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CEREAL BANK AS A NECESSARY RURAL LIVELIHOOD INSTITUTE IN ARID LAND, MAKOJA VILLAGE, DODOMA-TANZANIA

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ABSTRACT

In 2012, the study was carried at Makoja Village, in Semi-Arid region of Dodoma. The aim of the conducted study was to assess the importance of Cereal Bank to livelihood of farming households. A total of 80 respondents were interviewed. Data were analyzed using SPSS 16.0 computer program. The major findings of the study revealed that, almost all of the households (96.2 %) were poor, while more than a half of the sampled population was chronically food insecure. Income and expenditure analysis revealed that households had no opportunity to manage savings. Further analysis on expenditure revealed that despite being farming households, the later spent large proportion of their income in purchasing food for households. Cereal bank has been potential to provide food at the time of less, storage facility, seed stocking facility and a business opportunity. Cereal banks should be purposively promoted to improve livelihood and assure food security in the rural areas.

Keywords: Cereal Bank, Households Food Security, Semi-Arid, Livelihood, Wellbeing.

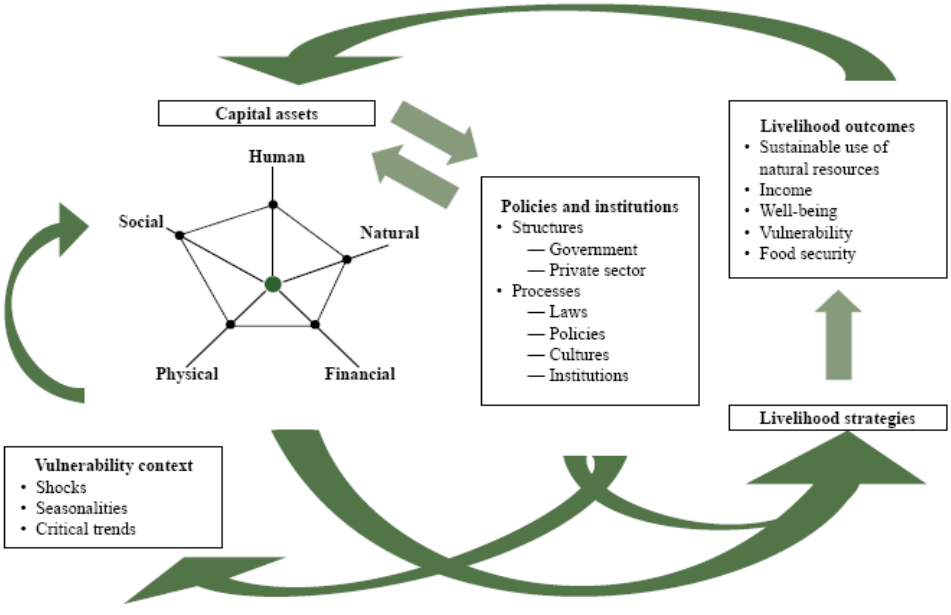
INTRODUCTION

Cereal Banks were established in the Sahel region due to the droughts of the early 1980s, and are increasingly important way to increase food aid impact (Berg and Kent, 1991). With the support of Non-Government Organizations and the Government itself, cereal banks were established in 2003 in Dodoma Region and Morogoro Region in Tanzania (Berg and Kent, 1991; Lay Volunteers International Association., 2010) Among the beneficiaries of the program executed in Dodoma

region, is Chamwino District Council, of which many villages are food unsecured due to unfriendly climatic (arid) factors (Lay Volunteers International Association., 2010). Primarily, cereal banks are meant to prevent farmers from 'over-selling' at low prices and then buying back at high prices, to avoid exploitation by middlemen and help surplus producing farmers to find a better market for their grain. In the main part they have proved institutionally unsustainable, tending to progressively decapitalize and disappear once outside support is removed. Cereal Banks are institutes located in rural areas.

Referring the Sustainable Livelihood Framework, policies and institutes have the role to promote the livelihood outcomes such as income and food security hence wellbeing of communities involved (DFID., 1999). Policies and Institutions are structures which are the public and private sector organizations that set and implement policy and legislation; deliver services; and purchase, trade, and perform all manner of other functions that affect livelihoods. Processes embrace the laws, regulations, policies, operational arrangements, agreements, societal norms, and practices that, in turn, determine the way in which structures operate (Serrat, 2008). As the process are influenced both internally and externally, Kumar De and Pal (2011) reported that politics and globalization are potential to food insecurity and thereby welfare in some countries.

Figure-1. The sustainable Livelihood Framework, DIFD (1999)



Drawing upon a range of sources it is vivid that both government and non government organization have played a greater role in establishments of Cereal Banks to the rural community, aiming to support the small scale farmers (Berg and Kent, 1991; Kent, 1998; Mukhwana, 2003; Mketto, 2009; Lay Volunteers International Association., 2010). However, the extent to which the cereal

bank at Makoja Village of Chamwino District Council has been useful to farming households is yet to be known.

Dodoma Region had been noticed among the poorest regions regions in Tanzania, characterised by low agriculture productivity (arid land), massive unemployment, increasing population density and experiencing malnutrition incidences higher that national average (Msaki *et al.*, 2012; Mwakipesile, 2012; Ndanga, 2012). Dodoma region is one of the poorest areas in Tanzania because of frequent famines caused by semi-arid natural conditions (Ndanga, 2012). Rainfalls are erratic, with an average annual precipitation level of 570 mm, where 85 % of the rains do fall in the months between December and April (Sakai, 2012). Such rainfall pattern in Dodoma makes it possible to maintain agricultural societies though unstable due to capricious rainfall (Ndanga, 2012; Sakai, 2012). Gogo people, the natives in Dodoma Region are basically agro pastorals, are vulnerable and do face shocks to weather which impact on the food supply (Matunga, 2012; Mwamfupe, 2012; Ndanga, 2012).

While subsistence farming is dominant in Dodoma, food crops are maize, sorghum, pearl millet and sweet potatoes (Matunga, 2012). Cash crops include sunflower, groundnuts, simsim, finger millet and peas (Matunga, 2012), Livestock keeping occupies the second important position to farming whereas cattle, goats, sheeps and donkeys are kept (Mwakipesile, 2012). Of recent, changes of climatic conditions and loss of soil fertility have led to low productivity hence exacerbating poverty (Ndanga, 2012).

At about 78 % of Chamwino district residents are engaged in agriculture and livestock keeping. Chamwino district residents are involved in producing millet, as food crops while groundnuts, sunflower, and simsim are cash crops. Conducting such a study in Makoja village has been pertinent to understand how useful the Cereal Banks have been to farming households in arid lands. Specifically the study was set to examine the food security status of households in Makoja village, to determine the household saving enabled by the cereal bank to farming households in Makoja village, and to measure the role of Cereal Banks as the livelihood and food security promoting institute to farming households in Makoja Village.

MATERIALS AND METHODS

Data for the current study was collected using a structured and semi- structured interview. A cross section study drew a sample of eighty (80) households from Makoja Village (Kothari, 2004). While a half of the sample (40 households) was purposively members of Cereal bank, 40 households were purposively non-members of Cereal bank. Both members and non-members made use of the Cereal Bank. While members of the cereal bank benefited from soft loans and dividend obtained as profits

from various operations carried by the Cereal Bank, non-members just benefited by keeping their harvest and obtain them in the future date at reasonable price. Specifically, household data regarding scale of agriculture production, food security, expenditure and income, welfare indicators and the utilization of the Cereal Banks were collected. The sampling was keen to engage various household strata including those of welfare and headship. Household heads were the interviewee.

In depth-interviews were conducted to the Chairperson, treasurer and secretary of the bank, as key informants. The collected from the primary source using the structured questionnaire was summarized, edited and coded before analyzing them. Quantitative data was analyzed using Statistical Package for Social Sciences (SPSS Version16).

Descriptive statistics such as frequencies and percentages was used to obtain the variability and central tendencies of variables. Relating household income and expenditure and income was also important in understanding the expenditure pattern of the community in relation to income generated. All relations were at first tested at ($p \leq 0.05$) and whenever significant, the level ($p \leq 0.01$) was used. Price elasticity was employed to measure the sensitivity of prices while using the Cereal Bank, and while not using the Cereal Bank. This was important to determine the savings managed while utilizing the Cereal Bank.

RESULTS AND DISCUSSION

Background Variables to the Households

Since the study engaged measuring livelihood outcomes, the understanding of household socio economic characteristics was pertinent. As shown in Table 1, age distribution of the respondents for this study is categorized into young, adults and elders groups. While there was no household head aged below 18 years old, the majority 66 % were less than 44 years old and hence economically active population. More than half of respondents were female (57.5 %) and males (42.5 %) of the studied population, obtaining almost equal gendered sample proxies who involve in different production activities. Gender has a lager impact on the planning and implementing farm activities (FAO., 2002). As it is a common feature to village communities 75 % of the households' heads were married therefore resuming household responsibilities.

While the majority, (57 %) of household heads attained primary education, 38 % were illiterate. Education has always been paramount attribute to a person as it determines someone's level of understanding and interaction with the surrounding environment (United Republic Of Tanzania., 2003). Besides, education is the most important instrument for developing human skills, knowledge and invigorating people from poverty (United Republic of Tanzania., 1999). As it was presented in

the Materials and Method section, 50 % of respondents were members of the Cereal Bank, while the other 50 % were non - members of the cereal bank.

Table-1. Households' Background Variables

Age Categories of Respondents		
Age Category	**Frequency**	**Percent**
18-37	24.8	31
38-43	28	35
44 and above	27.2	34
Total	80	100
Sex of respondents		
Male	34	42.5
Female	46	57.5
Total	80	100.0
Marital status of Respondents		
Married	60	75.0
Single	7	8.75
Widow	9	11.25
Total	80	100.0
Education level of Respondents		
Primary	46	57
Secondary	3	4
Tertiary	1	1
Illiterate	30	38
Total	80	100.0
Main Occupation of Respondents		
Agriculture	72	90.0
agriculture and business	8	10.0
Total	80	100.0
Status of memberships in Cereal Bank		
Member	40	50
Non member	40	50
Total	80	100.0

The mean household size for the household was found to be 5 ± 2. The research also found out that 91.25 % of the houses were roofed by iron corrugated sheets, 100 % of the walls made by burnt bricks but 82.5 % of the house floors were just soils. While burnt brick are made by the villagers themselves, the iron irrigated sheets have been necessary to resist strong erratic rains. Not having woods or cemented floors might be the sign of poverty persisting in the community.

Food Security and Production Status Households in Makoja Village

While there are several methods of measuring food insecurity, the number of meals taken by households is a quick and simple indicator to household food insecurity. As it is presented in Table 2, only a half of the households had three meals a day during the period of plenty (June – August).

Table-2. Households number of meals

Number of Meals during the period of plenty (June – August)		
Number of Meals per day	Frequency	Percent
ONE - TWO	40	50
THREE	40	50
Total	**80**	**100.0**
Number of meals during the period of insufficient (January – March)		
Number of meals per day	Frequency	Percent
ONE	75	93.8
TWO	5	6.3
Total	**80**	**100.0**

The study also revealed that while 93.8 % of the sampled households took a single meal during the period of less (January - March), only 6.3 % of the sampled households took two meals per day. This therefore explains that at about a half of households in Makoja are chronically foods insecure.

Determination of the Household Saving Enabled by the Cereal Bank to Farming Households in Makoja Village

In order to understand savings managed by households, it was important to analyse livelihood outcomes such as household income and expenditures. Review of household income showed the most important activities to households (practiced by the majority and earned relatively more income). As is presented in Table 3, the main source of income to the community was selling crops admitted to be practiced by 96 % of the households earning a mean of 422,454 TAS per annual.

Table-3. Households income

Sources of income	**ANNUAL INCOME**			
	Households engaged	Minimum (TAS)	Maximum (TAS)	Mean (TAS)
Employment	1	270000	270000	270000
Selling crops	77	15000	1700000	422454
Kiosk	13	50000	1800000	510153
Hair Salon	1	60000	60000	60000
Selling livestock	41	25000	15700000	858414
Bodaboda (hiring motorcycle)	16	20000	3000000	422812
Labor	44	9000	300000	73852
Hiring bicycle	13	13000	600000	125461
Tailoring	3	100000	960000	446666
Tomato selling	17	12000	480000	86000
Vegetable selling	3	36000	300000	178666
Baobab selling	15	20000	200000	72200
Selling water	3	20000	130000	73333
Firewood selling	13	20000	100000	46153
Food vending	5	100000	980000	396000
Remittance	2	150000	200000	175000

Selling of labor and livestock was consecutively done by 55 % and 51 % of households earning a total of 73,852 TAS and 858,414 TAS per annual respectively. Avoiding conglomeration of the data and distortion of the information, analysis on daily household income was done versus household size. The analysis showed that at per capital income of about 96.2 % of the households was below 1 dollar a day (up to 1583 TAS/day). This revealed that only 3.8 % of the households were relatively non poor in Makoja village. Income poverty existed in Makoja village, restricting the community to manage savings.

For household who had clear records, the annual expenditure of the households' income in various requirements was assessed. As is presented in Table 4, the sampled population spent 58.8 % of their income on food.

Table-4. Household Expenditures in Makoja Village

Households Expenditure	Respondents	ANNNUAL EXPENDITURES			
		proportional on expenditure (%)	Minimum TAS	Maximum TAS	Mean TAS
Food	80	58.84	50000	700000	237887
Dressings	62	16.00	2100	400000	90540
Education	66	9.21	2000	800000	73110
Household Consumables	79	8.34	1000	130000	33806
Religious donations	57	5.87	2000	100000	23368
Beverages	31	4.61	1400	235200	27567
Ceremonies	56	3.29	2000	100000	16517
Civic obligation	72	3.00	3500	50000	10506
Health & Medical	79	1.94	5000	50000	6518

The households spending over a half of their income in purchasing food suggests existing poverty and other two scenarios. The first scenario is that the food locally produced by households cannot provide for the household throughout the year. The second scenario is that food produced was poorly stored, managed or marketed. All in all, the findings suggested that Cereal Banks can offer solutions to food insecurity persisting in the rural arid areas. Spearman's correlation done between household incomes and household expenditure was 0.754** ($p \leq 0.01$). Households with relative more income had relatives more expenditure. Household expenditures are therefore function to household income. As many households were revealed to have relatively low income, chances to earn savings are limited to such community.

Pricing and Savings Opportunities Created By the Cereal Bank

Most farming households were interested to deposit millet and sunflower in Cereal Banks. To understand opportunities provided by the Cereal Bank the Price Elasticity of Demand (PEoD) was calculated using the following formula.

$\Delta Q / \Delta P * P_o / Q_o$ ---------- (1)

Where:-

ΔQ = Change in Quantity Demanded)

ΔP = Change in Price

P_o = New price

Q_o = New quantity demanded

A minus sign (-) is generally inserted in the formula before the fraction with a view to making elasticity coefficient a non-negative value (Dwivedi, 2002).

Assumptions

If PEoD > 1 then Demand is Price Elastic (Demand is sensitive to price changes)

If PEoD = 1 then Demand is Unit Elastic

If PEoD < 1 then Demand is Price Inelastic (Demand is not sensitive to price changes).

The Price Elasticity of Demand measures the rate of response of quantity demanded due to a price change. Respondents were subjected to a question what are the prices of crop in street and with a cereal bank, this question was posed in order to determine the prices changes and presented in Table 5.

Table-5. Price Elasticity for Millet and Sunflower Demand

Crop	Arrangement	Price Mark	Average Price	Price Elasticity
Millet	Without cereal bank	Minimum	25287	2.82 %
		Maximum	31250	
	With cereal bank	Minimum	35337	5.59 %
		Maximum	39550	
	New amount	1 bag		
	Old amount	3 bags		
Sunflower	Without cereal bank	Minimum	24600	16.4 %
		Maximum	30000	
	With cereal bank	Minimum	40560	24.37 %
		Maximum	46550	
	New Amount	23 bags		
	Old Amount	5 bags		

Findings revealed that the price elasticity of demand of both millet and sunflower with is higher while using a Cereal Bank facility. This implied that the community which utilized the Cereal Bank facility enjoyed reduced marketing cost and avoided middlemen who always manipulate the price.

Apart from the price elasticity itself, the research revealed that both the minimum and maximum price of millet and sunflower was relatively lower when the selling did not engage the Cereal Bank facility as compared to when sold using the Cereal Bank facility. Cereal Bank is potential to improve income and hence livelihood of rural farming households.

Table-6. Realized Benefits of Cereal Bank (Multiple Response)

	Responses	
Benefits of Cereal Bank	**N**	**Percent**
Food availability during period of less	86	19.3%
Market opportunity	69	15.5%
Soft food loans	37	8.3%
Availability of seeds	71	16%
Provide dividend	33	7.4%
Cheap food during hunger seasons	72	16.2%
Provide food safety in store	54	12.1%
Extension education	23	5.2%
Total	**445**	**100.0%**

A multiple response analysis presented in Table 6 showed the realized benefits of Cereal Bank to households in Makoja Village. Most households admitted that Cereal Banks are useful to assure household food availability. In order of importance, providing cheap food during hunger followed (it should be reminded that households stored food had the option of claiming the stored food or selling the stored food during period of less). The household proportions 16 %, 15.5 %, and 12.1 % realized the Bank as the means to acquire seeds, marketing opportunity and storage facility respectively. The small proportion (7.4 %), realized the Cereal Banks to be useful while obtaining dividend from the business done and extension education. The current findings echoes the study done to the Maasai pastoralist society seeking for changing livelihood strategies for improved food security, having multiple sources of income coping to decreased livestock productivity, threats from drought, pest and diseases and shortage of grazing lands (Msaki *et al.*, 2011). Livelihood supporting institutes are vital to wellbeing and food security of rural communities.

CONCLUSIONS

Majority of households in Makoja community are poor and chronically food insecured. As majority have admitted, Cereal Bank is a potential livelihood institute to buy, store and sell grain with primary intention of promoting household food security. However, few households have realized Cereal Banks as a business opportunity. As it is different to non-members, members of the Cereal Bank have been enjoying soft loans and dividend from the business done by the Bank. Cereal Bank is an opportunity to promote not only food security, but also the welfare of the poor communities living in rural areas.

RECOMMENDATIONS

The Cereal Banks should be taken seriously by both stakeholders to ensure decent livelihood outcomes and food security to the poor rural communities in arid lands. More campaigns should be done to open up more Cereal Banks in various places and to encourage non- members households

to enroll themselves as members of the bank. Various stakeholders should take purposive initiatives through Cereal Banks to make use of marketing, business and storage opportunities to alleviate poverty existing in rural areas.

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