

Livelihood Strategies, Shocks and Coping Mechanisms among Rural Households in Southern Zambia

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Abstract: The main objectives of this study were to document the level of access to assets; the livelihood strategies utilized; the shocks or risks faced and the coping mechanisms utilized by rural households in southern Zambia. Data was collected from 350 randomly chosen households in Monze and Kalomo districts. Quantitative and qualitative data collected from the survey was analyzed using descriptive statistics. The results indicate that distribution of livelihood assets in the study area are skewed by wealth showing that the majority of the production resources are owned by a few (27%) of the well-endowed households who owned more key assets like livestock and had greater access to land as compared to the poor. The results also showed that the households are diversifying their livelihood strategies among different asset combinations and activities. Crop farming, livestock rearing and petty trading are some of the major livelihood strategies being employed. Rainfall variability as manifested in droughts and erratic rainfall patterns was identified as a major shock and the most critical source of risk and vulnerability which has been causing frequent production losses and seasonal food shortages among the households. The households are engaging in various activities to cope with the various stresses and shocks. Livestock selling was one of the most effective strategies to ameliorate hunger. However the livestock herds have been dwindling in the past two decades due to disease outbreaks. Households are also depending more on food aid than in any other activity for survival.

Keywords: Coping mechanisms, livelihood assets, livelihood strategies, shocks, vulnerability, Zambia

INTRODUCTION

In recent years, most African countries including Zambia have experienced high rates of economic growth. The Zambian economy has been performing relatively well, with real Gross Domestic Product (GDP) growth of over 6.0%, respectively in the period 2001 to 2011 (Central Statistical Office, 2012). The recent economic trends have generally been due to good performance of the copper mining industry buoyed by the high global copper prices. Major exports are dominated by copper and cobalt (73%) and the remaining contributors - mostly agriculture, with some manufacturing and tourism. Agriculture is the major economic activity for rural households in Zambia. Farming generates food as well as cash for the farmers. For instance, agriculture alone contributed 20% of Gross Domestic Product (GDP) in 2005, of which about 80% was a contribution from the smallholder sub-sector. Agriculture also contributes to about 60% of employment in the country (Government of the Republic of Zambia, 2011a).

Despite these high rates of economic growth in Zambia, disparities between the rich and the poor continue to prevail, especially in rural areas. Currently,

poverty widespread in Zambia, with about 61% of the people in the country living below the poverty line and above half of them are considered to be in extreme poverty. Moreover, despite significant improvements in urban poverty reduction, poverty remains an acute problem for the rural people who make up the majority of the country's population with rural poverty rates being stuck at over 77 per cent for more than a decade (Central Statistical Office, 2006).

Rural environments in Zambia are complex and even though agriculture remains the mainstay of the rural economy, it is being seriously challenged by factors such as socio-economic stresses like poverty and climatic change. Poverty and environmental stresses due to climate change such as droughts or floods have increased the vulnerability of both urban and rural households but with more devastating effects being experienced more by the latter. Rural households face high risks of falling into more severe poverty in the future due to these shocks (Government of the Republic of Zambia, 2002, 2010, 2011b). Understanding these shocks and their consequences is essential for developing effective poverty alleviation strategies that strengthen existing coping measures. This study was hence motivated by the desire to understand how

Zambian rural households live and how they respond to these challenges. Therefore, the specific objectives of this study were to document the level of household access to resources and the household livelihood strategies they utilize as well as the shocks or risks they face and how they cope with these.

CONCEPTUAL FRAMEWORK

The study utilizes the livelihood framework to conceptualize and understand the livelihood activities or processes in the study area. Livelihood frameworks are frequently used by researchers to document and analyze the processes by which individuals and households utilize their resources and opportunities to make a living in particular socio-economic and biophysical contexts (Scoones, 1998; Carney, 1998; Ellis, 2000; Shanmugaratnam, 2008; Haan and Zoomers, 2005). A livelihood is defined as comprising 'the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household' (Ellis, 2000). Put simply, a livelihood is a living gained using endowments (assets), activities and opportunities. Individuals and households, using their endowments, engage in different activities within the bounds of the opportunity structures presented by a particular set of mediating factors (environmental, institutional, infrastructural, technological and socioeconomic). The mediating factors may facilitate or inhibit the livelihood process thereby influencing the nature of the livelihood outcome (Shanmugaratnam, 2008; Haan and Zoomers, 2005). Hence, one's endowments and the mediating factors determine the kind of livelihood obtained by the individual or the household. It is also important to note that a livelihood outcome impacts directly on endowments. A successful livelihood outcome may help to strengthen endowments, while failure could lead to depletion or loss of endowments.

In the pursuit of livelihoods, rural households diversify their income sources, while at the same time adopting strategies that increase production, avoid or minimize harvest loss and increase their access to key resources. Farm activities comprise crop and livestock production and the income derived from the same. Farmers usually diversify on-farm activities (in terms of crop-livestock mix and crop diversity) to spread risks (mainly against climate hazards and price changes) and to meet their consumption and marketing needs. Widening income sources by engaging in diverse off-farm and non-farm activities is essential as farming alone fails to provide an adequate means of survival (Ellis, 2000). Off-farm income includes wages or payment in kind obtained by working on other farms and income from the sale of natural resources, while the goal to capture maize-based farming systems in an environment where the risk of drought was considered moderate to high. In both these districts, the probability

non-farm income includes income from non-agricultural sources such as petty trading, rural non-farm employment, handicrafts, public support and remittances (Ellis, 2000). It is important to note that farm, off-farm and non-farm activities complement each other. Farm income can provide the capital needed to initiate and expand non-farm activities, while off-farm and non-farm activities can contribute to farm productivity by providing finance for farm input purchases and investment (Reardon *et al.*, 1994). Similarly, failure in one category of activity can have a negative impact on the other types of livelihood activities.

In addition to diversification, households also engage in adaptation activities in order to enhance prevailing security and wealth, or to reduce vulnerability and poverty (Davies and Hossain, 1997). This involves activities such as enhancing land and soil quality, adopting drought tolerant and fast maturing crop varieties, spreading risks by diversifying income sources, increasing access to resources, entering into formal and informal risk sharing arrangements and building family and kin support bases. However, it is important to note that the capacity to adapt and diversify is differential, varying from household to household depending on factors such as asset ownership, access to credit and inputs, infrastructure development and availability of alternative opportunities.

Rural livelihoods are often vulnerable to risks and shocks. Climate variability, human and livestock diseases, pests, flooding, unfavorable market trends, institutional deficiencies and so on, can present risks and inhibit livelihood endeavours. Vulnerability refers to both exposures to unfavorable developments like rainfall failure, or livestock loss that would cause considerable harm to one's livelihood; as well as the lack of means to cope with the loss without losing the household's livelihood base (Chambers, 2006). Various studies have shown that risks and shocks can perpetuate poverty and aggravate vulnerability by inducing asset sales and through lost income (Dercon, 2004; Dercon, 2005a, 2005b). In particular, climate variability is known to cause severe impacts on livelihoods that are sensitive to climate change, such as rain-fed agriculture (Adger *et al.*, 2003; Vogel, 2005; Yamin *et al.*, 2005). Farmers are known to practise different adaptive strategies to minimize the effect of climate variability and to enhance and maintain the quality of their land, but such endeavours are dependent on access to resources (Mortimore and Adams, 2001; Adger and Vincent, 2005).

METHODOLOGY

Data and data sources: This study uses data collected from Monze and Kalomo districts in Southern Province of Zambia. The districts were purposively selected with of a failed season ranges from 40 to 60%. Monze district is located in agro-ecological region II where annual rainfall is 800-1000 mm and the growing season

comprises 100-140 days (Bunyolo *et al.*, 1995; Environmental Council of Zambia, 2000). Kalomo is also located in agro-ecological region II. However, a small portion of the southern part of the district is located in agro-ecological zone I. Rainfall averages about 350 mm, which is far below the long term average for region II (Government of the Republic of Zambia, 2010). Both districts, like most other places in the province, have experienced declining rainfall levels during the past two decades.

Ten villages were selected in each of the two districts and from each village, farmers were proportionately selected randomly based on the distribution of maize production households to give a total of 350 households for the survey. Fifty-eight percent of the households were located in Monze District and the rest were located in Kalomo District. About 18% of the sample households were female headed. Structured questionnaires designed to capture information on a range of indicators related to ownership and access to assets, household livelihood strategies, shocks and vulnerabilities experiences by households and coping mechanisms were administered between June and August 2007.

Data analysis: For purposes of this study, descriptive data analysis was employed to document access to capital, livelihood strategies households are using and the risks and shocks which affect them. The data collected was analyzed to identify the main household capital assets and livelihood strategies for income generation in surveyed districts. Quantitative and

qualitative data collected from the survey was also analyzed to assess the risks and shocks that affect the households and the strategies they have adapted to cope with these risks and shocks. A descriptive-analytical narrative was used to present the findings from the study. The results were analyzed in form of percentage distributions on relevant variables. Household access to resources, livelihood strategies and the risks and shocks affecting them were analyzed by district, gender and wealth category as presented below. The household wealth categories were generated using Principal Component Analysis (PCA) based on the analytical approach by Filmer and Pritchett (2001), Langyintuo (2008) and Langyintuo and Mungoma (2008). The analysis and presentation of results by district, gender and wealth category was done in order to have a comprehensive picture of the livelihoods diversity and the strategies households are using to cope with risks or shocks in Zambia.

RESULTS AND DISCUSSION

Table 1 presents demographic characteristics of the sample households in the two study districts, Kalomo and Monze. These statistics suggest that the majority of the households (82%) in the two study districts are male-headed, which is consistent with province-wide statistics standing at 78% (CSO, 2006). About seventy-nine (79) percent of the household heads were married, while another 11% were widowed. The mean age for household heads in Monze and Kalomo Districts was 48 and 43 years, respectively. The estimated mean age

Table 1: Demographic characteristics of sampled households

	District		Whole sample
	Monze	Kalomo	
Household size (members)	Mean 5.98 (1-15)	7.10 (1-20)	6.44 (1-20)
Age of household head	47.8 (21-91)	42.6 (22-78)	45.6 (21-91)
Distribution of household heads in age groups (proportion)			
>= 60 years	0.42 (0-3)	0.24 (0-2)	0.34 (0-3)
16 - 59 years	2.83 (0-8)	3.23 (0-8)	3.00 (0-8)
<= 15 years	3.47 (1-10)	3.77 (1-10)	3.60 (1-10)
Female headed households (%)	22.1	12.3	18.0
Education level of household head (%)			
Illiterate	15.2	5.50	11.4
Primary education	57.8	50.0	54.6
Secondary	23.0	40.4	30.3
Post-secondary	2.50	2.10	2.30
Adult education	1.50	2.10	1.70
Marital status of household head (%)			
Single	6.40	4.80	5.70
Married	76.0	83.5	79.1
Divorced	2.90	3.50	3.20
Separated	2.00	0.00	1.20
Widowed	12.7	8.30	10.9
Wealth status of household (%)			
Poorly endowed	49.0	73.0	63.0
Well-endowed	51.0	27.0	37.0

Figures in parenthesis are the ranges; Survey Data, 2007

of the household heads in the sample was 46 years across the two districts. This is consistent with national statistics, which estimate that 69% of the household heads are of ages 25 through 49 years (CSO, 2006). Thus, on average and on the basis of their ages, the household heads could be regarded to be potentially productive with capacity to adopt new farming practices. About 89% of the heads had some formal education of which 55% had attained primary school education; 30% had secondary school education; and the rest (4%) had attained post-secondary education and some form of adult education. Some 11% reported having no formal education.

Southern Province is well-known for large household sizes, a fact our results seem to confirm for the two study districts. While nationally an average household has 5.1 members, our sample shows an average household size of 6.4. That is, both districts are characterized by large families with Kalomo having substantially larger household sizes (7.1) than Monze (6.0).

Table 1 also presents results from the Principal Component Analysis (PCA) to determine the wealth status of the sample households. The results show that 63% of the sample households were poorly endowed, relative to the communities' measure of wealth. In other words, the well-off households constituted 27% of the sample. In terms of the district distribution, more than half (51%) of the households in Monze District were well-endowed, compared to Kalomo District (27%). In terms of gender and wealth status, more than 86% of the female-headed households were poorly endowed, compared to 58% for male-headed households. These findings are consistent with other studies in Zambia which show that female-headed households are worse off than their male-headed counterparts in terms of wealth (World Bank, 2007).

Household access to capital assets: The livelihoods approach is founded on a belief that people require a range of assets to achieve positive livelihood outcomes. The assets which people or farmers need are the human, natural, physical, financial capital and social capital.

Human capital: Human capital represents the skills, knowledge, ability to labour and good health that

together enable people to pursue different livelihood strategies and achieve their livelihood objectives. At a household level human capital is a factor of the amount and quality of labour available; this varies according to household size, skill levels, leadership potential, health status, etc. The focus here is on households' access to farm labor. Table 2 shows the household labour force availability by gender of household head. Following Runge-Metzger (1988) and Langyintuo *et al.* (2005), each household member was converted to a man equivalent unit (MEU) with the assumption that individuals in different age groups cannot perform normal farm operations at similar rates of efficiency. For instance, under normal circumstances, a 5 year old cannot weed a farm with similar efficiency as a 30 year old but hardly would there be any difference between 20 and 40 year olds. Therefore, the development of MEU takes into consideration the differences in labor use efficiencies among different age categories.

Aggregated for each household and district, the estimated MEUs ranged from 1 to 14 with a mean of 4.18 (Table 2). An examination of the household labor-force availability that may be required for farm work suggests that in Kalomo, about 39% of the female headed households have less than the sample mean of MEU compared with 7% for the male headed households (Table 2). In Monze district, the differences were not very significant.

Natural capital: The land tenure system in the study area and the rest of Zambia can be described as predominantly traditional or customary. Customary land is usually vested in traditional leaders (local Chiefs and Headmen) who are the custodians. Individuals or households have a right to land. However, access to land is granted by the community's chief or headman who allocates pieces of land on which the households can establish their homesteads, cultivate crops and raise their livestock. The individuals or households allocated the land do not own it but have usufructuary rights over it for their production and sustenance. Within the households, the heads (usually men) apportion the land to family members for farming and building purposes. The usufruct rights are usually life long and transfer of these rights upon the death of the holder is common.

Table 2: Household labour force availability by gender of household head (%)

Labour force	District					
	Monze		Kalomo		Whole sample	
	Female (n = 45)	Male (n = 159)	Female (n = 18)	Male (n = 18)	Female (n = 63)	Male (n = 287)
0 -2	2	3	6	2	3	2
2.1-4	16	9	33	5	21	7
4.1-6	44	32	22	25	38	29
6.1-8	13	29	11	24	13	27
8.1-10	16	15	22	20	17	17
>10	9	13	6	23	8	17
Mean MEU	4.50	3.91	3.25	4.54	4.14	4.18

The inheritance of land use rights ensures that future generations of the family are guaranteed land use rights. The majority of the households (82%) have customary ownership of the land they cultivate which they inherited from their parents or relatives and the other 17.9% have access to communal land obtained from local chiefs and headmen. Very few households (0.1%) are using rented land or have formal title deeds for their land.

Distribution of farm land among households: The distribution of total farm land among the sample households is disproportionate. While some households have up to 74 ha, others have less than a hectare (Table 3). The average cropped area is about 3 ha with farmers in Kalomo cultivating slightly larger areas than those in Monze district. In general, an average of two individuals is supported on a hectare of land in Monze and Kalomo districts (Table 3). Table 4 suggests that more female than male headed households own smaller pieces of land. At the district level, in Kalomo district the difference between the two genders in the size of land owned is marked with none of the sample female headed households owning land which is 3 to 5 ha in size.

In terms of land distribution among different wealth categories, Fig. 1 suggests that households in the well-endowed wealth category own farm sizes in excess of 60% over the sample average (10.9 ha compared with 6.7 ha) while those in the poorly endowed category own farm sizes about 37% less than the sample average (4.2 ha compared with 6.7 ha). Similarly, corresponding figures for the cultivated land areas show that the well-endowed households own cultivated areas in excess of 45% over the sample average (4.4 ha compared with 3.0 ha) while the poorly endowed households have cultivated areas about 27%

less than the sample average (2.2 ha compared with 3.0).

Physical capital: Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. Infrastructure consists of changes to the physical environment that help people to meet their basic needs and to be more productive while the producer goods are the tools and equipment that people use to function more productively. The following components of infrastructure are usually essential for sustainable livelihoods: affordable transport; secure shelter and buildings; adequate water supply and sanitation; clean, affordable energy; and access to information (communications). This section discusses farmers' access to physical capital such as household dwellings and liquid and durable physical assets. Good quality housing is a status symbol, which may have implications for the household's access to social services. As can be seen in Table 5, different types of houses or dwellings exist but the predominant type is

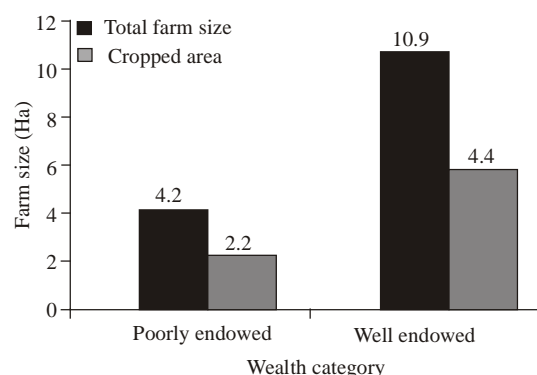


Fig. 1: Ownership of farm size by wealth group

Table 3: Land use by households

	District		Whole Sample
	Monze	Kalomo	
Total farm land (ha)	4.01 (0.250-22)	10.43 (0.40-74)	6.68 (0.25-74.0)
Total cropped land (ha)	2.57 (0.10-13.0)	3.65 (0.25-26)	3.02 (0.10-26.0)
Mean years of fallow	2.04 (0.00-12.0)	2.91 (0.00-8)	2.53 (0.00-12.0)
Man-land ratio	1.87 (0.04-49.8)	2.43 (0.04-19)	2.10 (0.04-49.8)
Land use intensity (R-value)	0.57 (0.05-1.00)	0.52 (0.06-1)	0.54 (0.05-1.00)

Figures in parenthesis are the ranges

Table 4: Access to farm land by gender (%)

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Farm size range (ha)	District				Whole sample	
	Monze		Kalomo			
	Female	Male	Female	Male	Female	Male
0-1	22.2	10.1	11.1	3.90	19.1	7.30
1.1-2	24.4	20.1	38.9	2.30	28.6	12.2
2.1-3	20.0	16.4	22.2	8.60	20.6	12.9
3.1-4	13.3	17.6	0.00	9.40	9.50	13.9
4.1-5	11.1	11.9	0.00	9.40	7.90	10.8
>5	8.90	23.9	27.7	66.4	14.3	42.9

Table 5: Types and proportional distribution of physical assets by households (%)

Asset type	District		Whole sample
	Monze	Kalomo	
Dwelling type			
Mud hut with grass thatch roof	14.8	4.80	10.6
Mud hut with grass asbestos/iron roof	3.50	0.70	2.30
Brick house with grass thatch roof	49.7	72.6	59.3
Brick house with asbestos/iron roof	30.5	19.9	26.1
Block house with asbestos/iron roof	1.50	0.00	0.90
Pole and dagga with grass thatch roof	0.00	2.10	0.90
Durable and liquid assets			
Motor vehicle	0.50	3.40	1.70
Motorcycle	2.90	3.40	3.10
Bicycle	62.3	73.3	66.9
Tractor	0.00	0.70	0.30
Tractor plough	0.50	0.70	0.60
Tractor hallow	0.00	2.10	0.90
Draft Animals	30.0	63.0	43.7
Animal plough	30.0	69.2	46.3
Animal hallow	10.8	27.4	17.7
Animal scotch cart	5.40	1.40	3.70
Wheel barrow	10.8	7.50	9.40
Television set	12.8	6.90	10.3
Radio	65.2	67.1	66.0
Private well	8.80	2.70	6.30
Private borehole	0.50	0.70	0.60
Water pump	0.50	4.80	2.30
Cultivator	14.2	28.1	20.0
Diesel pump	0.00	0.70	0.30
Water tank	0.00	2.10	0.90
Mobile phone	12.3	11.6	12.0
Land phone	0.50	0.00	0.30

Table 6: Mean number of livestock owned by wealth group

Livestock	Wealth group		
	Poorly-endowed	Well-endowed	Total
	(1)	(2)	(3)
Cows-local	4.07	4.66	4.48
Bulls-local	1.22	1.59	1.46
Young bulls-local	2.44	1.86	2.03
Heifer-local	0.00	0.00	0.00
Calves-local	2.71	2.53	2.59
Cows-improved	2.94	2.68	2.75
Bulls-improved	1.80	3.60	3.00
Young bulls - improved	0.00	1.00	1.00
Heifer-improved	0.00	1.33	1.33
Calves-improved	1.60	2.50	2.15
Goat-local	3.00	1.33	2.00
Pigs	6.84	8.01	7.32
Sheep	0.00	7.25	7.25
Transport animals	5.15	8.38	6.380
Chicken- local	10.37	15.47	12.31
Chicken-improved	13.43	30.80	20.67
Other	8.86	22.90	17.12

the brick house with grass thatch. This is more common in Kalomo (73%) district compared to Monze (50%). The most common and important durable and liquid assets include bicycles, radios, draft animals (cattle) and farming implements.

Sample household livestock ownership in the two districts from the survey is reported in Table 6. The farm households in the sample own cattle and most keep some combination of small livestock like goats,

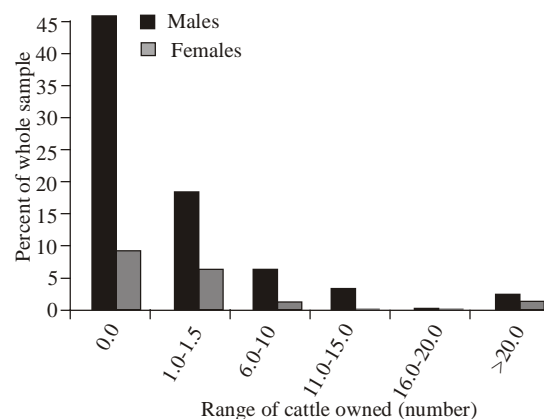


Fig. 2: Number of cattle owned distributed by gender of household head

pigs, chickens, ducks and other livestock. As can be seen in Table 6, cattle are the most important livestock species owned by the households and are used for various purposes. For most categories of livestock, the well-endowed households own more livestock than those that are poorly endowed (Table 6). The estimated Tropical Livestock Units (TLU) per household averaged about 2.8 for the poorly endowed households and 8.7 for the well-endowed households. More male than female headed households keep larger numbers of cattle (Fig. 2).

Financial capital: Financial capital denotes the financial resources that people use to achieve their livelihood objectives. The definition used here, however, limits itself to try to capture an important livelihood building block, namely the availability of cash or equivalent that enables people to adopt different livelihood strategies. The section thus considers sources of financial capital obtained through credit-providing institutions. Most farmers in developing countries like Zambia generally have limited access to credit from financial institutions and thus lack financial resources to meet immediate cash needs and other important requirements such as farm inputs like fertilizer and seed. Since credit is usually in short supply, it is often very costly when available. As shown in Table 7, there appears to be a limited number of credit sources for farmers in both Monze and Kalomo. Strikingly, none of the farmers in Kalomo district admitted having received any cash credit while those in Monze at least got some cash credit from various sources.

Some NGOs attempt to fill the vacuum of lack of access by providing either cash or input credits to farmers (Table 7). Some farmers sometimes receive input credit from private companies operating out grower schemes for the cultivation of cash crops such as cotton and tobacco. The government also attempts to fill the vacuum of lack of access by providing subsidized input credit to selected farmers under the Farmer Input Support Programme (FISP) and the Food Security Pack Programme. This intervention is not without its critics. There has been considerable debate about the sustainability of input subsidies and its impact on the private sector. The challenge thus remains to find solutions to the problem of increasing access to credit by poor small-scale farmers who lack collateral assets. From these results, it shows that there has been a gap in the provision of credit services in the rural areas. This limited and often complete lack of access to rural financial services hampers smallholder's efforts to improve or expand their farm activities so as to earn income.

Institutional and social capital: Rural and farm households sometimes need social support to effectively achieve a better quality of life. Social

support networks or social capital examined here include is concerned with household participation in governmental and Non-Governmental Organization (NGO) support programmes. Farmers in rural areas in Zambia including those in Monze and Kalomo districts face difficulties in accessing various forms of institutional support mainly because they live in remote and distant places with limited or poor infrastructure such as roads and telecommunications. Table 8 shows the levels of access to institutional support to the survey households.

The results indicate that support in terms of food relief or aid was accessed by a majority of the sample households. This mainly came from NGOs like World Vision International, Care International and Catholic Relief Services. The predominance of food aid support reflects the problem of poor food crop production among the smallholder farmers in Southern Province and elsewhere which has been caused by droughts or floods. Some of the NGOs have been providing direct food relief to poor and vulnerable households whilst others have been involved in food-for-work programmes. Apart from food aid support, other forms of institutional support to farmers involve provision of inputs like seed and fertilizers. Since credit is acknowledged to be in short supply and it is often very costly when available, the Government has attempted to fill the vacuum of lack of access by providing input credit to farmers. Under the Farmer Input Support Programme (FISP) and the Food Security Pack Programme, the Government has been providing fertilizer and improved seeds to many vulnerable but viable smallholders. The government provides a small loan repayable in-kind consisting of seed for a cereal (i.e., maize, millet, rice), plantings for tuber (sweet

Table 7: Access to credit by households (%)

Access to	District		Whole sample
	Monze	Kalomo	
Credit (cash and input)	15.8	4.8	11.2
Cash credit	7.8	0	4.6
Source of cash credit			
Financial institution	2.0	0	1.1
Money lender	0.5	0	0.3
NGO	2.0	0	1.1
Other	3.4	0	2.0

Table 8: Sources of institutional support to households in Zambia (%)

Source	Type of support			
	Food	Seed	Fertilizer	Months of Support
World vision international	31.1	0.6	0.0	3.6 (1-12)
Action Aid	0.30	0.0	0.0	4 (4-4)
Catholic relief services	3.70	0.0	0.3	1.6 (1-4)
Care international	11.7	1.1	0.3	5.4 (1-6)
Government starter pack	0.30	0.9	0.3	1.5 (1-6)
Programme against malnutrition	0.30	0.0	0.0	2.5 (2-3)
World food programme	0.30	0.6	0.0	2 (2-2)

Figures in parenthesis are the ranges

potato, cassava) and seed for a legume (groundnuts, beans) and to farmers identified as vulnerable. In the past few years, millions of farmers have received input packages on credit and this has had a positive effect on the availability of and access to food for needy households.

Access to information about new technologies such as seed or fertilizer is important in determining the level of utilization of improved maize varieties among the small-scale farmers. The provision of research and extension information is an important responsibility of the government to the farming population. In Zambia, public agricultural extension services are provided through extension workers of the Ministry of Agriculture and Livestock (MAL). These activities are complemented by NGOs and private seed companies as well as tobacco and cotton out grower scheme operators. Table 9 shows the level of access to field demonstrations by the sample households. The results show that there is very limited coverage of extension services in the country in general and access to field days and demonstrations in particular.

The limited access to public extension in most rural provinces is mainly due to inadequate resource allocation to the agricultural sector. The cuts in government expenditure have had a direct consequence on the quality and coverage of government agricultural services like extension. Public expenditure cutbacks have meant that there are fewer extension activities like demonstrations as well extension workers being recruited to service the rural communities. As

mentioned earlier, some NGOs and private sector companies have tried to fill the gap in extension provision but these also have limited coverage. In order to improve farmers' access to and bargaining power for social services (such as credit), farmers are assisted by personnel from MAL and NGOs to form farmer associations or cooperatives. Fewer farmers in the Monze district than those in Kalomo district belong to any such associations.

Household livelihood strategies: The term livelihood strategies is used to denote the range and combination of activities and choices that people make in order to achieve their livelihood goals. Livelihood Strategies include: how people combine their income generating activities; the way in which they use their assets; which assets they chose to invest in; and how they manage to preserve existing assets and income. Strategies may reflect underlying priorities, such as to diversify risk. Livelihood Strategies are diverse at every level. Rural and urban households engage in various livelihood strategies to earn a living. This section examines some of these livelihood activities which the surveyed rural households are involved in. The respondents were asked to indicate what they considered to be major activities that are sources of income for their households. The results as seen in Fig. 3 show that the households depend mostly on agriculture for their livelihoods. On-farm income comes from the sale of both food and cash crops (grains, fruits and vegetables),

Table 9: Access to field demonstrations (%)

Hosting organization	Number of field days attended	Number of field demonstrations attended	Number of times discussing maize production
Agricultural extension	1.22 (0-5)	0.6 (0-5)	1.4 (0-6)
Agricultural research	1 (1-1)	0.3 (0-1)	0.4 (0-2)
NGO	1.0 (0-3)	0.3 (0-2)	0.6 (0-4)
Seed company	0.8 (0-4)	0.4 (0-4)	1.0 (0-8)
Cotton company	1.2 (0-4)	0.7 (0-4)	0.5(0-8)
Tobacco company	0.1 (0-1)	0	0.2 (0-2)
Agric. development agency	0.5 (0-2)	0.1 (0-1)	0.5 (0-2)

Figures in parenthesis are the ranges

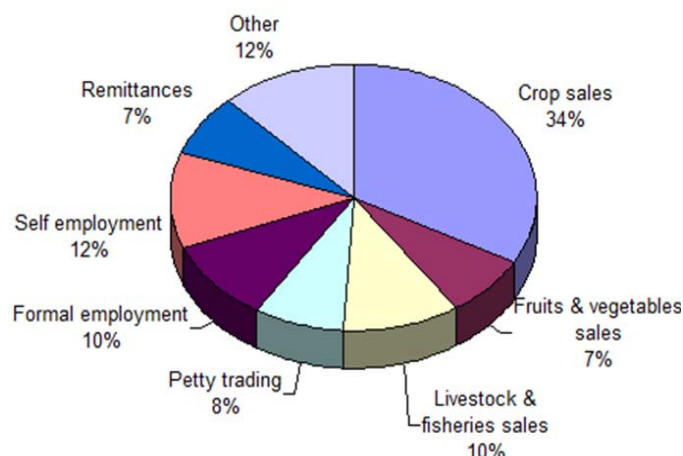


Fig. 3: Sources of household income

as well as livestock and fisheries products. Off-farm income includes cash income from both agricultural work and non-agricultural activities like self-employment, formal employment, petty trading, remittances and others.

Crop production activities: In Monze and Kalomo districts, crop production is generally done at subsistence level, complemented by limited semi-commercial and commercial farming. The major crops grown are maize, sorghum, groundnuts, millets tobacco and cotton while minor ones include cowpeas and vegetables (such as tomatoes, onion, cabbages and other leafy vegetables). Maize is the major staple crop in most parts of Zambia. Results of this survey shows that in total, maize constitutes the single largest cultivated crop, occupying 60% of the cultivated area in Monze and Kalomo districts, respectively (Fig. 4). Both local and hybrid maize varieties, are cultivated by the surveyed households. Production of some crops has increased in the area since the mid-1990s. These are cotton, sorghum and cassava. Increase in cassava production in the districts has been due to the promotional activities of NGOs such as Programme against Malnutrition (PAM) and World Vision International in drought prone areas of the country. In the case of cotton, multinational companies such as Dunavant are responsible by providing input credit to farmers. Tobacco production has also increased particularly in Kalomo mainly due to the white commercial farmers from Zimbabwe who have settled in the area. The planting of different varieties of crops is a risk management strategy adopted by farmers.

Livestock production and marketing: Households keep livestock especially small ruminants and poultry in addition to their crop production activities as a livelihood and risk management strategy. Livestock provide meat for direct household consumption and manure for crop production. Additionally, they play various roles in accomplishing social obligations such

as marriage ceremonies, etc. Most of the farmers sell their livestock to local people and other itinerant urban traders. However, the marketing of livestock has been negatively affected by outbreaks of livestock diseases in recent years. The increased disease outbreaks are mainly attributed to the low and limited farmer access to veterinary services in most rural provinces due to privatization policies and public sector expenditure cutbacks. Livestock diseases like foot and mouth disease in places like Southern and Western provinces which lead to heavy losses of oxen have had a major impact on both cash and food crop production and thus negatively affecting the livelihoods of farmers. In order to mitigate this problem, farmers have been advised to vaccinate their animals (cattle) and to frequently dip their animals to avoid outbreaks of certain livestock diseases.

Income from agriculture and off-farm activities:

Households earn cash income obtained from sales of agricultural commodities. As can be seen in Table 10, sales of crops, livestock and fisheries, as well as fruits and vegetables contribute about 50% to income in the two districts, reflecting the important role of agriculture in the livelihood strategies of the households. Some households also receive remittances. The estimated income from remittances in Monze and Kalomo districts corresponds to about 8 and 7% of total household income, respectively. In addition to the above-mentioned activities, people in the rural communities are also involved in a diversity of other livelihoods. The other livelihood activities include collection of natural products (mushrooms and honey); selling of firewood; handicrafts; transportation; and so on.

As shown in Table 10, farming households are engaged in various off-farm activities such as petty trading, employment in the formal and informal sectors as well as selling labour in order to supplement their incomes. Figure 5 shows the proportions of households

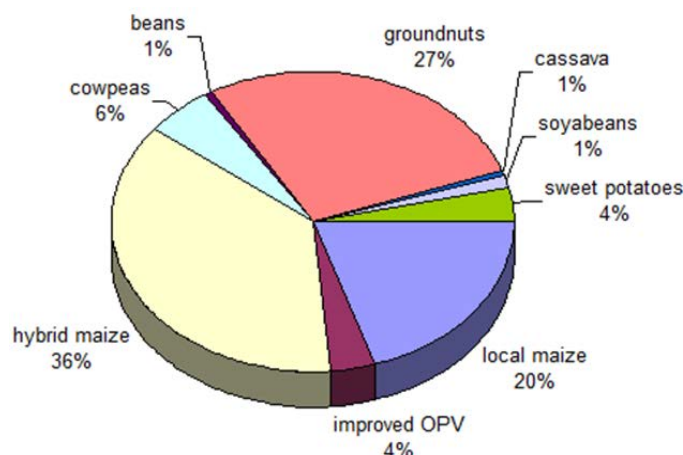


Fig. 4: Distribution of land area among crops in Monze and Kalomo

Table 10: Income from agriculture and off-farm activities

Item	Average Amount (ZMK)		Whole sample
	Monze	Kalomo	
Total (ZMK Million)	0.83	1.63	1.15
Sources of income (%)			
Crop sales	34.3	30.4	33.2
Fruits and vegetables	7.10	7.80	7.50
Livestock and fisheries	10.7	9.00	10.2
Petty trading	7.50	8.70	8.00
Formal employment	13.3	8.00	10.0
Self-employment	10.5	13.1	11.6
Remittances	8.10	6.50	7.40
Other	8.40	16.5	12.1

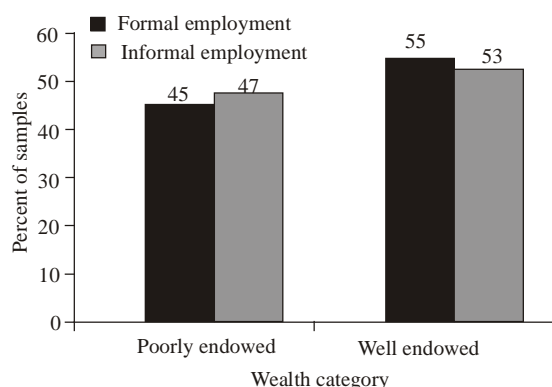


Fig. 5: Proportion of households involved in off-farm activities in different wealth groups

engaged in these other off-farm activities. An estimated 22% of the households are employed in both the formal (such as civil service work as teachers) and informal sectors (such as bicycle repair work, artisanal work, local beer brewing, etc.). Among the different wealth categories, a larger proportion of well-endowed households are in self and formal employment as compared to the poorly endowed households (Fig. 5).

Livelihood outcomes: Livelihood outcomes are what people seek to achieve through their livelihood strategies. Therefore, livelihood outcomes are the achievements-the results-of livelihood strategies. Outcome categories can be examined in relation to categories such as: more income; increased well-being; reduced vulnerability; improved food security; more sustainable use of the natural resource base; social relations and status; dignity and (self) respect; and so on.

Among the sample households in Monze and Kalomo districts, the major household livelihood outcomes include increased agricultural production, increased food security, increased access to markets, education, health, land ownership, social status and job opportunities. Asked to rank these outcomes with '1'

representing the outcome being 'most important', the outcomes representing physical availability of food such as agricultural production and food security were observed to be highly considered by the households. In addition to being ranked by a large number of the households these outcomes that are directly related to availability of food were ranked highly on the scale (Table 11).

On the other extreme a few households ranked, increased social status and getting out of agriculture very low. Only 19 and 6 households ranked these two livelihood outcomes respectively, perhaps indicating that the majority of the households pay little attention to these. The other outcomes fell in between the scale spectrum as shown in Table 11.

Increased access to food or food security by far is the most important livelihood outcome and the availability of food especially in a direct way cannot be overemphasized. About 47% of the households indicated that they fell short of food for some members of the households at some time in the last year. Around 80% of the households have had at least experienced shortages of food in months spreading from September to January.

Shocks: Shocks usually refer to sudden events that have a significant impact-usually negative-on livelihoods. They are irregular and vary in intensity and include events such as natural disasters, civil conflict, losing one's job, a collapse in crop prices for farmers etc. These can be classified into categories such as: Human shocks (e.g., illness, accidents); Natural shocks (e.g., floods, earthquakes); Economic shocks (e.g., job losses, sudden price changes); Conflict (e.g., war, violent disputes); and Crop/livestock health shocks. Shocks and trends may be linked. For example some changes that appear as trends at a national or even regional level (such as increased infection rate for diseases such as AIDS and malaria) can impact upon a household or individual as severe shocks (i.e. death in the family).

Several shocks affected the production activities of the sample households. The major common shocks among the households (in order of being cited by more households) included drought, loss of livestock, livestock diseases, plant pests and diseases, erratic rainfall, increases in input prices and floods (Table 12). Other shocks expressed by a few household are also shown in the Table 12.

The rankings of the shocks in term of severity shows that drought is the single most important shock experienced by households. Most of the major shocks also ranked highly in comparison to the shocks mentioned by the few households (Table 12).

Drought and erratic rainfall were cited as the most serious shocks or risks that threaten the livelihood of

Table 11: Ranking of important household livelihood outcomes

Livelihood outcome	Monze		Kalomo		Whole sample	
	N	Rank	N	Rank	N	Rank
Increase agricultural production	182	1.24 (0.61)	139	1.50 (1.02)	321	1.35 (0.82)
Reduce agricultural production risk	72	3.38 (1.49)	46	3.54 (1.43)	118	3.44 (1.46)
Reduce marketing risk	41	2.98 (1.19)	33	3.36 (1.63)	74	3.15 (1.41)
Increase food security	190	1.99 (0.84)	138	1.99 (0.95)	328	1.99 (0.89)
Improve health status of members	107	3.72 (1.22)	76	3.58 (1.39)	183	3.66 (1.29)
Increase volume of household assets	65	4.42 (1.25)	49	4.16 (1.32)	114	4.31 (1.52)
Increase education level of household members	123	3.68 (1.04)	95	3.6 (1.32)	218	3.65 (1.17)
Increase land ownership	19	4.42 (1.86)	30	4.37 (1.30)	49	4.39 (1.53)
Improve social status	8	4.87 (2.03)	11	5.64 (1.68)	19	5.32 (1.83)
Increase income/reduce income risk	100	3.64 (1.57)	70	3.61 (1.69)	170	3.63 (1.62)
Increase job opportunities/earn wages	14	3.42 (1.95)	14	4.78 (3.02)	28	4.11 (2.59)
Get out of agriculture	3	2.67 (1.53)	3	5.00 (6.08)	6	3.83 (4.17)

Table 12: Mean rankings on perceived shocks/risks that affect households

Shocks/risks	N	Mean (Std. Dev.)
Drought	326	1.29 (0.71)
Livestock diseases	232	2.46 (1.13)
Loss of livestock	242	2.81 (1.25)
Death of breadwinner	54	2.52 (1.54)
Plant pests and diseases	157	3.18 (1.35)
Erratic rainfall	117	3.43 (1.52)
Destruction of crops	58	3.21 (1.17)
Dangerous weeds	52	3.69 (0.98)
Increases in input prices	101	3.06 (1.11)
Large drop in maize prices	90	3.72 (1.17)
Large drop in cassava prices	12	3.33 (1.56)
Loss of farm land	13	3.31 (1.44)
Illness of breadwinner/wife	42	3.74 (1.31)
Theft of property	33	3.21 (1.62)
Burning of property	21	3.43 (1.63)
Household's breakdown	11	3.36 (1.80)
Conflict	5	3.00 (1.41)
Other	8	3.75 (0.89)

households. In the past twenty years, the problems of drought or erratic rainfall has become even more serious than before, occurring almost every year. This has impacted negatively on maize production in the survey districts. For instance, the drought of 2004/05 resulted in total crop failure mainly because nothing was done to mitigate the dry spell. In recent years, conservation farming has widely been encouraged among the farmers in order to mitigate this problem. The droughts and erratic rainfall patterns to a large extent reflect climate variability or change that has been experienced in the country. Zambia experiences recurrent droughts, which tend to be severest in agro-ecological region I. Zambia has experienced 4 droughts in the last four decades. In the period 1976-2007, droughts were experienced in the 1986/87, 1991/92, 1994/5 and 2004/05 seasons (Environmental Council of Zambia, 2000; Mungoma, 2007; Thurlow *et al.*, 2009).

Livestock diseases and loss of draught power are important shocks and risks that also negatively affect households. These shocks and risks have been on an increase in the past twenty years. For instance, households in the surveyed communities lost their cattle due to Foot and Mouth Disease which hit the whole of Southern Province during the 2004/05 farming season.

The mortality of cattle has had negative impacts on maize production through its impacts on draught animals. In order to mitigate this problem, farmers have been advised to vaccinate their animals (cattle) and to frequently dip their animals to avoid outbreaks of certain livestock diseases. Crop pests and diseases are equally important risks faced by the farmers in the survey districts which have affected maize production and maize storage.

Coping mechanisms: There are several events or problems that have been harmful to individual households and entire communities. These events have caused the communities to fall into destitution whose severity varies depending on the magnitude of the problem. For instance, whole communities have been affected by severe drought in which they have lost their crops leading to hunger which forces them to engage in various coping strategies in order to meet their food requirements for their survival. Figure 6 illustrates the various food shortage coping mechanisms that have been adopted by the survey households in Monze and Kalomo districts.

To cope with food shortages, most households sell small animals (23%), work for food (17%), reduce other expenditures (14%), reduce frequency of food intake (14%) or work more off-farm (12%). Other households sell cattle or other assets or farm equipment, receive food aid or withdraw children from school (Fig. 6).

The rural households in Monze and Kalomo usually have savings or "insurance" in order to cushion themselves from shocks. These savings or "insurance" are in the form of livestock (cattle, goats, pigs, chickens); produce stored in granaries (maize, millet, groundnuts and beans); and crops stored in the field (cassava). They normally sell these assets or savings when they are affected by shocks like droughts, illness and so on. The money raised from the sale of these assets is used to buy other food or meet medical costs. Carter *et al.* (2004) called such practices 'destructive coping strategies' which actually aggravate vulnerability and perpetuate poverty. Households usually sell whatever assets they own, starting with the least valuable and then the more valuable as they try to

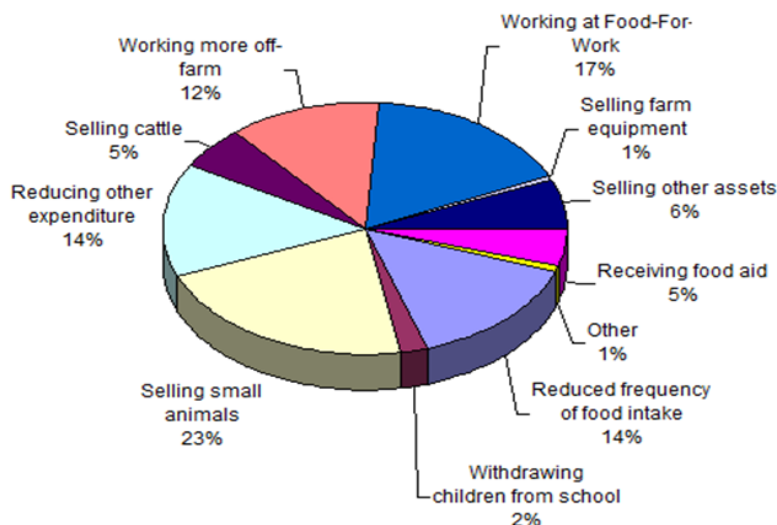


Fig. 6: Most important food shortage coping mechanisms

cope with stresses like food shortages. According to the respondents, asset sales usually start with chicken, pigs or goats and then extend to young bulls or heifers and ultimately to the sale of cows or oxen. Seed stocks are sometimes consumed as food, leading to seed shortage during the sowing period. In desperate situations households are forced to reduce the intake of food. The sale of oxen and consumption of seed reserves have severe consequences to the welfare of households. Such measures reduce the capacity of households to produce, thereby increasing their vulnerability to subsequent food shortages. In the same vein, the sale of cows leads to the loss of milk and milk products that can be used for household consumption or sold to buy food. It also means the loss of the asset through which households may obtain future oxen and cows.

CONCLUSION

The results of this study have shown that the main livelihood assets owned by households in Monze and Kalomo are land and livestock. There is wealth and gender differentiation in terms of ownership and access to these assets. The overall wealth status of the households indicated that 63% were poor and 27% were well-endowed or better-off. The well-endowed households owned more livestock and had greater access and cultivated larger pieces of land than their poorer counterparts. Similarly, male-headed households owned more livestock and had more access to land as compared to their female-headed counterparts. Generally, there was skewed ownership and access to livelihood capitals or assets with the poor households owning or having less access to, for instance, physical assets, credit and social capital, relative to the wealthy households.

The study has also revealed that households in Monze and Kalomo are diversifying their livelihood strategies among different asset combinations and

activities. The household livelihood strategies or income is derived from a number of activities which they are engaged in. These activities include crop production; livestock selling; petty trading; formal and informal employment; and collection of natural food products like mushrooms and honey. Several shocks and stresses affect the livelihood activities of the households. The major common shocks affecting the households include drought, loss of livestock, plant pests and diseases, erratic rainfall, floods and increases in input prices. Rainfall variability as manifested in droughts, floods and erratic rainfall patterns was identified as a major shock and the most critical source of risk and vulnerability which has been causing frequent production losses and seasonal food shortages among the households. The households are engaging in various activities to cope with the various stresses and shocks. Livestock selling was one of the most effective strategies to ameliorate hunger and other sudden shocks like the death of a bread winner or close family members. However the livestock herds have been dwindling in the past two decades due to disease outbreaks and poor pastures. Households are also depending more on food aid than in any other activity for survival. This has been necessitated by the deterioration of the natural resource base due to persistent droughts which in turn have eroded grain stocks. Petty trading business such as beer brewing and making handicrafts and getting involved in some off-farm piece work and in food for work programmes have also significantly allowed minimum consumption levels as well as access to other forms of capital.

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REFERENCES

- Adger, W.N., S. Huq, K. Brown, D. Conway and M. Hulme, 2003. Adaptation to climate change in the developing world. *Prog. Dev. Stud.*, 3(3): 179-195.
- Adger, W.N. and K. Vincent, 2005. Uncertainty in adaptive capacity. *C. R. Geosci.*, 337(2005): 399-410.
- Bunyolo, A., B. Chirwa and M. Muchinda, 1995. Agro-ecological and Climatic Conditions. In: Muliokela, S.W. (Ed.), *Zambia Seed Technology Handbook*. Ministry of Agriculture, Food and Fisheries, Berlings Arlöv, Sweden.
- Carney, D., 1998. Sustainable Rural Livelihoods: What Contributions Can We Make? Department for International Development, London.
- Carter, M.R., P.D. Little, T. Mogues and W. Negatu 2004. Shocks, sensitivity and resilience: Tracking the economic impacts of environmental disaster on assets in Ethiopia and Honduras. The World Bank and US Agency for International Development (USAID).
- CSO (Central Statistical Office), 2006. 2006 living conditions monitoring survey. The Government of the Republic of Zambia, Lusaka, Zambia.
- Central Statistical Office (CSO), 2012. Living conditions monitoring survey report 2006 and 2010. Central Statistical Office, Lusaka, Zambia.
- Chambers, R., 2006. Vulnerability, coping and policy. *IDS Bull.*, 37(4): 33-40.
- Davies, S. and N. Hossain, 1997. Livelihood Adaptation, Public Action and Civil Society: A Review of the Literature. IDS Working Paper No. 57, Institute of Development Studies, Brighton, pp: 5.
- Dercon, S., 2004. Growth and shocks: Evidence from Ethiopia. *J. Dev. Econ.*, 74(2004): 309-329.
- Dercon, S., 2005a. Vulnerability: A micro perspective. Proceeding of the ABCDE Europe Conference. Amsterdam, May 2005.
- Dercon, S., 2005b. Risk, poverty and vulnerability in Africa. *J. Afr. Econ.*, 14(4): 483-488.
- Ellis, F., 2000. *Rural Livelihoods and Diversity in Developing Countries*. Oxford University Press, Oxford, pp: 10-12.
- Environmental Council of Zambia, 2000. *State of the Environment 2000*. ECZ, Lusaka, Zambia.
- Filmer, D. and L.H. Pritchett, 2001. Estimating wealth effect without expenditure data or tears: An application to educational enrollments in states of India. *Demography*, 38(1): 115-132.
- Government of the Republic of Zambia, 2002. *Zambia National Action Program for Combating Desertification and Mitigating Serious Effects of Drought in the Context of the United Nations Convention to Combat Desertification*. Ministry of Tourism, Environment and Natural Resources, Lusaka, Zambia.
- Government of the Republic of Zambia, 2010. *National Climate Change Response Strategy (NCCRS) Paper*. Ministry of Tourism, Environment and Natural Resources, Lusaka, Zambia.
- Government of the Republic of Zambia, 2011a. *Sixth National Development Plan 2011-2015: Sustained Economic Growth and Poverty Reduction*. Ministry of Finance and National Planning, P.O. Box 50062, Lusaka, Zambia.
- Government of the Republic of Zambia, 2011b. *The Economics of Climate Change in Zambia*. Ministry of Tourism, Environment and Natural Resources. Lusaka, Zambia.
- Haan, L. and A. Zoomers, 2005. Exploring the livelihood research. *Dev. Change*, 36(1): 27-47.
- Langyintuo, A.S., 2008. Computing Household Wealth Indices Using Principal Components Analysis Method. CIMMYT, Harare, Zimbabwe.
- Langyintuo, A.S. and C. Mungoma, 2008. The effect of household wealth on the adoption of improved maize varieties in Zambia. *Food Policy*, 33(2008): 550-559.
- Langyintuo, A.S., P. Hamazakaza, E. Nawale and I. Jere, 2005. Maize production in Zambia: Setting indicators for impact assessment and targeting. Strengthening Seed Marketing Incentives in Southern Africa to Increase the Impact of Maize Breeding Research Project, CIMMYT Report, Harare, Zimbabwe.
- Mortimore, M.J. and W.M. Adams, 2001. Farmer adaptation, change and 'crisis' in the Sahel. *Global Environ. Chang.*, 11(1): 49-57.
- Mungoma, C., 2007. ZARI maize research programme: An update with focus on drought tolerance. Proceeding of the Maize Sector Stakeholders' Workshop. Lusaka, Zambia, May 2.
- Reardon, T., E. Crawford and V. Kelly, 1994. Links between nonfarm income and farm investment in African households: Adding the capital market perspective. *Am. J. Agr. Econ.*, 76(5): 1172-1176.
- Runge-Metzger, A., 1988. Variability in agronomic practices and allocative efficiency among farm households in northern Ghana: A case study in on-farm research. Nyankpala Agricultural Research Report No. 2. Nyankpala, Tamale, Ghana.
- Scoones, I., 1998. Sustainable rural livelihoods: A framework for analysis. IDS Working Paper 72.

- Shanmugaratnam, N., 2008. Between War and Peace in Sudan and Sri Lanka. James Currey and African Academic Press, Oxford.
- Thurlow, J., T. Zhu and X. Diao, 2009. The Impact of Climate Variability and Change on Economic Growth and Poverty in Zambia. IFPRI Discussion Paper 00890. International Food Policy Research Institute (IFPRI), Washington, DC.
- Vogel, C., 2005. Seven fat years and seven lean years? Climate change and agriculture in Africa. IDS Bull., 36(2): 30-35.
- World Bank, 2007. Zambia poverty and vulnerability assessment. Report No. 32573-ZM. Retrieved from: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2007/10/04/000020439_20071004094458/Rendered/PDF/325730ZM.pdf.
- Yamin, F., A. Rahman and S. Huq, 2005. Vulnerability, adaptation and climate disasters: A conceptual overview. IDS Bull., 36(2): 1-14.