

Why Do Smallholder Farmers In Four Tanzanian Districts Continue With Coffee Production Despite Fluctuating Prices?

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Abstract

Coffee production and marketing in Tanzania faces many challenges; price and weather variability, limited access to agricultural inputs, poor extension services, lack of irrigation, lack of credit facilities and land shortage which have decreased their capacity to consistently meet the supply of quality and required quantity. Despite of the challenges, coffee continues to be the main source of income to smallholder farmers. The study explores why coffee is still the most important crop to small scale farmers in four districts despite of the challenges they face. Household survey was conducted to 189 randomly selected coffee farmers. The study found out that despite of the production and marketing challenges, coffee farming has remained a source of reliable income, a traditional crop and cultural symbol. Conclusions are reached that gaining from coffee production provides the means of investment to other food crops.

Keywords: coffee, smallholder farmers, fluctuating prices

• *Background Information*

There are two types of coffee produced in the world: *Coffea arabica* (Arabica coffee) and *Coffea canephora* (var. *Robusta*). While coffee production is concentrated in the southern hemisphere, it is consumed more in the northern hemisphere. During the 2016/17 season, global coffee production was reported to be 158.93 million bags: 98.84 million bags (62%) of Arabica and 60.10 million bags (38%) of Robusta. In terms of continent-wide production, South America was the leading producer (45%), Asia and Oceania produced 30%, North America's Mexico and Central America regions produced 14.5%, and Africa produced 11%. While 10 countries produced 88% of all coffee in the world, Brazil was the leading producer with about 55 million Bags (TCB, 2017).

1.1 Importance of coffee in Tanzania

Coffee is one of Tanzania's primary agricultural export crops representing about 5% percent of total exports, 24% of traditional cash crops and generating export earnings averaging 100 million USD per annum over the last 30 years (about 145 million USD in 2011). However, the share of coffee in total exports had gradually declined from 7% in 2001 to around 3% in the last few years. The coffee industry in Tanzania provides direct income to more than 400,000 families who own small farms and benefits indirectly the livelihoods of estimated 2.4 million Tanzanians (TCB, 2017). Tanzania produces two types of coffee, Arabica and Robusta. The major Arabica growing regions are Kilimanjaro/Arusha, Songwe, Mbeya, and Ruvuma. Other Arabica growing regions include Tanga, Iringa, Morogoro, Kigoma, Manyara, Mwanza, Katavi and Mara. Robusta is mainly produced in the Kagera region. It is estimated that 275,000 hectares are under coffee cultivation; large private estates reach yields up to 2.500 kg/ha (with irrigation and fertilizers), and smallholders reach an average of 250-300 kg/ha (TCB, 2017).

Smallholder households, with 0.5 -1.0 hectares, are responsible for 90% of coffee production; the remaining 10% is produced by some 110 large estates. Smallholder growers produce coffee mainly for commercial purposes and domestic consumption of coffee has decreased from 7% in 2000/01 to 4.8% in 2015/16 (TCB, 2017).

Annual per capita coffee consumption in Tanzania is 0.06 kilo, and 7-8 per cent of the country's total coffee production is locally processed and consumed. Although the contribution of other sectors, such as minerals and tourism (25% in 2015/16) is currently greater than that of coffee, coffee is still one of the most important cash crops in Tanzania. However, export shares are decreasing; for example, it decreased from 7.2% in 2001 to about 3.2% in 2017. Factors associated with this decrease include increasing share from other sectors and decreasing prices in the world market. Other factors which have contributed to the decline of its importance include price fluctuation (high production cost compared to income) (Mhando, 2007), limited extension services, climate change and limited uses of agricultural inputs. The annual coffee production in Tanzania fluctuated from 58,175.1 tons in 2000 to 47,591 tons in 2018 (TCB, 2017).

Despite the decreasing importance of coffee in Tanzania as an important source of foreign exchange as compared with other sectors, limited extension services and increasing costs of production and other associated challenges, smallholder farmers have continued with coffee cultivation on their own land with fluctuating income and limited support. The present study thrives to explore why coffee farmers in four districts have continue with coffee cultivation despite the challenges facing them.

2: The Role Of Production And Marketing In Agriculture

Production and marketing are both important parts of a total business system aimed at providing the consumer with need-satisfying goods and services. Marketing is defined as the series of services involved in moving a product (or commodity) from the point of production to the point of consumption (Dixie, 1989). It refers to the process of price-decision for a good by seller and buyer together, and markets are the places where such decisions take place (Ellis, 1996). It involves planning, organizing, directing, and handling agriculture products to satisfy the producer and the consumer. Marketing plays an important role in stimulating production and consumption and accelerates the pace of economic development of a country (Mahanta and Konwar, 2014). It can signal the needs of both consumers and industrial users and gives integrative force that matches production to customer needs. Markets can be perfect or imperfect depending on buyers and sellers' influence on price formation, and integrated or fragmented depending on availability of transport and communication among the market participants (Masanjala, 2005). An efficient marketing system can provide better prices to producers and improve the availability of competitive prices to consumers (Tracey-White, 2003).

On the other hand, production is the process of combining and coordinating inputs (resources and factors of production) in the creation of goods and services. Agricultural production involves investment of scarce resources on various inputs and production processes to produce crops of the choice and supply the produces to market. Such action (investment) by farmers will depend on price signal (demand chain) and physical transmission (supply chain) functions of marketing systems (Ellis, 1996). Price signal transmission depends on the number and size of participants, information system and the physical infrastructure (Sapkota, and Pokhrel, 2010). Production will tend to vary with the level of input usage. In an economy, production and marketing must go hand in hand. Whenever there is a market power on one side of a transaction, the resulting price does not equate the marginal cost of production (Ellis, 1996). A fair and high price available to farmer has positive impact on farm production decisions, which leads to an expansion of the production program and its improvement at farm level. In contrast, an unfair and low price available to farmer affects farm production decision negatively and renders him/her reluctant to continue the production program (Sapkota, and Pokhrel, 2010). Therefore, marketing is used to direct production in accordance with clear signals from the marketplace (FAO, 2008).

3: Methodology

This study was conducted in four coffee cultivating districts in Tanzania, namely Mbinga, Mbozi, Kyerwa and Tarime. The four districts were sampled from two zones that are leading in coffee production in Tanzania: Mbozi and Mbinga in the southern zone, Kyerwa and Tarime in the western zone. These districts represent zones that produce Arabica (southern) and Robusta (western). Household survey was conducted to 189 randomly selected farmers from four coffee growing districts.

In addition, interviews were conducted with key informants (district officials who deal with coffee) and stakeholders (Coffee Management Services, Tutunze Kahawa, Café Africa) from the study areas were consulted.

4: Results and Discussions

4.1 Current situation of coffee production and marketing in Tanzania

The agriculture sector is affected by different causes that can lead to low productivity (Masood et al., 2012). Agricultural production decreases due to many factors like climate change, the degradation of the land, low soil fertility, land ownership, illiteracy, lack of good quality of seeds and fertilizers, traditional farming methods, technological factors, lack of entrepreneurship in agricultural zones, weak agrarian structure, internal and international migration and droughts (Masood et al., 2012). Productivity of land is a very important factor of agriculture because it is the most permanent and fixed factor among the three categories of inputs; land, labour and capital (Sreekanth *et al*; 2017). Over the last 40 years, crop productivity has risen throughout the rest of the world yet has remained stagnant in Africa (Jayne 2010). This is the case in Tanzania where coffee production is very low.

Table 1: Coffee output per household and yield per hectare in 2015/16 farming season

District		Coffee output (kg/household)	Coffee Yield (kg/ha)	Yield per Tree (kg/tree)
Mbinga	Mean	436.64	554.98	0.70
	Minimum	20.68	51.08	0.08
	Maximum	1980.00	1553.98	2.20
	Std. Deviation	367.447	250.58	0.54
Mbozi	Mean	437.46	422.25	0.378
	Minimum	8.80	3.62	0.03
	Maximum	3634.40	1745.30	1.10
	Std. Deviation	583.42	253.39	0.35
Tarime	Mean	150.34	405.78	0.78
	Minimum	19.80	27.17	0.16
	Maximum	1078.00	1956.24	2.03
	Std. Deviation	175.69	378.38	0.68
Karagwe	Mean	397.98	539.68	2.98
	Minimum	25.20	24.45	0.36
	Maximum	6480.00	2600.91	7.56
	Std. Deviation	860.76	518.14	2.62
Kyerwa	Mean	440.35	731.80	2.62
	Minimum	36.00	88.92	0.73
	Maximum	1323.00	2091.40	4.70
	Std. Deviation	338.62	513.00	1.46

Coffee output per household and yield per hectare was low and varied significantly among coffee producing households within and across the four sampled districts. On average the output per household for Arabica coffee varied from 150.34 kg in Tarime district to 437.46 kg in Mbozi district, while yield varied from 405.78 kg/ha in Tarime district to 554.98 kg/ha in Mbinga district (Table 1). In all three Arabica producing districts, coffee yield in the 2015/16 farming season varied significantly. In Mbinga, yields varied from 51.08 kg/ha to 1,555.98 kg/ha. In Mbozi and Tarime districts, the coffee yield variation was even high. It varied from 3.62 kg/ha to 1,745.30 kg/ha in Mbozi district, and from 24.17 kg/ha to 1,956.24 in Tarime district. The yield for Arabica coffee across the three sample districts that grow Arabica coffee are far below the average yield of 2,500 kg (2.5 tons) per ha in Brazil. For Robusta coffee, average coffee yield in the 2015/16 farming season varied from 518.14kg/ha in Karagwe district to 731.80 kg/ha in Kyerwa district. In both Robusta growing districts, coffee yields varied

greatly from 24.45 kg/ha to 2,600.91 in Karagwe district and from 88.92 kg/ha to 2,091.40 kg/ha in Kyerwa district (Table 1). These Robusta yields are far below the yield of 6,000 kg/ha (6 tons/ha) achieved in Vietnam, a major Robusta producing country in the world. This is an indication that productivity is still very low.

The main reasons of low productivity include lack of inputs such as fertilizers, and a lack of appropriate improved varieties that are drought and disease resistance. Youth who grew up in coffee cultivation areas have developed coffee cultivating culture and are ready to invest in coffee cultivation (Mbozi and Mbinga districts) but they still need more support from the government in terms of extension services or even provision of agricultural inputs. Other reasons are poor investment in coffee production due to poverty and withdraw of youth labor from the coffee sector. It has been reported that coffee is regarded as the crop of old people in some areas in Tanzania and thus, there are efforts to turn this tide and bring the youth into coffee cultivation. Café Africa is one of the NGOs which has initiated a project aimed at involving Katavi Region youth in coffee cultivation. Nevertheless, it is common for women to work in commercialized crops and women's direct control over income from these crops is much less than that of men and frequently even disproportional to their labor input into the crops (Masanjala, 2008)

4.2 Challenges of coffee production in Tanzania

In general, smallholder farmers have limited resource endowment relative to other farmers in the sector. The main characteristics of production systems of smallholder farmers are outdated technologies, low returns, high seasonal labour fluctuations and women playing a vital role in production (Mhando, 2007). Coffee farmers face various challenges that impede their growth and ability to effectively compete in the domestic and export markets. However, in the study areas farmers have been noted to continue with coffee cultivation despite these odds. This section explores challenges of producing coffee among the smallholder farmers in Tanzania.

4.2.1 Challenges of production varieties used by respondents

Table 2: Varieties of coffee cultivated by respondents

District	Coffee Varieties				Total
		Conventional	Hybrid	Both Conventional and Hybrid	
Mbinga	Frequency	74	1	25	100
	Percentage	20	0.3	6.8	27.0
Mbozi	Frequency	67	3	20	90
	Percentage	18.1	8	5.4	24.3

One of the reasons for poor agricultural performance in many developing countries is a lack of progress in improving traditional plant varieties over the centuries (WIPO, 2010). It has been argued that modern plant breeding has enabled yields to increase substantially. It is estimated that improved varieties have contributed to more than 50% of overall yield increases for important crops in Europe (WIPO, 2010). Coffee farmers in Tanzania do not often use improved varieties, as they continue using older inherited varieties that were used by their parents. Respondents (70.8%) have reported their use of old and aging conventional varieties, which have a great effect in coffee productivity (Table 2). It has been reported as well that conventional varieties are easily attacked by Coffee Berries Diseases (CBD) and coffee leaf rust (TaCRI, 2017). The two diseases are the main challenges for Arabica producers and they are very expensive to treat. Despite the presence of alternative disease-resistant varieties, farmers have continued to use the conventional varieties. Farmers claimed that prices of a seedling of newly introduced variety are higher (TZS 300) compared to conventional varieties, which are sold at TZS 100. A higher water requirement is another reason indicated by the producers as to why they have continued to use the old conventional varieties. In fact, shifting to the new hybrid varieties will not only reduce the costs of production, but will increase productivity, quality, and ultimately income to the smallholders.

4.2.2 Availability of extension services

Agricultural extension services include the provision of farmers with knowledge, information, experiences and technologies needed to increase and sustain productivity in order to improve wellbeing and livelihoods (Raidimi, 2017). Delivery of quality agricultural extension services in Tanzania has been a center of attention for a long time (Daniel, 2013). Agricultural extension services in Tanzania have been entrusted to local government authorities to ensure effective participation of beneficiaries and to motivate private sector involvement in service

delivery (Raidami, 2017). However, there is a failure of the local government to provide much needed extension services to the coffee producers. This has resulted in farmers continuing to use conventional methods of coffee cultivation in the dynamic coffee market. The gap left by the government extension services has been utilized well by multinational companies who have penetrated the coffee industry in Tanzania up to the farm gates.

Thus, with the lack of information on coffee marketing and developments in the globe coffee industry, farmers have become the victims. Farmers lack basic knowledge about trends of the world market and how it is likely to affect them. URT (2013) reported that there were 7,974 extension workers against the requirement of 15,082 extension workers at village and ward levels, with only 42% of farmers receiving extension services. This means that most of the farmers have continued to cultivate coffee by using inherited knowledge from their parents which results to low harvest.

During the study it was reported that an extension officer has visited less than 50% of coffee farmers. It was reported that only 48.4% of the sample households have been visited at least twice a year. Those who were rarely visited account for 28.5% of the sample households (Table 3).

Table 3: Frequency of extension officer visit to farmers

Tarime	Frequency	50	16	14	80
	Percentage	13.5	4.3	3.8	21.6
Karagwe	Frequency	43	1	17	61
	Percentage	13.5%	4.3%	3.8%	16.5%
Kyelwa	Frequency	28	0	11	39
	Percentage	7.6	0.0	3.0	10.5%
Total	Frequency	262	21	87	370
	Percentage	70.8%	5.7%	23.5%	100

Source: Survey Data

4.2.3 Limited input use and crop husbandry

Limited use of quality inputs and deficient husbandry practices are also referred to as production obstacles in coffee farming. Before the abolition of cooperatives in Tanzania, farmers received agricultural inputs on a loan basis and the balance was paid after the farmers sold their crops (Mhando, 2017). After trade liberalization, farmers are supposed to purchase agricultural inputs on their own and as a result, most of the coffee farmers cannot afford to purchase and use agricultural inputs. Likewise, some of the farmers do not follow GAP, with resulting lowered productivity of coffee. For example, productivity in Mbozi is 250 grams of parchment coffee per tree, but with GAP farmers could increase it to 2-3 kilograms of parchment coffee.

		<i>Frequency visit from extension officers</i>					
		<i>At least once a year</i>	<i>Once a year</i>	<i>Once in two years</i>	<i>Rarely</i>	<i>frequency</i>	
Mbinga	Frequency	30	15	3	7	0	55
	Percentage	12.2	6.1	1.2	2.8	0	22.4
Mbozi	Frequency	28	13	0	15	7	63
	Percentage	11.4	5.3	0	6.1	2.8	25.6
Tarime	Frequency	37	7	0	11	4	59
	Percentage	15	2.8	0	4.5	1.6	24
Karagwe	Frequency	6	1	0	30	1	38
	Percentage	2.4	0.4	0	12.2	0.4	15.4
Kyelwa	Frequency	18	4	0	7	2	31
	Percentage	7.3	1.6	0	2.8	0.8	12.6
frequency		119	40	3	70	14	246
% of total		48.8	16.3	1.2	28/5	5.7	100

Agrochemicals (fertilizer, pesticides and herbicides) and manure were largely used in Mbozi and Mbinga Districts in the southern coffee growing zone but were used much less in the western districts. Except for timely weeding, very few farmers practiced simple, but important, husbandry practices like mulching and timely pruning of their coffee tree (Table 4).

Not only has low use of fertilizers and other inputs has reduced coffee production over the years but also use of the fake agricultural inputs has greatly contributed to decrease in yields. Fertilizer education and training programs in East Africa were found to boost average incomes by 61% (Johnes, 2015). The government needs to ensure the right type of fertilizers are available at the right price, and at the right times

4.2.4 Lack of credits

Table 5: Inputs and husbandry practice in the farm

			Inputs and husbandry practices in farm								Total
			Chemical fertilizer	Manure	Pesticides	Herbicides	Irrigation	Mulching	Timely pruning	Timely weeding	
District	Mbinga	Frequency	100	89	99	63	5	42	92	85	575
		% of Total	5.8	5.1	5.7	3.6	.3	2.4	5.3	4.9	33.1
	Mbozi	Frequency	90	74	86	76	25	33	87	76	547
		% of Total	5.2	4.3	5.0	4.4	1.4	1.9%	5.0%	4.4%	31.5%
	Tarime	Frequency	9	76	6	1	7	66	64	72	301
		% of Total	.5	4.4	.3	0.1	0.4	3.8	3.7	4.1	17.3
	Karagwe	Frequency	1	28	1	3	0	44	57	59	193
		% of Total	0.1	1.6	0.1	0.2	0.0	2.5	3.3	3.4	11.1
	Kyerwa	Frequency	0	11	0	1	0	32	38	37	119
		% of Total	0.0	.6	0.0	0.1	0.0	1.8	2.2	2.1	6.9
Total		Frequency	200	278	192	144	37	217	338	329	1735
		% of Total	11.5%	16.0	11.1	8.3	2.1	12.5	19.5	19.0	100.0

Many smallholders are excluded from productivity-enhancing financial services and are unable to secure much needed fixed and working capital, which ranges from land, machinery, high-yielding seeds, and fertilizer (Schengen, 2013). Smallholder financing has limited number of loans from commercial banks to agriculture and therefore limited access to loans is just one factor affecting their poverty (Banerjee and Duflo 2007).

The reasons for limited finance in agriculture are numerous: the dispersed demand and high cost of service in low-population areas; the weak administrative capacity of rural banks; agriculture-specific covariate risks such as variable weather patterns, pests, and price fluctuations; and lack of formally defined property and land-use rights support collateral demands for loans (Schengen, 2013). In Tanzania, high interest rates for loans (20%), combined with fluctuating prices, make farmers hesitate to take loans from commercial banks like CRDB and NMB. Fluctuation of prices hinders farmers from investing in coffee because they are not sure if they will get return from their investment. High interest rates put farmers in a trap. Therefore, farmers do not cultivate coffee for commercial purposes, but in order to continue with what they have been doing over the years. At the same time, most of the land in Tanzania is untitled; and thus, farmers cannot use their land as collateral to access loans from the Banks. Missing land deeds disqualifies farmers from getting bank loans. Easy process of obtaining land deeds to farmers and initiation of an agricultural bank, which would take on board the challenges that face farmers, could be steps in the right direction.

4.2.5 Marketing challenges

There are several challenges relating to coffee marketing in Tanzania. There is overdependence on external markets: over 95% of all coffee produced in Tanzania is exported. When the price increases, farmers invest in coffee cultivation but when the price decreases, farmers are discouraged from investing and taking care of their coffee plots.

Farmers have reported a lack of market information and, as a result, they end up selling their coffee without understanding the prevailing prices. Although the Coffee Industry Regulation Act prohibits trading coffee without a license, there are middlemen in the villages who take advantage of the farmers' vulnerabilities and collect coffee from farmers at lower prices (Mhando, 2017). Both the local government and the TCB have failed to control these middlemen, even though the practices reduce the motivation of the farmers to continue with production and, thus, a smaller amount of coffee is produced. Similarly, smallholder farmers depend on income from coffee for their livelihoods and will sell to whoever offers higher prices. The presence of a cross-border black market for coffee from Kagera to Uganda has been reported, although there is no official figure of the amount involved. Rough estimates show that 40% of coffee produced in Kagera is sold across the border in Uganda. Coffee trade and prices are highly determined by coffee quality, which is a manifestation of GAP and processing.

Unlike the estates, a smallholder farmer works at the individual level and, thus, the quality of their coffee differs. Those who work hard to produce high quality coffee would like to see their efforts rewarded and are motivated to continue with the production of high quality coffee. However, traders pay uniform (blanket) prices regardless of quality (Mhando, 2013). This is likely to impact the morale of the farmers who might otherwise work hard and produce high quality coffee for a higher monetary gain.

Farmers depend on cooperatives in their production and marketing processes. However, bureaucracy within the cooperative structure fails to understand the business model of coffee, which is very crucial. Cooperatives are not flexible with changing prices as opposed to PCBs. At the beginning of the season, the prices are higher because traders have orders and they compete to purchase coffee to fulfill their orders. In the middle of the seasons the prices fall. Societies should pay to its members the same prices fetched at the auction, and not simply blanket prices. PCBs take advantage of these cooperatives in making profit.

4.3 Why is coffee still the most important source of income despite all the challenges faced by farmers?

4.3.1 Relative importance of coffee

Revenue from coffee farming has been reported to be an important source of income to smallholder farmers in the study areas. Farm income refers to profits and losses incurred through the operation of a farm. Production of cash crops contributes to livelihood diversification and poverty alleviation by directly increasing the farm household's income earning potential, which, in turn, increases the household's spending potential. Since cash crops earn higher value than food crops, the production of cash crops enables the farm household to obtain more income for their own food production (Masanjala, 2008). Coffee production allows smallholder farmers access to a broader means of increasing their incomes, and simultaneously, provides farmers with a means of financing the other food crop. This is because the introduction of coffee is accompanied by improved delivery of inputs on credit through traders, and participation in production has enabled farm households to acquire resources for use in other elements of the crop mix (Dorward *et al.*, 1998). Unlike food crops, coffee cultivation needs an institutional arrangement that will promote the easy availability of agricultural inputs, extension services and markets. To initiate and review coffee cultivation, TCB has linked farmers in new and potential coffee growing areas with markets: Maskati, Bunduki and Maguruwe in Morogoro; Busekelo in Mbeya; and Bushoke in Mwanza. These areas provide potential for using new hybrid coffee seedlings.

Table 6: Main Sources of household income (%)

Crop	Mbinga	Mbozi	Tarime	Karagwe	Kyerwa	Total
Coffee	98.1	93.3	84.6	78.2	89.7	90.2
Banana	0.0	0.0	1.3	10.9	0.0	1.9
Maize	1.9	3.3	10.3	1.8	0.0	3.8
Vegetables	0.0	2.2	1.3	0.0	0.0	0.8
Livestock	0.0	0.0	2.6	0.0	0.0	0.5
Beans	0.0	1.1	0.0	9.1	10.3	2.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Research data

Even though food crops are important to household food security and income, coffee remains the most important contributor to the household income as reported by 90.2 % of all the respondents (Table 6). As the data from Table 7 indicates, coffee is still the most popular crop and source of income as indicated by 81.2 and 88.2% of the respondents. This means that coffee is still an important crop among the farmers in the coffee producing zones. Because coffee is a traditional crop, it is perceived to be an important main source of income and a cultural symbol; a Matengo farmer is just one example. During the study, it was reported that a Matengo household in Mbinga District is respected based on availability of a well-attended coffee farm, without which one would not be respected, nor deemed creditworthy in the village.

Most of the predicted gains in welfare due to coffee production are based on the notion of comparative advantage and specialization in agricultural production. Thus, despite decreasing prices and the associated challenges, farmers have continued to value the crop. Besides being a major source of income, coffee is a leading crop in providing the coffee growing households' reliable income in the past five years (Table 6). While having a diverse livelihood portfolio can reduce the risk of market volatility, the risk of food insecurity and smooth cash flow over time, for SHF in Songwe and Mbeya Regions, coffee is needed to cover school expenses, household expenses

(including, but not exclusively, food expenses) and to buy inputs for use on coffee and essential staple crops. The study by AGRA/IDH (pers comm) found that the cash income from the sale of staples and other crops within a local market was not enough to cover the cost of inputs for these crops.

Table 7: Leading crop or livestock enterprise in providing reliable income in the past five years (%)

Crop/Livestock enterprise	Mbinga	Mbozi	Tarime	Karagwe	Kyerwa	Total
Coffee	92.2	93.3	68.4	81.8	89.7	85.6
Banana	0.0	0.0	2.6	7.3	0.0	1.7
Maize	2.9	3.4	21.1	1.8	0.0	6.4
Vegetables	0.0	1.1	1.3	0.0	0.0	0.6
Livestock	4.9	2.2	3.9	0.0	0.0	2.8
Beans	0.0	0.0	0.0	9.1	10.3	2.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Research data

4.3.2 Lack of alternative sources of income

Although farmers have been noted to continue with coffee production despite its challenges, it was noted as well that farmers lack alternative sources of income, which would assist them in getting away from coffee cultivation. Almost all respondents have indicated that they have limited alternatives and thus they are still cultivating coffee despite all the odds.

4.3.3 Expansion of land under coffee

Relative to other areas of the developing world, Africa has been a continent of ample land and scarce labor. Between 1960 and 2000, FAO reported that the amount of arable land under cultivation (including permanent crops) has risen marginally, but the population of households engaged in agriculture has tripled (Saris, *et al*, 2010). This has caused a steady decline in the ratio of arable land to agricultural population these findings reinforce the views that over time rural populations tend to cluster in areas where agro-ecological conditions are favorable and access to markets and services are best, leading to a highly nucleated pattern of settlement and land shortage (Jayne *et al.*, 2010). At the same time, there are still large tracts of unallocated land in the more remote parts of some regions, but the economic value of this land is limited because of the lack of access to markets and services. This relates to Tanzania where there is still much unused arable land. Thus, despite the shortage of land in the traditional coffee growing areas in Tanzania, new areas have been opened for coffee production. Table 8 shows new land area opened for coffee production in Karagwe and Kyerwa Districts. This could explain the increasing coffee production in Kagera region a few years ago despite challenges like climate change and smuggling of coffee to neighboring countries.

Table 8: New areas opened for coffee production in Karagwe and Kyerwa districts

District	2013/14	2014/15	2015/16
Karagwe	475	-	67
Kyerwa	17,793	18,030	18,666

Source: Karagwe and Kyerwa District Offices

Even though there is a land constraint in some of the study districts, some of the respondents have reported expanding their coffee farms. Overall, 35% of the sample households reported that they expanded land under coffee in the past five years.

The proportion of households that expanded land used for coffee varied from 26% and 50% in Tarime and Kyerwa districts respectively. Only 5% of the sampled farmers reported reduction of land used for coffee and about 60% of the sample households maintained the land under coffee cultivation in the past five years (Table 9). The high proportion of farmers who expanded coffee farms relative to those who reduced further expansion underscores the importance of coffee relative to other crops in the study districts. Jayne (2010) reported that there is a strong relationship between access to land and household income. This indicates that the income of those farmers who expanded their farms is going to increase as it is noted that land holding size is positively related to variables signifying productive farming potential and wealth, which is most likely correlated with initiative and effort.

Table 9: Proportion of sample household that have expanded or reduced coffee farms in the past five years (%)

District	Mbinga	Mbozi	Tarime	Karagwe	Kyerwa	Total
Expanded	40.0	30.5	26.0	38.2	50.0	35.2
Reduced	1.1	1.2	9.1	14.5	0.0	5.0
Constant	58.9	68.3	64.9	47.3	50.0	59.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: research data

4.4 Conclusions and Recommendations

In conclusion, this paper reveals that despite of challenges of coffee production, farmers have continued with its production. Farmers perceive coffee production as a traditional crop, and therefore it is a cultural symbol. Nevertheless, farmers have admitted that they are gaining more from coffee than other crops. In addition, the gain of wealth from coffee production provides the means of investment to other food crops.

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