

# Baseline Survey of ADMADE Units in Luangwa Valley

## Introduction

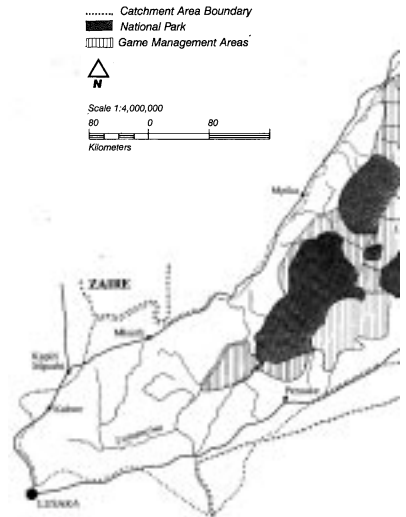
ADMADE builds community organization and leadership to more effectively manage and conserve natural resources and to sustainably use the benefits from these resources to improve living standards for households residing in ADMADE areas. The program primarily operates around the larger national parks in the country, including Luangwa, Kafue and Lower Zambezi national parks. Of these three areas, ADMADE is most developed in Luangwa and least in the Lower Zambezi area. Planning appropriate interventions in achieving these objectives in the different regions requires a baseline database on environmental, social and economic variables relevant to how ADMADE results might be influenced and how ADMADE's success can be evaluated. This paper summarizes the results of an initial baseline survey for Luangwa Valley. Data are drawn from the on-going monitoring work by the African College for Community based Natural Resource Management, which is presently undertaking similar surveys for other regions in the country.

## Ecosystem characteristics and land use activities

The Great Rift Valley extends down through East Africa and reaches southward into Zambia where it links with the Luangwa Valley, through which flows the meandering Luangwa River. The Valley is flanked by the uplands of the Central African Plateau and is predominantly covered by woodlands to the west and mixed farmland and woodlands to the east. The whole of the Luangwa catchment accounts for over 20 percent of Zambia's total land area or approximately 16,000 km<sup>2</sup> (see Figure 1).

Within the Luangwa Valley there are four national parks, totalling over 16,000 km<sup>2</sup>. They were set aside more than four decades ago to protect a resource for which the Luangwa Valley has become internationally famous: wildlife. Surrounding these parks are lands given special government status called game management areas and within these areas traditional tribal communities reside.

Above the Valley floor on the plateau is a relatively intact watershed on the western side of the catchment and numerous perennial streams flowing from this side support the flow of water in the Luangwa River during the dry season. This fact is very critical to the viability of wildlife populations in the Luangwa Valley. The eastern side of the catchment is largely



cleared or severely fragmented with patches of woodland, due to intensive agricultural activities and an expanding human population. Significant exceptions include a number of protected forest areas shown in Figure 2. Tributaries into the Luangwa from the east that once maintained water flow through most or all of the year now have been filled with sand and flow only during the wet season. This absence of flowing tributaries creates dry season compression of many wildlife species as well as human activities along the Luangwa River, especially on the east bank, which causes potential conflicts between wildlife and humans.

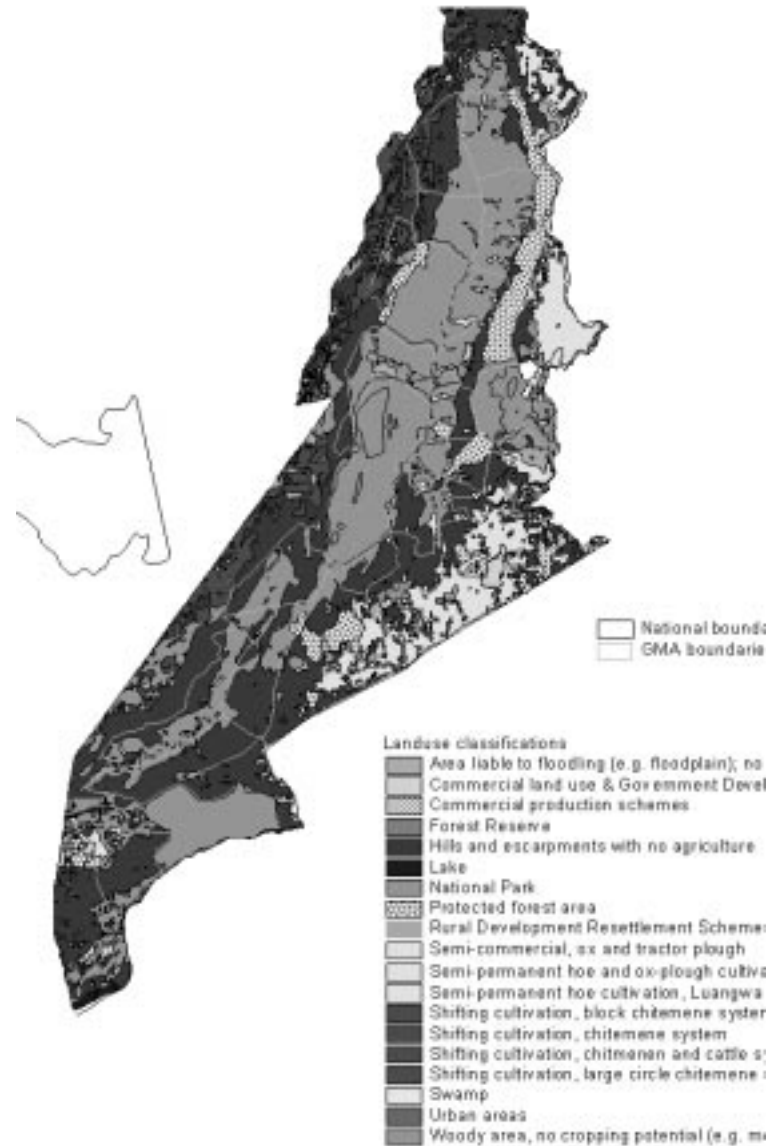
Soil characteristics in the Valley are generally unsuitable for farming except for alluvial soils, limited primarily to areas along major streams. The remaining soils are either heavy clay, which are generally saline, difficult to plow, and prone to drought, or escarpment soils, which are too shallow and rocky to farm. Total percentage of land area having soils suitable for farming on the valley floor is less than 5%, shown as thin slivers of yellow in the background of olive green in Figure 3. Additional factors limit agricultural production in the Valley and these include tsetse flies, which restrict the use of oxen, seasonal flooding, and wildlife. Outside the valley on the plateau, soils are extensively more suitable for farming, as shown by the numerous lands areas colored as either yellow or green in the same figure.



Much of the Valley's floor is covered extensively by mopane woodland, which is associated with the clay soils and is dominated by *Colophospermum mopane*. Along the transition between mopane soils and escarpment soils, there are locally abundant hardwood timber species, such as *Afzelia quanzensis*, *Enthandrophragma caudatum*, and *Berchemia discolor*. The plateau woodland has a predominance of miombo tree species. Though these species are generally not favored for timber, the woodland produces significantly more honey than mopane forests and it also produces a variety of edible and valuable wild mushrooms.

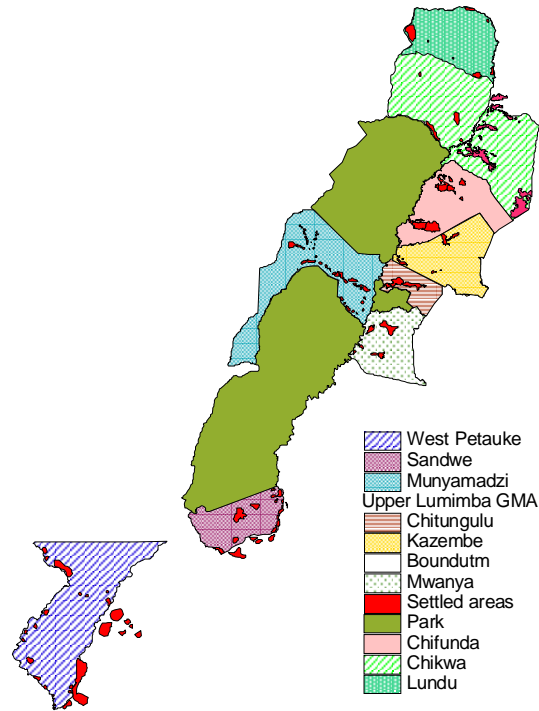
Donor-funded development projects have had considerable impact on land use activities within this watershed. Historically they have favored agricultural development over wildlife management as a land use activity, though over 70% of the catchment area is designated as either park or game management area. In many areas of the Valley new crop varieties are being introduced through donor-assisted programs and in some cases through assistance by the private sector, such as cotton and tobacco. In contrast, Luangwa's wildlife provides a very limited source of red protein for most local residents through legal harvesting. Yet, it has been estimated that the annual harvest potential from wildlife is as high as 725kg per km<sup>2</sup> in this Valley.

Given the ecological threats facing this watershed and the potential for donor assistance to develop certain land use potentials at the exclusion of others, there is great need for donor support to be effectively coordinated in dealing with such problems as soil loss, river siltation, deforestation, and soil fertility. There is also need for donor support to continue to help develop the potential for sustained-yield use of a broad range of natural resources and the markets needed to encourage effective management of these resources



**ADMADE boundaries and geographic features**

An ADMADE area is defined according to the game management area it falls within and the boundary of the chief's area overlapping with the GMA. Under the new Wildlife Act, a community, as defined by the chief's area, may wish to be independent of other communities depending on their relative allotment of communally owned land in game management areas and their capacity to generate wildlife revenues. An ADMADE area will therefore correspond to the boundary of the community that functions as a single management authority for the wildlife resources in their area. This management authority is referred to as a Community Resource Board. ADMADE areas currently established in the Luangwa Valley are shown in Figure 4.



Among the areas illustrated in the map, Lundu and West Petauke have yet to formalize their Community Resource Boards (CRBs) through the required elections of the ADMADE policy. All the other areas shown in Figure 4 have been demarcated into Village Area Groups or VAGs. These demarcations represent spatial divisions within which resident households live in clustered settlements. They also represent different resources used or associated with these designated communities.

A VAG is an important unit for community participation and benefit sharing under the ADMADE policy. For example, community-based use plans developed by ADMADE specify land use regulations that each individual VAG community accepts and wishes to enforce for the benefit of the whole community. Also, VAGs are the unit of

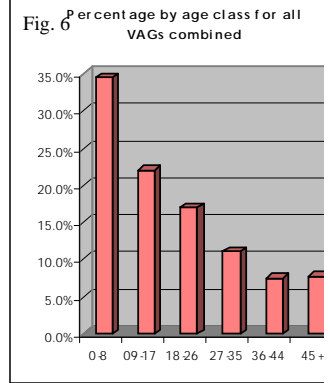
community participation for deciding how to support community needs from the revenues earned from wildlife license sales. VAG boundaries for the five GMAs supported under the USAID/NRM project are given in Figure 5.



**Demographic characteristics of human settlements in ADMADE areas**

Five of the seven ADMADE areas in the Luangwa Valley were surveyed to produce a detailed population profile of the communities living in these areas. They were Munyamadzi, Mwa (or Lower Lumimba), Chanjuzi (or Upper Lumimba), Chifunda and Chikwa. The survey was undertaken by visiting each household in a VAG to record household size and the age and sex of each member. Results show high similarity for percentage of the total population represented by different age classes (see Figure 6 and Table 2) and reveal a disproportionate percentage among the 0-8 age class. This would suggest the potential for a high population growth rate in these areas, especially since human populations are known to be growing in the region (based on current census data). It is unclear how much of this skewed age class distribution is attributed to patterns and rates of mortality. To more clearly answer this question will require additional studies.

Table 2. Unit name	0 -8	09 -17	18 -26	27 -35	36 -44	45 +
Chifunda	34.3%	20.7%	17.3%	10.3%	6.8%	10.6%
Chikwa	36.7%	19.8%	20.7%	10.5%	7.0%	5.2%
Lower Lumimba	32.6%	21.7%	14.9%	12.3%	8.5%	10.0%
Munyamadzi	33.6%	24.4%	16.3%	12.0%	8.2%	5.6%
Upper Lumimba	35.6%	23.7%	15.6%	10.5%	7.2%	7.4%
<b>Totals</b>	<b>34.6%</b>	<b>22.1%</b>	<b>16.9%</b>	<b>11.1%</b>	<b>7.6%</b>	<b>7.8%</b>



Assuming that Valley populations are growing and with the current pattern of age distribution likely to yield even higher growth rates, there is real concern over the implications this growth will have on household capacity to sustain both economic and nutritional needs. This problem is especially real when examining the distribution of good farming soils and patterns of human settlement (see Figure 7). These results show that for most all ADMADE areas, human populations have already exceeded the

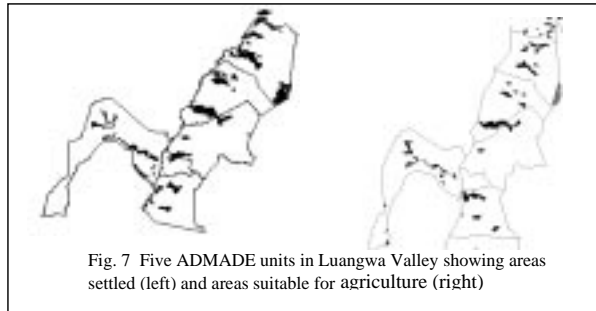


Fig. 7 Five ADMADE units in Luangwa Valley showing areas settled (left) and areas suitable for agriculture (right)

limits of the best farming area and families will be increasingly dependent on marginal areas for feeding themselves.

This is a demographic scenario that is primed for land use conflicts should these families depend on natural resource extraction to compensate for their economic or nutritional shortfalls. Such problems should also

correlate with ADMADE areas having the highest population density and highest absolute populations, since these variables will most likely influence the actual number of households that would likely increase the incidence of land use conflicts. Based on results in Table 3, Chanjuzi (or Upper Lumimba) has the highest total population and Mwanza, Chanjuzi and Chifunda areas have the high human density.

ADMADE area	Total households
Chifunda	1785
Chikwa	1679
Lower Lumimba	1680
Munyamadzi	1633
Upper Lumimba	1963

Unit name	Population	Area	Density
Chifunda	7446	2104	3.5
Chikwa (total)	6834	4354	1.6
Chikwa (east)	6100	2426	2.5
Mwanya	7508	1587	4.7
Munyamadzi	7856	3177	2.5
Chanjuzi	8975	2555	3.5

All three of these areas are currently experiencing serious problems of land use disturbance affecting the success of their ADMADE-based wildlife industries. In Mwanya, for example there were over 30 fishing camps used by local fishermen along the Luangwa River in 1998. During 1998 and 1999, use of wire snares and incidence of village encroachment on wildlife habitat as measured by complaints of safari clients hunting in this concession has increased (Figure 7). Remedial efforts by ADMADE to reverse such trends will clearly depend on how well benefits generated through the program can reach the needs of households who are contributing to these conflicts.

### **Social and Economic Characteristics of Valley Communities**

From a total of 295 male-headed households (MHH) interviewed to determine relative wealth measured by personal assets, 37% owned bicycles (8% for female-headed households or FHH). Fewer people owned radios, totaling only 28% (4% for FHH) and just 6% owned sewing machines (1% for FHH). These figures clearly indicate a low standard of material wealth for most residents from these particular VAGs, representing Mwanya, Chanjuzi, Chifunda and Chikwa areas.

	PROPERTY/WEALTH INDICATORS												
	Bicycle		Radio		Sewing machine		Brick house		Bed		Mattress		Gun
	HHs	Sample	HHs	Sample	HHs	Sample	HHs	Sample	HHs	Sample	HHs	Sample	HHs
Nthumbe	15	69	19	69	2	69	2	69	4	69	1	69	3
Kamira	3	8	4	8	0	8	0	8	3	8	3	8	0
Luelo	45	86	31	86	10	86	2	86	20	86	16	86	3
Zimwanda	19	37	11	37	2	37	1	37	4	37	2	37	1
Chasera	14	20	10	20	4	20	8	20	7	20	4	20	1
Yakobe	13	20	8	20	1	20	5	20	7	20	3	20	0
Kanga(Both)	7	20	2	20	3	20	3	20	2	20			
Chilumba (Both)	5	20	4	20	2	20	10	20	6	20			
Chimphamba (Both)	5	10	2	10	1	10	2	10	11	10			
Lumezi(Both)	2	5	1	5	1	5	0	5	0	5			
<b>Total HHs</b>	<b>109</b>		<b>83</b>		<b>19</b>		<b>18</b>		<b>45</b>		<b>29</b>		<b>8</b>
<b>Total Sample</b>		<b>295</b>		<b>295</b>		<b>295</b>		<b>295</b>		<b>295</b>		<b>240</b>	

Access to social services was also surveyed in terms of households who used or had access to particular public facilities. Respondents were also asked whether these facilities were provided by ADMADE. In terms of schools, 67% of MHHs had accessed to schools in their area and believed these schools were supported by ADMADE. For women, 65% said their children had access to schools but only 75% thought these schools had been supported by ADMADE. For clinics, 91% MHHs had access to a clinic and of these 43% said their clinics were built by ADMADE. For FMMs 78% had access to clinics and 54% attributed their health care services to ADMADE support. A relatively high level of access was also found for grinding mills. Among MHHs, 83% said there was a grinding mill nearby for them to use and 80% said the grinding mills were provided by ADMADE. Respective percentages for FHH were 63% and 100% believed their mills were provided by ADMADE. Access to wells was rather poor: 52% for MHHs and 31% for FHHs and for both categories, neither indicated ADMADE had provided assistance for wells. In terms of access to stores or tuckshops, 83% MHHs said they were accessible and nearly all the women felt they had access to a store or shop but that ADMADE had done little to support these facilities. The social service provider that was found to be totally lacking in all the areas surveyed was a reliable local market to sell commodities produced by residents.

### **Agricultural activities**

Among the 204 MHHs interviewed in the four ADMADE areas, 69% grow maize (54% for 109 FHHs), whereas for sorghum, 18% (36% FHH); sorghum, 27% (31% FHH); rice, 27% (31% FHH); cotton, 36% (8% FHH); groundnuts, 40% (34% FHH); finger millet, 22% (1% FHH); cassava or sweet potatoe, 18%. Details for each VAG are provided in the table below.

<b>MAIN CROPS GROWN</b>													
	Maize		Sorghum		Rice		Cotton		Groundnuts		f/millet		Sweet pot Cassa
	HHS	No.	HHS	No.	HHS	No.	HHS	No.	HHS	No.	HHS	No.	HHS
Kamira	9	9	0	9	3	9	0	9	0	9	0	9	0
Luelo	40	86	0	86	20	86	35	86	0	86	22	86	0
Zimwanda	38	38	0	38	15	38	24	38			21	38	
Chasera	17	20	16	20	9	20	0	20	14	20	0	20	5
Yakobe	16	20	19	20	0	20	0	20	7	20	0	20	2
Kanga	6	10	2	10	0	10	2	10	0	10	0	10	
Chilumba	10	10	0	10	7	10	10	10	8	10	0	10	
Chimphamba	2	5	0	5	0	5	1	5	0	5	2	5	
Lumezi	3	6	0	6	1	6	2	6	0	6	0	6	
<b>Total HHS</b>	<b>141</b>		<b>37</b>		<b>55</b>		<b>74</b>		<b>29</b>		<b>45</b>		<b>7</b>
<b>Total Sample</b>		<b>204</b>		<b>204</b>		<b>204</b>		<b>204</b>		<b>71</b>		<b>204</b>	

Despite the high percentage of residents who grow maize, few farmers have access to input that would improve yields, such as fertilizer and maize seeds. Most farmers who were interviewed spoke of the high financial risk of using fertilizer and therefore depended on local maize and existing soils as could be improved through burning of plant material for ash. The table below provides the percentage of farmers who used external inputs to improve maize

yield. Among the MHHs, only 5% purchased fertilizer (the sample from Chasera and Yako were not included as these areas received inputs through their VAGs as a community project the first time). For FHHs, only 1% purchased fertilizer. Unfortunately the survey did not distinguish the type of seeds obtained as an input to household farming. The relatively low percentage indicates, however, a strong dependence on local varieties. It is assumed that most of these farmers obtained cotton rather than maize seeds, since the latter requires fertilizer.

FARMING INPUTS (MHHs)				
	Fertilizers		Seeds	
	HHs	Sample	HHs	Sample
Kamira	0	9	0	9
Luelo	8	85	2	85
Zimwanda	0	38	31	38
Chasera (pilot area)	19	19	19	19
Yakobe (pilot area)	17	20	17	20
Kanga	0	0	2	2
Chilumba	0	0	18	20
Chimphamba	0	0	1	7
Lumezi	0	0	5	6
<b>Total HHs</b>	<b>44</b>		<b>69</b>	
<b>Total Sample</b>		<b>171</b>		<b>206</b>

FARMING INPUTS (FHHs)				
	Fertilizers		Seeds	
	HHs	Sample	HHs	Sample
Nthumbe	0	13	0	
Kamira	0	4	0	
Luelo	1	18	13	
Zimwanda	0	8	0	
Chasera	0	21	0	
Yakobe	0	11	0	
<b>Total HHs</b>	<b>1</b>		<b>13</b>	
<b>Total Sample</b>		<b>75</b>		

### Crop Security

Respondents were also asked for their views on what problems they experienced that contributed to low yields and higher risks of food shortage for their families (see table below). Among the MHHs the problems most commonly expressed were lack of fertilizer (44%), drought (41%), crop damage from wildlife (36%), and lack of marketing facilities (33%). FHHs gave quite different views, indicating the most serious problems were lack of labor (39%), drought (23%), lack of markets (21%) and hunger and sickness (17%).

CROP PRODUCTION PROBLEM																		
	Lack of fertiliser		Low soil fertility		Labor		Drought		Floods		Marketing		Hunger sickness		Old age		Crop damage	
	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.
Nthumbe	0	69	14	69	0	69	4	69	3	69	9	69	15	69				
Kamira	6	8																2
Luelo	53	85			1	85							5	85				10
Zimwanda	37	38			3	38					10	38						
Chasera	5	19	7	19	15	19	19	19	17	19	17	19						
Yakobe	0	20	0	20	20	20	20	20	7	20	13	20	20	20	3	20	20	
Kanga	7	10	2	10	0	10	3	10	0	10	0	10	0	10	0	10	7	
Chilumba	10	10	10	10	10	10	9	10	4	10	10	10	0	10	0	10	10	
Chimphamba	0	6	3	6	0	6	1	6	0	6	1	6	1	6	0	6	0	
Lumezi	2	6	1	6	0	6	2	6	0	6	0	6	0	6	1	6	0	
<b>Total HHs</b>	<b>120</b>		<b>37</b>		<b>49</b>		<b>58</b>		<b>31</b>		<b>60</b>		<b>41</b>		<b>4</b>		<b>49</b>	
<b>Total Sample</b>		<b>271</b>		<b>140</b>		<b>263</b>		<b>140</b>		<b>140</b>		<b>178</b>		<b>206</b>		<b>52</b>		



Number of households most dependent on wildlife for securing food security during wet season in VAGs of key wildlife importance				
GMA	L. Lumimba	L. Lumimba	Chifunda	Chikwa
VAG Name	Lukusuzi	Yakobe	Mapamba	Kanga
Households dependent on wildlife	21	10-15	25	23
Number of animals killed per month per household	5	5-10	5	8
Estimated animals killed for food security per wet season by these households	420	336	500	736
Total households	360	232	532	160

With the introduction of the new ADMADE structure that allows a more direct way for households to participate in the decision-making on how wildlife revenues should be used, security is ranked as the highest priority. Unless more productive farming systems are introduced to relieve the need for households to barter game meat for food, the current pressure on existing natural resources in these ADMADE areas will likely grow and diminish the economic potential wildlife might have for rural development in this region.

### **Conclusion**

The Luangwa Valley has limited potential for agriculture because of biophysical characteristics of this valley ecosystem. Growing human populations in this valley may be exceeding the limits with current farming practices. This strain is manifesting itself with high levels of subsistence poaching or illegal killing of wildlife by households unable to overcome hunger and economic poverty any other way. ADMADE's challenge is to improve community leaders to address this problem and to ensure wildlife revenues returned to the community will target this key development need: food security and household income. This can be done only if households are allowed to participate in the process so that they can fully understand the importance of their involvement in finding and supporting acceptable solutions.

It is unrealistic to expect all households to support the principle of conservation unless their basic human needs can be achieved. Otherwise, management will need to depend on costly and often ineffective law enforcement approaches that only further alienate or antagonize people. Given the relatively low human population densities found in the valley and their proximity to its diverse natural resources, resident communities could provide a powerful force for conservation if the economic benefits through legal uses of these resources were to provide alternatives to poverty. This is because ADMADE has created a structure for residents to participate in and manage their resources, most especially wildlife, and to use its benefits in ways most helpful to the households living in the area. This survey has been conducted to give a baseline comparison for ADMADE's future efforts in achieving this objective.