

Effect of Tea Factory Management on Food Security among Smallholder Tea Farmers in Bomet County

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ABSTRACT

Health and well-being of the general population, children's growth, development, and cognitive ability as well as the productivity of the workforce are all negatively impacted by food insecurity. In tea growing regions, there are records of high malnutrition, high morbidity rates, and low farm productivity and low incomes. The study aimed to determine the effect of tea factory management on food security among smallholder tea farmers in Bomet County. The study was guided by Sustainable Livelihood Theory. The study adopted mixed approach design entailing exploratory design and explanatory research design. All the registered 16572 tea farmers in selected tea growing regions were the target population for this study. Multi-stage purposive and random sampling techniques were used to select a sample size of 391 smallholder tea farmers in Bomet County. Instruments of data collection included questionnaires, key informants, interviews, focus group discussions and direct observations. The Cronbach Alpha value was used to test the instrument's reliability. The Statistical Package for Social Sciences (SPSS) Version 26 was used to analyze the data in both descriptive and inferential ways. Thematic analysis and tables were used to present the findings from the study's qualitative data. The study findings revealed that there was negative linear effect of tea factory management on food security (-0.353 0.073). The study recommends that small scale tea farmers need to change their economic practices through adoption of modern methods of farming. Diversified methods of farming will address the problem of food insecurity. Efforts to improve food security in Bomet, Kenya, should be made by the various stakeholders (farmer organizations and farmers; NGOs; and external assistance) involved in food security, according to the findings of the study. The beneficiaries of these recommendations are smallholder farmers and population of Bomet County at large.

(Keywords: Food Security, Tea Factory Management, Tea Farmers)

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I. Introduction

Food availability, food accessibility, food utilization, and food system stability are all taken into account when determining food security. Food availability shows that high and nutrient dense food should be accessible in a region, irrespective of whether it is produced or processed locally or internationally (Perez-Escamilla, Gubert, Rogers & Hromi-Fiedler, 2017). People must be able to obtain food both physically and economically in order to have access to it. In order to maintain a healthy lifestyle, people of all ages should have easy access to nutritious food. As a whole, a stable food system provides enough food for the community while also coping with economic and climatic changes.

Many communities around the world are struggling with daily hunger and starvation, despite increased attention in the global media and increased aid efforts by many organizations (Veterans Aging Cohort Study Project Team, 2015). Food insecurity around the world has been caused by a variety of factors over time. The rising cost of staple foods around the world is one factor (wheat, rice and corn). Wheat prices have risen by 120 percent, while rice prices have risen by 75 percent (Bruinsma, 2017). Poor people also play a role. In the last two years, an estimated 100 million people have fallen into poverty – for example, in 2013, Afghanistan households were spending 75 percent of their income on food (World Bank, 2014). Importing food contributes to global food insecurity as well. Haiti, for example, imports more than 80% of its rice.

Egypt produces half of its wheat needs. Wheat imports expose the country to rising food prices, despite its average food production. It is the world's leading importer of the commodity. The country's population continues to grow at a rate of 2% per year. Additionally, the Sahara's barren desert landscape severely restricts the ability to grow crops. An annual subsidy for baladi bread amounts to nearly \$3.5 million, according to a

World Bank report (Mohamed, 2018). Ethiopians face serious food insecurity in their homes. More than 7 million Ethiopians, out of a total population of 76.9 million, are considered food insecure, and another 10 million are considered drought-prone. Food insecurity is exacerbated even further by the country's rapid population growth. Despite high food prices in a declining global economy, South Africa produced bumper harvests, especially in the 2007/08 season. Families in the poorest households are particularly hard hit by rising food prices, as they spend a large portion of their income on food (Van den Berg & Raubenheimer, 2015).

Food insecurity among Kenya's middle-class households, particularly in the rural areas, is a serious problem, but this has not changed. Bomet is a rural area where middle-class families are frequently at risk of going hungry. It's despite national food policy's goal of alleviating middle-class household food insecurity, particularly among small-scale farmers, through agricultural food production in their own communities (Myers, 2020). Only a small amount of information has been gathered about middle-class households' food production and consumption patterns as well as their levels of food insecurity and their methods of dealing with it. Following this observation, the study of food security among small-holder tea farmers in Bomet County is necessary.

Just like in Kenya, agriculture sector is the backbone of Bomet County's Economy. It is the major source of food, income, employment and raw material for the industrial sector. Although the county used to be one of the food basket regions in Kenya during the 20th century, most of the farmers shifted to tea production in the 21st century. Majority of the farmers practice smallholder tea farming, food crops (maize, beans and potatoes) as well as dairy animals. Bomet County experiences food shortage every year. The current food policy in Kenya stipulates that an average person consumes 98 kilograms of maize per year; however, today one person consumes about 50 kilograms of maize which means small scale tea farmers are at risk of suffering food insecurity. Food security has become a problem in Bomet County because of lack of resources such as financial resources, lack of access to nutritious food at affordable prices, lack of knowledge about nutritious diet. Further, more increase in population and poverty has accelerated the problem of food insecurity. Therefore, the symptoms of food insecurity can easily be observed in Bomet County, such as poor health, morbidity, low income and low farm productivity. Despite the increased production of tea in the county of Bomet, the prevalence of food insecurity is still so high, estimated to be 57.24% (Bomet County Annual Report, 2018). Even though the farmers receive income from the sale of tea from the nearby tea industries, most of the households go hungry due to lack of food. The income from tea is not enough to cater for the household expense as well as food security. There are limited studies carried out to look at factors affecting food security in Bomet County. The study therefore sought to examine effect of tea factory management on food security among smallholder tea farmers in Bomet County with a view of bridging the knowledge gap for the benefit of Bomet, Small scale Tea Farmers and Stakeholders.

Theoretical Framework

The Sustainable Livelihoods Theory

Chambers and Conway developed the theory of sustainable livelihoods (1992). This approach to sustainable rural lifestyles relies heavily on local resources, including personal, social, financial, natural, and physical resources, to support rural communities. As defined by the sustainable livelihood's framework, "livelihoods" encompass the facilities, and activities necessary to support one's daily needs while reducing poverty. In order to be sustainable, a livelihood must be able to withstand or recover from stress and shocks, or it must preserve or expand its capabilities, which will give sustainable livelihood possibilities for future generations" (Scoones, 1998). The sustainable livelihood concept proposed by Chamber and Conway (1991) suggests that households use a variety of assets to meet the needs of their members. Poor people in developing countries' rural areas are the primary target of this movement. It's a method for determining which projects should be prioritized. Livelihood studies look at the rural poor as active participants in their own destinies, emphasizing their assets rather than their deficiencies.

People's ability to access, defend, and retain a wide range of assets, such as resources or capital, determines the livelihood strategies they choose. These assets play a critical role in rural and urban survival tactics. This approach emphasizes that assets are pooled to pursue strategies like livelihood diversification, which can either provide food directly or offer an entitlement to it, rather than focusing on a single one. Vulnerability to food insecurity plays an important part in developing a foundation for a sustainable way of life. Over the course of time, this also incorporates the context of any vulnerabilities or shocks experienced.

There are several types of physical assets that might be owned by the community, such as farm animals and land as well as a variety of other things that enable people to live and work in their local communities (Pandey et al., 2017). As a member of a social group with varied degrees of inclusiveness, an individual or a family has access to a wide range of communal and larger societal benefits. Social capital can be defined as an individual's ability to gain advantages from their participation in social groups (Krishna & Shrader, 2000).

Community and inter-household trust are the foundations for this type of reciprocity (Goulden, Adger, Allison & Conway, 2013); people rely on these social resources when following diverse career paths.

Nature's wealth, which includes everything from soil to air to water to all types of living things on Earth is known as natural capital. Natural capital, or the value of the natural environment, is now widely accepted. Ecosystems that contribute to the economy's well-being are also included. Sustainable development is dependent on the proper management of natural capital. Entrepreneurs and businesses employ financial capital to buy the materials and services they require to produce their products or to deliver their services to the sector of the economy in which they operate, such as retail, commercial, and investment banking.

II. Methodology

A pragmatic paradigm approach was used in this study because it allowed for the use of both qualitative and quantitative strategies in various stages of the research procedure, (Molina-Azorin, 2016). Pragmatism mainly emphasizes on the what and how of the study problem. In addition, pragmatism is perceived to be a model that gives the fundamental theoretical framework for mixed research methodologies, (Rezaee, 2017).

This study used a multi-method approach to research. Using a combination of quantitative and qualitative data collection, analysis, and integration is known as a mixed methods research approach (Taheri, Jami Pour & Asarian, 2019). Using this strategy, researchers can gain a deeper understanding of a problem than they could by looking at it from two different perspectives. The unit of analysis of the study were households among smallholder tea farmers in Bomet County.

The unit of analysis of the study were households among smallholder tea farmers in Bomet County. Bomet County was the site of the research. South of latitude 29° and longitude 1° and east of latitude 35°, you'll find Bomet County. Nakuru, Kericho, Nyamira, and Narok are the counties that border it on the east, north, south, and west, respectively. 2037.4 km² is the total land area, with 1,716.6 km² of this land suitable for farming.

The study used a mixed approach design that included both exploratory and explanatory research methods. Key informant interviews, focus group discussions, and direct observations were used to gather qualitative data in this exploratory study. Qualitative data was gathered by asking open-ended questions to the participants. Analysis of qualitative (words, texts or behaviors) data typically follows the path of aggregating information (themes) into categories and presenting data collection's richness in terms of ideas.

The target population for this study were all households in Bomet County who are smallholder tea farmers. According to the Bomet County annual report (2021) there are approximately 16572 registered smallholders' tea farmers who take their tea to five tea factories; Kapkoros, Tirgaga, Rororok, Kapset and Mogogosiek. Therefore, the target population for this study were all registered 16572 smallholders' tea farmers. From the target population of 16572, Yamane (1967) sample size formula was used to select a sample size from population. Multistage sampling was used in this study. Non-probability sampling and probability sampling are both used here.

Table 1 Sample Size

Name of Tea Factories	Sample Size
Kapkoros	109
Tirgaga	102
Rororok	82
Kapset	54
Mogogosiek	43
Total	391

The study examined primary and secondary sources of data. Primary data was collected by the researcher from sources such as questionnaires, observation, interviews and Focus Group Discussion (FGD); Sources of secondary data were government publications, books and journal articles. The study used questionnaires as the main method of data collection. This is because the questionnaires helped the researcher to describe the characteristics of a large population which can provide broad capability and ensure a more accurate sample for the gathering targeted findings which helped in making conclusion and recommendations (Bartram, 2019).

Using interview schedule, key informants gave in depth information concerning tea growing and food security nexus among smallholder tea farmers in Bomet County, Kenya. In this study, open ended questions were developed through reading books and research materials relevant to the study. The aim of the interview questions was to verify the information obtained through questionnaires.

This study employed content validity technique to establish that the instrument is able to measure the intended variables accurately. The researcher sought advice from experts who went through the instruments; ensuring relevant information concerning food security is included. The data to be obtained were tested for reliability by obtaining the coefficient of reliability. The researcher considered an $r=0.7$ and above as appropriate. All of the test items measure the same construct, that is, the general factor saturation. The reliability of the instrument was tested through the use of Cronbach Alpha coefficients. That is, to establish the reliability of the questionnaire.

The collected data were analyzed using both quantitative and qualitative methods. Qualitative analysis involved the use of narrations and descriptions of data collected from the interview guide, key informant interviews and focus group discussions. This involved identifying major themes emerging from the data collected and relating them to the research objectives. After quantitative data collection, the data were organised and edited to remove any inconsistencies, repetitions or errors that might made analysis difficult. Descriptive and inferential statistics were used to analyse the data with the aid of the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics included percentages, frequencies, mean and standard deviation. Inferentially correlations and multiple regression analysis were applied to get the change in dependent variable caused by the effect of independent variables. The regression equation used for hypotheses testing is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \epsilon$$

Where:

Y represent food security

β_0 represent constant term

β_1 , represent beta coefficients

X_1 represent tea factory management

ϵ represent Error term

III. Findings

Response Rate

The study respondents were smallholder tea farmers, tea factory managers and chiefs. Data collected statistics revealed that out of the anticipated total sample population of 401(100%) respondents, 378(94.3%) responded and their responses analyzed. This response rate was considered appropriate for analysis as it surpassed 50%, as recommended by Mugenda (2010). This response comprised of 368(94.1%) smallholder tea farmers out of the anticipated 391, 5(100%) tea factory managers out of the 5 anticipated one and 5(100%) chiefs out of the anticipated 5.

Tea Factory Management and Food security among smallholder tea farmers in Bomet County

The second study objective was to determine the effect of tea factory management on food security among smallholder tea farmers in Bomet County. Table 2 presents the study results.

Statements		SA	A	UD	D	SD
X21.1 The management have reduced tea prices making the farmers to get small amount of money to buy food	F %	210 57.1	136 36.9	12 3.3	8 2.2	2 0.5
X21.2 Management have training session with farmers on the use of technology to improve yields	F %	17 4.6	20 5.4	6 1.6	233 63.3	92 25.0
X21.3 The factory sends their extension workers to do extension work on farm management	F %	11 3	27 7.3	23 6.3	269 73.1	38 10.3
X21.4 The factory management give free inputs to small scale farmers	F %	9 2.4	7 1.9	15 4.1	207 56.3	130 35.3
X21.5 The tea factory has invested on road maintenance for easy transportation of farm inputs and products	F %	10 2.7	18 4.9	10 2.7	263 71.5	67 18.2
X21.6 The tea factory management have credit schemes to farmers to boost their living	F %	30 8.2	224 60.9	73 19.8	36 9.8	5 1.4
X21.7 The tea factory has ensured that there is market development of tea produce	F %	61 16.6	236 64.1	42 11.4	24 6.5	5 1.4
X21.8 The tea factory has subsidized inputs and attractive output prices for	F %	14 3.8	21 5.7	27 7.3	196 53.3	110 29.9

farmers							
X21.9 Tea factories provide transport tea products to minimize damages both for the farmer and for the production	F %	127 34.5	174 47.3	16 4.3	46 12.5	5 1.4	
X21.10 The tea factory management have come up with storage facilities for farm produce as they wait for collection to the factory	F %	11 3	10 2.7	31 8.4	243 66	73 19.8	
X21.11 The factory management are training farmers in other farm production to improve household food production	F %	13 3.5	27 7.3	11 3	133 36.1	184 50	
X21.12 The tea factory management are providing quality fertilizer to farmers and how to use them	F %	108 29.3	195 53	20 5.4	40 10.9	5 1.4	
X21.13 The tea factory management are providing improved seeds to farmers for planting	F %	7 1.9	28 7.6	14 3.8	115 31.3	204 55.4	
X21.14 Extension officers provide a source of information on new technologies for farming communities which when adopted can improve production, incomes and standards of living.	F %	18 4.9	25 6.8	40 10.9	205 55.7	80 21.7	
X21.15 Extension service providers make an innovation known to farm households, act as a catalyst to speed up adoption rate and also control change	F %	8 2.2	11 3	8 2.2	194 52.7	147 39.9	
X21.16 The tea factory management have adopted logistics social responsibility (LSR) rules to increase how to handle farmers	F %	65 17.7	226 61.4	20 5.4	42 11.4	15 4.1	
X21.17 The tea factory management are mostly concerned about in-farm diseases management in order to improve product quality	F %	16 4.3	40 10.9	42 11.4	176 47.8	94 25.5	

Table 2 showed that majority 346(94.0%) of the respondents agreed and 10(2.7%) disagreed that the management has reduced tea prices making the farmers to get small amount of money to buy food.

Also, 37(10.0%) agreed that Management has training session with farmers on the use of technology to improve yields. However, majority of the respondents 325(84.4%) of the respondents disagreed.

Further, 38(10.3%) agreed that the factory sends their extension workers to do extension work on farm management. However, majority of the respondents 307(83.4%) of the respondents disagreed. Another, 16(4.3%) agreed that the factory management gives free inputs to small-scale farmers. However, majority of the respondents 337(91.6%) of the respondents disagreed.

Also, 28(7.6%) agreed that the tea factory has invested on road maintenance for easy transportation of farm inputs and products. However, majority of the respondents 330(89.7%) of the respondents disagreed. Further, majority of the respondents 254(69.1%) agreed that the tea factory management has credit schemes to farmers to boost their living. However, 41(11.2%) of the respondents disagreed.

Also, majority of the respondents 297(80.7%) agreed that the tea factory has ensured that there is market development of tea produce. However, 29(7.9%) of the respondents disagreed. Further, 35(9.5%) agreed that the tea factory has subsidized inputs and attractive output prices for farmers. However, majority of the respondents 306(83.2%) of the respondents disagreed.

Also, majority of the respondents 301(81.8%) agreed that tea factories provide transport tea products to minimize damages both for the farmer and for the production. However, 51(13.9%) of the respondents disagreed.

Further, 21(5.7%) agreed that the tea factory management has come up with storage facilities for farm produce as they wait for collection to the factory. However, majority of the respondents 316(85.9%) of the respondents disagreed.

Also, 40(10.8%) agreed that the factory management is training farmers in other farm production to improve household food production. However, majority of the respondents 317(86.1%) of the respondents disagreed.

Furthermore, majority of the respondents 303(82.3%) agreed that the tea factory management is providing quality fertilizer to farmers and how to use them. However, 45(12.3%) of the respondents disagreed.

Also, 35(9.5%) agreed that the tea factory management is providing improved seeds to farmers for planting. However, majority of the respondents 319(86.7%) of the respondents disagreed.

Another, 43(11.7%) agreed that Extension officers provides a source of information on new technologies for farming communities which when adopted can improve production, incomes and standards of living. However, majority of the respondents 285(77.4%) of the respondents disagreed.

Also, 19(5.1%) agreed that Extension service providers make an innovation known to farm households, act as a catalyst to speed up adoption rate and also control change. However, majority of the respondents 341(92.7%) of the respondents disagreed. Further, majority of the respondents 291(79.1%) agreed that the tea factory management have adopted logistics social responsibility (LSR) rules to increase how to handle farmers. However, 57(15.5%) of the respondents disagreed.

Finally, 56(15.2%) agree and 270(73.3%) disagreed that the tea factory management are mostly concerned about in-farm diseases management in order to improve product quality.

Further the study findings from interviews revealed that the incomes from the tea plant are of a special feature. They are regular and are perceived every month during the entire year. Therefore, they contribute permanently to the accessibility of needed food quantities throughout the year. They are generally low compared to some food-based livelihoods. Tea plant income, although continuously earned throughout the year, is lower than the income from the production of some foodstuffs. It was revealed that farmers have an annual tea plant income that is less important than the income they would have received from the sale of wheat or sweet potato.

The study findings agree to what Harrizon, Benjamin, Patrick & Anthony, (2016) established that the limited ownership and decision making by smallholders on processing, marketing and distribution of profits at the factory levels failed to provide incentives to produce quality tea and reduce operational inefficiencies in tea collection and processing. Also, study findings concur with Wen et al., (2020) that shade management particularly in the low and mid country reduces ambient temperature and prevents sun scorch.

Conclusion of the Study

The study further concluded that the management has reduced tea prices making the farmers to get small amount of money to buy food and that factory management ensures that there is market development of tea produce.

Recommendation of the Study

The study recommends that both national and county governments should provide food storage facilities for perishable products also the Ministry of agriculture should provide extension services to small scale tea farmers.

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