement allows brokers to purchase oranges at a lower price due to the weak negotiating position of the producers. Brokers link the orange producers and buyers from Kenya and other domestic markets in Tanzania. In most cases, the brokers agree to pay a fixed sum for the entire crop in which they only theoretically assume the risk of damage to the crops from adverse climatic conditions. Oranges are sold before they have ripened or when the orange tree is blossoming, and advance payment is based on future orange prices, which are dictated mainly by traders. Brokers pick the oranges when the market prices are high, by which time

30% to 50% of oranges will have fallen from the trees. This produces a great loss from the farmers' perspective and greatly affects their income.

The third way of selling is when farmers receive advance payment from the traders/brokers in the form of a loan. Traders/brokers can visit the village and inspect the farm. If it has the ability to produce enough oranges, the trader pays an advance to the farmer, which the farmer can then use to pay his/her debts. In this arrangement, a trader/broker and a producer enter an agreement (in front of the village government leaders), stipulating that the farmers will repay a trader/broker through oranges, although it is not specified how many oranges will be involved in the repayment. In this way, traders/brokers assist farmers in solving their problems by providing guaranteed cash. However, after receiving the cash advance, the farmer is not allowed to harvest anything from their farm and their duties are simply to maintain the farm until the debt is repaid. In addition, the farmers have no say in when the traders/brokers will return to harvest the oranges, and in most cases a low price, usually around TZS 20 per orange, is offered. This arrangement is reported to be very common in the study area. It was estimated that about 70% of orange farms in the two villages are under control of the traders/brokers. With limited sources of income apart from orange, farmers depend on traders/brokers to lend them money to solve their financial problems, such as paying for school fees and medical expenses.

The scenario mentioned above, the so-called rural indebtedness, is common in East Africa. Since the amount harvested and price offered to farmers does not repay the debt to the trader/broker, the loan is carried over until the next season. Although farmers do not benefit from the harvest, they are obliged to maintain the farm (clearing/weeding). Limited cash flow to assist farmers' needs motivates them to take quick cash from traders/brokers. Thus, the traders/brokers remain in a position to control the next production season. During the off-season, when farmers find it difficult to pay school fees and medical expenses, they have no choice but to surrender themselves and borrow from traders/brokers. The debt increases and farmers remain in a captive relationship where a trader/broker controls the farm for several consecutive seasons, and the farmer becomes a watchman on their own farm (although they are still able to harvest other crops on the farm).

Interviews conducted in the study area indicated that some farmers end up losing their farms due to debt, whereas others continue to give the trader/brokers the right to harvest for 3 to 4 years. By borrowing cash from traders/brokers, farmers solve their immediate expenses but they surrender their farms to the traders/brokers, which makes them more vulnerable for the time they have granted a trader/broker the right to harvest on their farm.

III. Possibility of Establishing Producers Marketing Organizations

The capability for self-organization is a vital entry point for the development of any society. The history of cooperative unions in Tanga Region is not impressive. One example of a cooperative initiated by the farmers was in Lushoto District, where coffee farmers united to form a cooperative union to cater for

their production and marketing needs. Another example is Tanga Regional Cooperative Union (TARECU), which was one of the cooperatives initiated by the government at the regional level when the government took control of the cooperative movement in the late 1960s (Maghimbi, 1992). TARECU dealt with cashew nuts, maize, cardamom, and coconut. However, based on its top-down formation, it failed to deliver what farmers expected because it had neither a good start nor a strong base of cooperation among its members. A third example is Tanga Dairies Co-operative Union (TDCU), which is small-holder dairy farmers in collaboration with a group of Dutch farmers. Union members are dairy cattle farmers in the Tanga Region, including dairy cattle farmers in Mkuzi Village.

Suitable organizations are initiated by people who share common interests and would like their organization to assist them in solving challenges in production and marketing. These people must trust each other, and without this trust an organization will not work. Key informants in Muheza District administration reported that there were several efforts to initiate organizations to help orange farmers in production and marketing. For example, in 1999 some farmers and influential people in Kilulu and Mkuzi wards initiated an organization called the Bondei Orange Farmers' Cooperative. However, it was not successful because the organization threatened the private participants in the marketing chain who control orange production.

In 2006, similar efforts were made to initiate Tanga Best Orange Growers, a cooperative that covered Muheza, Pangani, Korogwe, and Handeni Districts. This organization did not use the word "cooperative" because of fear of being associated with the previous failed cooperative (TARECU). However, like the previous organization, it too collapsed because it did not involve farmers to make them aware of the benefits they would accrue from joining the organization. It should be noted that these organizations might not be beneficial or appropriate for farmers in Mkuzi and Mindu villages. Such an organization should only be initiated if there is a need and people are ready to organize. Instead, smaller groups that do not incur management costs would help farmers more in their production and marketing.

The farmers claimed not to know the benefits of joining these organizations, and without proper knowledge of how these organizations can help, farmers are not likely to commit themselves. Therefore, when initiating an organization, a concerted effort should be made to educate farmers on the benefits of membership, showing them success stories from similar organizations, such as the organization that was initiated by the Bena people in Kwabada village, Muheza District. Though they live in the same area as the Bondei, the Bena have shown greater ability to organize themselves. Although the Bondei admire and praise the Bena for organizing and helping themselves, the Bondei have failed to do so because they do not trust each other. When I asked why the previous organization failed, the reasons given by the Bondei respondents were that they were selfish among themselves, that each person would like to work on their own, and that they are not ready to see others have success. Their spirit is different from that of the Bena who like to collaborate in most of their activities. It goes without saying that there are no differences in ability between the Bondei and the Bena; it is

simply that these different attitudes to self-organization come from the historical backgrounds of the two ethnic groups. As the Bena came as immigrants from other areas to work on sisal estates and they are still the minority with little political and economic patrons in this area, they understand the importance of uniting themselves. In contrast, as the Bondei were the main stakeholders in the previous failed organizations, they are hesitant to reorganize themselves or join or initiate any new institutions.

CONCLUSIONS AND RECOMMENDATIONS

Orange production is valued in Tanzania because of its growing contribution to the National GDP by its potential for export earning, rural employment, and poverty reduction. However, such potential will only be realized in Mkuzi and Mindu villages by improving the performance of the orange marketing and production system. We have seen that in both villages the production process is highly influenced by the marketing chain and that traders directly control production. Marketing channels, mechanisms, and price formations that benefit farmers can strategically influence proper crop production and management. Farmers depend on participants in the marketing chain to sell their produce, and if they do not come, farmers lack alternative marketing arrangements. Farmers are held captive by participants higher up the marketing chain, and they are experiencing a number of problems at both the production and marketing levels due to a lack of pre-requisite resources and finance for expansion and strengthening of their orange farms. Farmers often become powerless over their farms, cannot attend their farms, and thus lack the morale to invest in orange production.

Development of new varieties, dissemination of new technology, assured input supply, access to financial services, and strong marketing support are actions that can be taken towards solving the challenges of the orange growers. For instance, some seedless varieties have been proven effective in capturing the international market because they can be used to make juice concentrate (Makorere, 2013). It is important to encourage the creation of new varieties, and introduction of those varieties will produce oranges that are demanded by the market. There is also a need to invite participation of the private sector through public–private partnerships, and hence, orange seedlings would have to be supplied by private suppliers.

While these actions are being undertaken, there is a need to organize an integrative strategy that will help farmers diversify from orange cultivation and take actions to stabilize their income, such as the planting teak trees (see Photo 6) as well as fast species timber trees, which will supplement their income from orange.

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Photo 1. A pure stand orange farm; surrounded with maize, coconuts and mango trees at the far (Mkuzi on 30/Jul./2016)



Photo 2. Oranges which have been attacked by insects (Mafere on 19/Aug./2014)



Photo 3. Production of orange seedling by budding a new cultivar from orange tree on lemon rootstock (Mkuzi on 25/Jul./2016)



Photo 4. Oranges loaded in a lorry ready to be transported to the market (Mindu on 27/Jun./2017)



Photo 5. Oranges piled ready to be transported to the market (Mkuzi on 08/Aug./2015)



Photo 6. Teak trees close to Orange farm (Mkuzi on 21/Jul./2016)