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The Socio-Economic Factors Influencing Variations on Household Food Status in Bahi District, Tanzania

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Abstract
This paper is an attempt to examine the socio-economic factors influencing variations on household food status in Ibugule and Kigwe villages, Bahi district, Tanzania. A mixed method approach through cross sectional research design was employed to 130 household heads aged 18 years and above. Interviews, focus group discussion, documentary review and field observation techniques were used in data collection. Descriptive statistics including frequencies and percentages were used to analyze quantitative data while content analysis has been used to analyze qualitative data. The relationship between demographic characteristics and the status of household food security was tested through Pearson Chi-square Tests at 5% significant level. The main socio-economic factors identified as influencing variations on household food status were demographic variables such as sex, age, marital status, household sizes and household heads' occupations. Other factors include labour variations, variations on the use of agricultural inputs and equipments as well as improper usage of household grains. The correlation results indicate significant influence of sex, marital status, education level, household size and occupation on household food status variations while age had insignificant influence. It is concluded that, variations on household food status in Bahi district is aggravated by socio-economic characteristics though the amount of grain harvested is mainly controlled by climatic factors. Therefore, in addition to providing food aid at times of dire food shortages caused by recurring droughts, other measures such as education on post-harvest loses, proper use of the harvested grains, availability of soft loans and provision of agricultural education on good farming techniques ought to be effected in order to improve crop production and supply consequently, reduce transitory households food insecurity.
Keywords: Socio-economic factors, household food status, transitory food insecurity, grains, Bahi, Tanzania

1. Introduction

Food insecurity has become a chronic and widespread problem in the world including Tanzania. The problem is on the increase, even in advanced industrialized countries like Canada where each year an estimated 833,098 people each month depend on food banks (Rosen et al, 2014; Tarasuk, Mitchell and Dachner, 2014; Shawn and Diana, 2013). About 17.9 million people in the United States are reported to be unable to buy enough food to maintain good health (Coleman et al, 2011).

Like Europe, African continent has been suffering from food shortages for several centuries (FAO and WFP, 2014; Mthuli et al, 2012). The severity of the problem varies from one African sub-region to another however; the situation is reported to be extremely worse in sub Saharan Africa (FAO, 2014; Mthuli et al, 2012; Thornton, 2011). The region remains the most malnourished in the world where one in every four children under the age of five years is underweight (FAO, 2014). East Africa with a far smaller population has more than twice 42% of hungry people as compared to West Africa which is more populated than any other African sub-region with only 18% lowest number of hungry people. The proportion is also higher in Central and Southern Africa which are also far more lightly populated (Mthuli et al, 2012; Mukhabi, 2011).

Tanzania has had a long history of famines in both pre and post-independence period and these have largely been blamed on the vagaries of climate and sometimes pests (Bryceson, 1990; Banyikwa, 1990). Drought has been singled out as the most important cause (FAO, 2014; WFP, 2014; Mthuli et al, 2012). Of all parts affected by drought and food shortages, Dodoma region seems to be the most severely affected (Gosbert, 2012). It is a region in which food security problems abound. Reference to food insecurity in this region is linked to its history of periodic droughts. Literature shows a pattern of crop failure after every four years because of drought or pests. This leads to serious food shortages in such years usually calling for food aid from outside the region (Liwenga 2003; Banyikwa 1990). The problem however, is not confined to such years only. Transitory (seasonal) food shortage is reported to occur almost every year in many parts of Dodoma region (Brown, 2013; Gosbert, 2012).

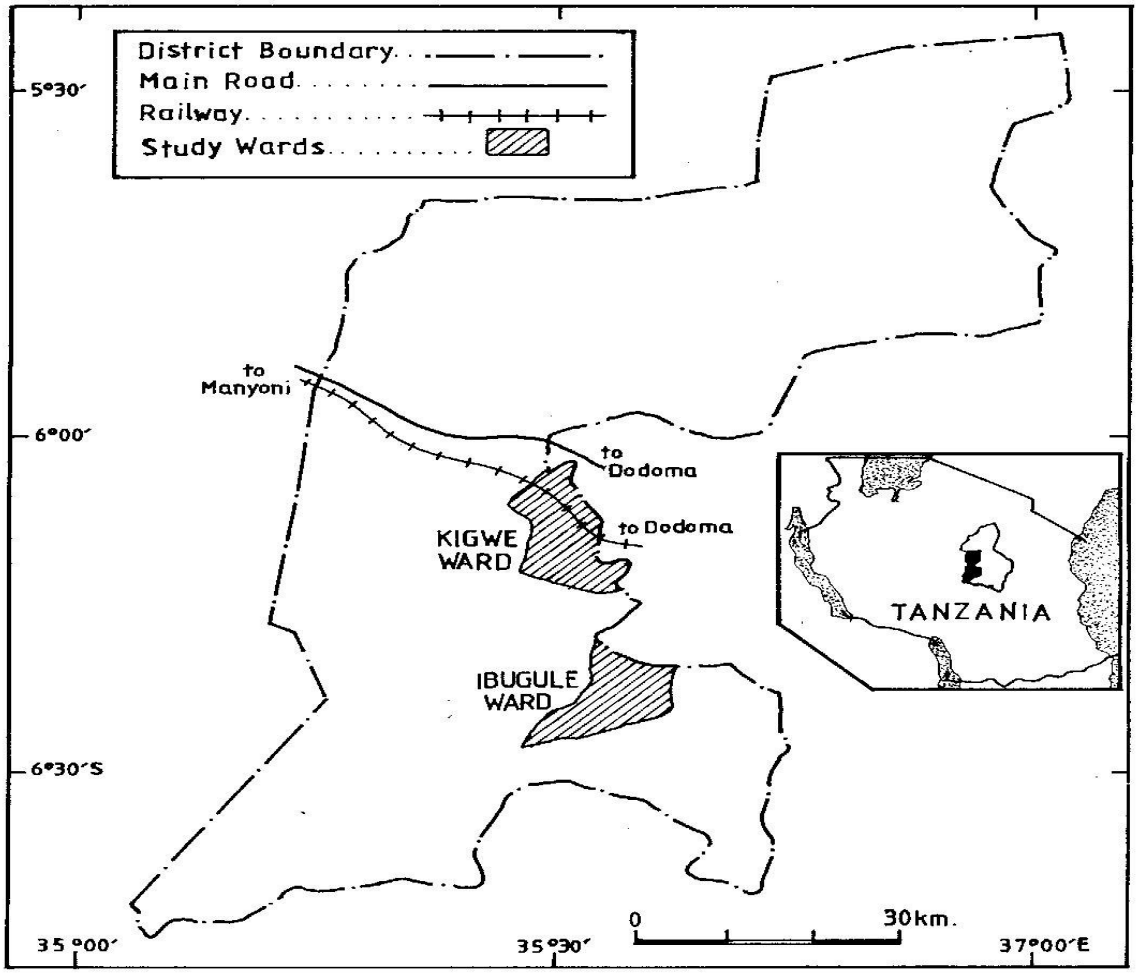
Transitory food shortage is more pronounced in Bahi district than in any other district in Dodoma region. The district is the poorest with a larger number of people who are food insecure since its establishment in 2006 (BDC, 2008). The problem intensifies in the period of January to March before the new harvest. Households tend to have used all the preserved food while the anticipated new harvests are not yet ripe. The

causes for food crises are mainly pegged on natural factors. Very little is said concerning socio-economic factors that may either, by themselves cause food insecurity or aggravate the problem already triggered by natural factors. This study therefore, intends to examine the socioeconomic factors influencing transitory household food insecurity in Bahi district, Dodoma region, Tanzania.

2. Methodology

2.1 Description of the Study Area

Bahi district is one of the six districts of Dodoma region. The district is found in the central plateau of Tanzania, west of Dar es Salaam city. The District extends between latitudes 6° 00' and 6° 30' south and between longitudes 35° 00' and 37° 00' east. It has a total land area of 6,100 square kilometers. Administratively, it is divided into four divisions namely Mwitikira, Chipanga, Bahi and Mundemu. These are further sub-divided into 20 wards and 56 villages. The studied wards are shown in Map 3.1. They are Ibugule and Kigwe from Bahi and Mwitikira divisions respectively.



Map 1. Location of Bahi District showing Ibugule and Kigwe wards

2.2 Research Design and sampling procedures

The study employed a cross sectional research design. The design was used on the grounds that, it allows the collection of data from different groups of respondents at a time. Both purposive and simple random sampling techniques were employed to select the study area and sample households. Purposive sampling was used to select the district and villages for study where Bahi district and its villages of Kigwe and Ibugule were sampled for study. Simple random sampling was employed to select two studied wards out of twenty wads in Bahi district. All the twenty wards were written in pieces of paper, mixed up in a box and then one piece after another was picked without replacement. Kigwe and Ibugule wards were selected after the exercise. A total of 130 households were selected, approximately 5.6% of the total households. According to Boyd et al, (1981) five percent of the study population can suffice a sample under a certain circumstances. To get proportional sample of each village, 5.6% of the total households were taken. The exercise resulted to a sample of 50 households in

Ibugule and 80 households in Kigwe, thus making a total of 130 households.

Thereafter Key Informants (KI) were purposively selected. These comprised two village agricultural extension officers, the District Agricultural Officer (DAO), two Village Executive Officers (VEOs) and ten villagers constituting males and females. The ten villagers (five from each village) formed the Focus Group Discussion (FGD). The selection of these respondents was done with the help of the VEOs who provided to the researcher the names of people whom were thought could provide the required information.

2.3 Data collection methods, analysis and presentation

The study involved both quantitative and qualitative data collection methods including interviews, focus group discussion, documentary review and field observations. Semi-structured questionnaires were administered to households' heads with age 20 and above. The age 20 was chosen as a starting point because many people in that age especially in villages have families. In-depth interviews were conducted between the researcher and village leaders who provided information on transitory food insecurity in their villages and documentary review was used to supplement missing information.

Conversely, focus group discussion and field observation were used to collect qualitative data. Focus Group Discussions were conducted to ten selected elders both males and females. The purpose was to get general information on the causes of transitory food insecurity in the area. Field observation was used to cross check the physical availability of food and other behaviours related to the use of grains.

Furthermore, descriptive statistics including frequencies, percentages and mean were carried out with the help of Statistical Package for Social Sciences (SPSS version 16.0) and Microsoft Excel 2003). Content analysis was employed in analyzing qualitative data collected through key informants interviews and FGD. Thematic analysis was employed in cording and analyzing qualitative data obtained from the field. Results on quantitative data have been presented through tables and figures while the qualitative data were presented through quotations.

3. Results and Discussions

3.1 Available food and food status in the study area

The total amount of food available in a household in a year determines whether the household is food secure or insecure (FAO, 2009). In that regard, the total amount of food available in the study area was established by adding up all grains obtained in the year of this study 2007/2008. This included grains harvested in the household, grains purchased from sales of other cash crops or livestock, grains obtained as gifts as well as grains from the balance of the previous harvest. The amount obtained was converted to Reference Adults (RA) with an average food requirement of 2500 calories per day, then per year (912500 calories). In this study, calculations on calorific requirements were based on sorghum and bulrush millet, the major staple foods in the study area. Literature shows a calorific value of 3350 cal/kg for both sorghum and bulrush millet (Banyikwa, 1990). The calorific requirement per household per year was converted to kilograms and later to bags of approximately 100kg each. According to Kayunze *at al.* (2009); Lukmanji and Hertzmark, (2008) point out that, the amount of grains required per adult equivalent is 2.7 bags of food per person per year. Less than that, one is considered to be food insecure.

Analysis of the state of food obtained in the households from all sources showed inter-household variations. According to Table 1 only 31.5% of the total sample households obtained enough food that could last the whole year; an average of 2.7 bags per person and more. About 68.5% of the households obtained less than 2.7 bags of grain thus, were food insecure.

Table 1: Variations in household food status (N = 130)

State of food	Ibugule (n=50)		Kigwe (n=80)		Overall (N=130)	
	F	%	F	%	F	%
Food secure	11	22.0	30	37.5	41	31.5
Food insecure	39	78.0	50	62.5	89	68.5

The above findings indicate that food insecurity is very high in the studied areas as more than a half (68.5%) of the surveyed population had inadequate food to last for the whole year. Village-wise, households in Ibugule were more food insecure (78%) than those of Kigwe (63%). The major reason was variations on sources of income where in Kigwe many households reported to be involved in petty trading rather than depending on crop cultivation only. Those who depended on crop cultivation were more vulnerable to food insecurity particularly in years with inadequate rainfall as they could not afford to buy grain due to low income levels. The study findings resembles with what was observed by Ngongi, (2013) in Kahama, who noted higher food insecurity (77.7%) among households.

3.2 Socio-economic factors influencing variations in household's food status

3.2.1 Age of the respondents

Age of the household head has detrimental effect on household food supply. Results in Table 2 depict that, many respondents (44%) were in the ages between 25 - 44 years and 30% were between the ages 45 - 64 years while household heads above 65 years constituted 6.2%. Based on these results, more than 93% of the respondents were in the active working group and had high ability of adopting new agricultural technology thus improve production and household food security as reported by Brown (2013). Idrisa, Gwary and Shehu, (2008) noted the same that in connection with agricultural practice, age has a greater influence on the rational thinking of farmers with respect to agricultural threat, use of improved agricultural technologies, and other farming related activities.

In terms of household food status, majority of household heads aged below 25 and above 65 years were found to be more food insecure (70% and 75%) respectively than other groups even though aged were mostly affected. The reasons for household heads below 25 years to be more food insecure is their situation of being new in family issues with little resources (land and livestock) thus still depended on their parents for support while household heads above 65 years were found to be more food insecure because of low labour power due to their ages thus reported to depend on support from their children. However, statistical analysis in Table 3 showed insignificant correlation between age and household food status (Chi-Square 1.337, df = 4, p-value = .720) as observed by Brown (2013) in Singida region who found age not to have significant effect on household food security.

Table 2. Socio-economic characteristics of respondents and household food security (N=130)

Characteristics	Categories	Food secure		Food insecure		All	
		F	(%)	F	(%)	F	(%)
Age	<25	08	30.7	18	69.3	26	20.0
	25-44	19	33.3	38	66.7	57	44.0
	45-64	14	35.9	25	64.1	39	30.0
	> 65	02	25.0	06	75	08	6.2
Sex	Male	38	38	62	62	100	76.9
	Female	06	20	24	80	30	23.1
Marital status	Single	13	59.0	09	41.0	22	16.9
	Married	35	38.5	56	61.5	91	70.0
	Others	06	35.3	11	64.7	17	13.1
Education level	None	07	20.0	28	80.0	35	27.0
	Primary	19	23.7	61	76.3	80	61.5
	Secondary	05	33.3	10	66.7	15	11.5
Occupations	Cultivators	19	21.8	68	78.2	87	66.9
	Agro-pastoralists	12	42.9	16	57.1	28	21.8
	Others	06	40.0	09	60.0	15	11.3
Household size	1 – 4	37	53.6	32	46.4	69	53.1
	5 – 8	15	34.1	29	65.9	44	33.8
	> 9	03	17.6	14	82.4	17	13.1

3.2.2 Sex of the respondents

Respondent's sex has a big role to play on issues related to food production and security as males and female face different challenges on resource access and ownership pertinent for food production. As indicated in Table 2, distribution of respondents from the surveyed households indicate that, out of 130 heads of households 76.9% were males while 23.1% were females. The results further indicate that 80% of female headed households were found to be food insecure as compared to 62% of male headed households. With this finding, one can argue that, households headed by men were more food secure (38%) than female headed ones (20%). These results are more justified by the statistical analysis that shows significant relationship between household food status and sex of the respondents (Chi-Square 8.379, df = 1, p-value = .002) where female headed households showed to be more food insecure than male headed households. These results are in line with that of SFTZ, (2009) in Mara region, Tanzania and that of Obayelu (2010) in Nigeria who found that, households headed by women were more prone to food insecurity as they have little access to resource such as land than is the case of households headed by men.

Table 3. Relationship between Demographic characteristics and household food security (N=130)

Variable	Chi-square-value	df	P-value
Sex	1.337	4	.720
Age groups	8.379	1	.002*
Marital status	12.069	3	.007*
Education level	14.569	2	.001*
Occupations	59.127	2	.000*
Household size	7.755	10	.005*

3.2.1.3 Marital status and household food security

Marital status is a vital factor in maintaining household food security since it impact resource accessibility, food production, availability and consumption. The study findings shown in Table 2, indicates that, majority of the respondents (70%) were married while 16.9% were single, and the remaining 13.1% were widowed or divorced. In terms of household food status, the study results reveals that, high number of widowed and divorced (64.7%) and that of married headed households (61.5%) were found to be food insecure as compared to 41% of single headed households. This implies that single headed households were safer than married, widower and divorced households. Furthermore, the results on the relationship between marital status and household food status in Table 3 indicates significant association (Chi-Square 12,069, df = 3, p-value = .007) between marital status and household food status where married, widower and divorced headed households were found to be more food insecure than single headed households similar to what is reported by Ngongi, (2013). The author argues that married farmers in most cases have big number of people to be fed thus frequently face food shortage. The findings also concur with those of Obayelu, (2010), in Nigeria who found unmarried individuals to be more food secure than married.

3.2.1.4 Education levels and household food security

Education level of the household head has a role to play in household food status as it determines rational thinking and occupations of individuals. Findings in Table 2 show that 61.5% of the surveyed household heads had primary education, 27% did not attend formal schooling and only, 11.5% had secondary education and more. Education levels were further related to household food status. The study findings indicate that, higher percent of food security is observed among household heads with secondary education (33.3%) as compared with those who had primary (23.7%) and none formal education (20%). This implies that food security among households increases with the increase in education and vice versa. The level of education was noted to have significant impact on household food status (Chi-Square 14.569, df = 2, p-value = .001). Similar results were observed by Ngongi, (2013) in Kahama, Tanzania where majority of the respondents with low education levels were found to be food insecure.

3.2.1.5 Respondents occupations' and food security

According to Buhi, (2008) respondent's occupation determines food status in the household. As indicated in Table 2 majority of the respondents 66.9% were cultivators, 21.8% were agro-pastoralists and the remaining 11.3% were civil servants and petty traders. While all villages were dominated by cultivators, Ibugule village had more agro-pastoralists compared to Kigwe village which had more civil servants and petty traders. This complies with that of URT, (2010) that 80% of employment opportunities in Tanzania is offered by agricultural sector and it is a major source of food to the majority.

The study findings on the household food status in relation to the occupation of the household head showed that, cultivators (78.2%) were more food insecure than civil servants and petty traders (60%) and agro-pastoralists (57.1%). Food safety was relatively higher among agro-pastoralists 42.9% than civil servants and petty traders (40%) and cultivators (21.8%). Agro-pastoralist were more food secure than other groups because of livestock ownership where in-terms of food shortage, they were in a position to sell part of their livestock and buy food that could last for the whole year than other groups as observed by Brown (2013) in Singida. These findings are supported by the statistical analysis (Chi-Square 59.127, df = 2, p-value = .000) that shows significant association between occupation and household food status. The study findings further concur with that of Ngongi, (2013) in Kahama who observed that, household heads who kept livestock were more food secure as compared to those without cattle.

3.2.1.6 Household size and food status

The household size determines the household food production and consumption. As indicated in Table 2, a larger

number of the surveyed households (53.1%) had 1 - 4 household members, 33.8% of them had 5-8 household members and the remaining 13.1% had 9 members and above. Household size was further related with household food status where more than a half (53.6%) of household members ranging from 1 – 4 were found to be food secure as compared with those ranging from 5 – 8 (34.1%) and above 9 members (17.6%). These results imply that larger family sizes were more food insecure (82.4% and 65.9%) as compared to lower family sizes (46.4%). Despite the fact that big household size provides ample family labour force, it has cost implication on household consumption which is almost high as compared to low family size. The findings on the relationship between household size and household food status indicates significant association (Chi-Square 7.755, df = 10, p-value = .0053) where families with many members were found to be more food insecure than those with few household members. Similar observations was noted by Ngongi, (2013) in Kahama and Amaza et al, (2009) in Nigeria (Borno state) who noted that households with larger family sizes had higher probabilities of being food insecure than those with smaller sizes, and vice versa.

3.3 Influence of other factors on variations in household's food status

3.3.1 Size of Farms

The total area cultivated per season per household determines the amount of crops to be harvested (Brown, 2013; Amaza et al, 2009). However, this depends on inputs used, soil quality, seeds used, labour availability as well as the climatic condition of an area (Amaza, et al, 2009). Analysis of farms cultivated Table 4 show that respondents cultivated moderate farms; neither large nor small. The mean acres cultivated per household were 3.0 ranging from a minimum of 0.75 to a maximum of 10.2 acres. Both the mean, minimum and maximum farm sizes at Ibugule village were higher than that of Kigwe. The major factor for this variation was the locality where Kigwe was found to be semi-urbanized with more population as compared to Ibugule thus farm extension was possible at Ibugule than Kigwe.

Table 3: Size of farms among respondents (N = 130)

Size of farms	Ibugule (n=50)	Kigwe (N=80)	Overall (N=130)
Mean	3.5	2.5	3.0
Minimum	1	0.5	0.75
Maximum	11.5	9	10.25
Standard deviation	1.942	1.698	1.820

According to Bahi district profile (2008), the mean size of farms cultivated by the household was found to be within the range that could provide each household with adequate grain. Data show that the average yield per acre in Bahi district was 6.4 bags. This implies that on average, a household would harvest about 18 bags from the 3.0 acres. Households in Ibugule would harvest about 22.4 bags from 3.5 acres, whereas those of Kigwe would harvest about 16 bags from the 2.5 acres. However, only few households (31.5%) as (seen in Table 1 above) obtained enough food that could last the whole year while majority (68.5%) had inadequate food. Both climatic and non-climatic factors have contributed to such situation although the focus of the study was on non-climatic factors.

3.3.2 Labour availability and use of agricultural inputs

Production of food depends on the availability of labour and other inputs. The study findings from this study in Table 5 depict that, 65.4% of the respondents were experiencing labour shortage and only 34.6% were labour sufficient. None of the respondents reported to use inputs like fertilizers or modern agricultural equipments like power-tiller or tractor thus mostly depended on hand hoe. With low use of agricultural inputs means low productivity (Baltzer and Hansen, 2011) hence food insecurity.

Table 4. Labour availability in the study area

Labour sufficient	Ibugule (n=50) %	Kigwe (n=80) %	Overall (N= 130) %
Yes	32.0	36.3	34.6
No	68.0	63.8	65.4

Labour shortage has been triggered by out-migration of youths to urban areas in search for employment soon after they complete their basic education as reported by one respondent during the focus group discussion;

"It is true that our children who are living in urban centers do support us in terms of remittances, but their absence is a big burden. We happen to experience labour shortages especially during farming and weeding. Moreover only a few of them do remember to send money back during food shortage or during farming season"

(A married female, household head, with 52 years old, a member of the focus group discussion).

Moreover, labour shortage was reported to be a serious problem to cultivators than to agro-pastoralists, civil servants and petty traders. The earlier group was economically disadvantaged than the later groups as reported by one respondent during the focus group discussion;

"The farming season needs preparations in both labour and financial resource since rainfall in our area is

unpredictable. Those who have money have the ability to hire more labour and ploughs as earlier as possible to accomplish farming activities like planting, tilling and wedding, but many of us who depend solely on our hands normally fail to accomplish the mentioned farming activities on time hence earn less than our fellows" **(A male, household head, aged 59 years with primary education).**

Moreover, pastoralists had the advantage of using oxen ploughs for cultivation. Some relatives could also borrow the oxen and those with money could hire. However, this has an impact on timely cultivation because borrowing and hiring is possible only after the owner has finished cultivating his/her farms. Additionally, the number of oxen in the study areas was lower as compared to the demand. Small holder farmers reported to waste time waiting for the long que till their time and due to unpredictable rainfall they sometimes failed to use them as planned.

3.3.3 Improper use of household grain

Uses of grain in a numerous ways that are not for the purposes of feeding household members aggravate the problem of household food insecurity elsewhere. Findings in (Figure 1) indicate that, about 36% of the respondents who were food insecure sold grain to get money for general usage. Others, 38% reported to use grain in making local brew hoping to make profit while 18% of the households reported to use grain for traditional ceremonies such as initiation rituals, wedding and funerals.

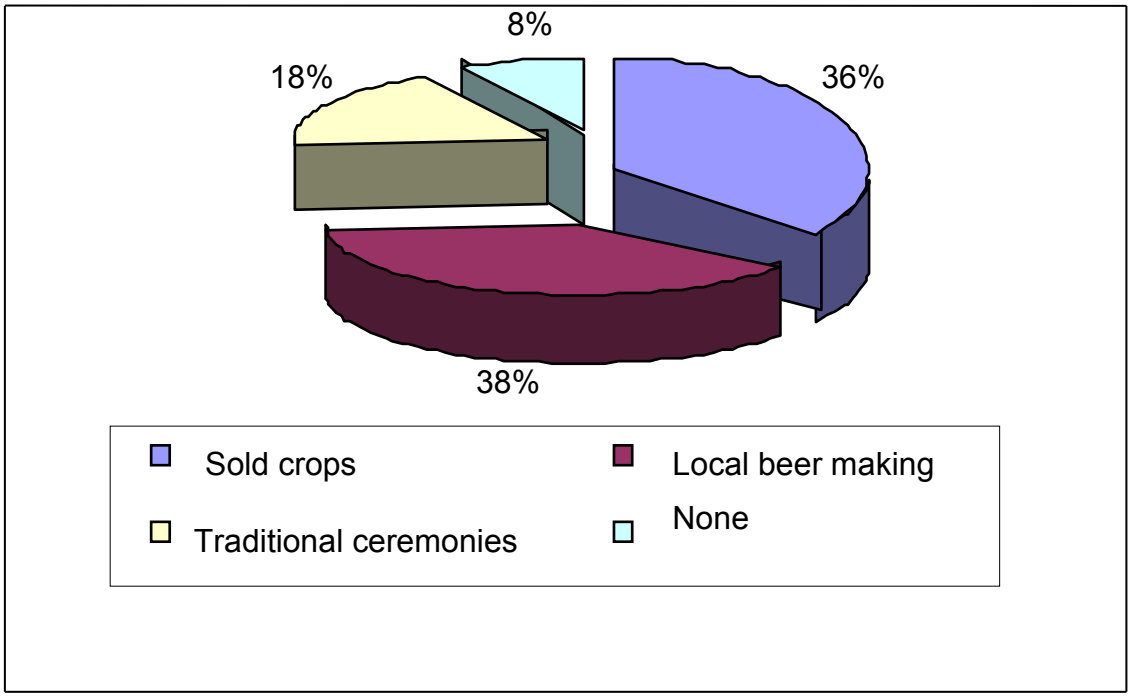


Figure 1: Varied usage household grains in the study area

Moreover, local brew production had an implication on the depletion of household grains. This was further supported by respondents who admitted that, although local brew production acted as a source of income, the process contributed much to exhaustion of household grains particular to households that used what was available in their households as affirmed by one respondent during the focus group discussion;

"In reality, when one calculates how many bags are used for local brewing in our village per year, nobody will oppose that the process contributes much to household food insecurity among households. However, to some household, this helps them to earn money and later buy food for the household. Majority of these people buy grains from other small holder farmers in the village or nearby villages who sell the grain to get money for different needs". **(A male, household head aged 48, with primary education**).

The contribution of inappropriate food consumption to household food insecurity is supported by Garnett, (2010) in Britain who noted that, if released for human consumption instead of feeding animals and alcohol production, the achieved grains would be sufficient to feed 3.5 billion people in the world.

4.0 Conclusion

Food insecurity, particularly transitory is a persistent problem affecting more than half of the households in Bahi district. While environmental factors account for a cyclic occurrence of famines in almost every four years, social economic factors account for transitory food insecurity almost every year. Demographic factors such as sex, age, marital status, household sizes, dependence on farming as a sole occupation, size of farms, labour shortages, lack of use of agricultural inputs and misuse of grain are among the causes of variations in household

food status in the district. In order to reduce the problem of food insecurity in the study area intensification of agriculture and encouraging farmers to grow crop varieties with relatively better yields and use of agricultural inputs and implements is required. Moreover, education on the proper use of the reaped grains by each household needs to be overemphasized. Furthermore, enhancing rural credits to the subsistence farmers and youths is of very importance since it can help in overcoming the problem of labour drain, households' capital problem to buy modern farm implements and the lack of start-up capital to work in off-farm activities. This can help to improve people's livelihood thus reduce transitory household food insecurity.

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