

MINISTRY OF NATURAL RESOURCES AND
TOURISM

WILDLIFE DIVISION

**BASELINE SURVEY OF THE EASTERN PILOT WILDLIFE
MANAGEMENT AREAS**

FINAL REPORT

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Executive Summary

0.1 INTRODUCTION

others were allowed to give their comments on the response given. The consensus of the majority was recorded as right response.

special informants who seemed to understand the area better and had interest in conservation were

Understanding the concept of WMA

This was measured by calculating the percentage of people mentioning all the three attributes of the concept, i.e. participation, benefit sharing, and resource conservation in defining the concept. Results show that perception is comparatively low (31%).

Level of development of WMA

Idodi-Pawaga has made considerable progress. MBOMIPA has been converted to an NGO with and Advisory Board. Every member village has a Natural Resources Committee and a group of trained Game Scouts. They still need to form Authorised Associations to carry out the proposed WMA activities.

Economic Aspects

Land use and

also poor governance by VG in managing and allocating resources to different users has contributed to these conflicts.

Village economic status

People in Idodi-Pawaga are principally agriculturalists. Almost 99% of the population are either pure farmers or mixed farmers. Other economic activities include livestock keeping mainly by Masai, Sukuma and Barbaig. There is also petty business especially during dry season. It includes shops, transport services, and milling machines. Fishing and beekeeping are operated on subsistence levels.

animals damage was reported to account for one third of the total crop loss. Post harvest crop losses are also high due to poor storage facilities and techniques.

Incomes and expenditure at household and VG levels

Household income levels

Field data show that over 82% of the respondents in Idodi-Pawaga earn less than one dollar a day. Most of the income comes from agriculture and related activities. Other sources of incomes at household levels come from business, employment, and remittance.

Expenditure at household levels

Information at household expenditure was not easily available, especially in the form of quantities and money terms, because farmers do not have the tradition of keeping records for their incomes and expenditures. Rather, villagers were able to list areas of expenditure, which included, buying domestic goods, health costs, education costs and farming expenses.

Health and education appear to consume a lion's share of the households' incomes. Common diseases are water borne diseases such as diarrhea, typhoid, dysentery, and malaria. Thus improving water sources has a big impact on peoples' welfare. TB and the AIDS pandemic were reported to be serious where about 25% and 10% of the population was reported to be affected, respectively.

Many villages do not have health services and the few with them are lacking qualified personnel and drugs. High rates of infection lead to reduced labour force and productivity in the household, increase poverty levels among rural communities. The cost of treating diseases is considerably high and is a burden to the already meager household budgets.

Income sources by VG

The income sources for most village governments are 10% of the development levy collected, cess from petty trade in the villages, fines for by-law violators, wildlife quotas and other incomes from natural resources use. Income from wildlife account for 73.8% of the VGs' incomes.

VGs expenditures

Village governments in Idodi-Pawaga spend 64.2 % of their income for recurrent and development purposes. There is a great variation of the VGs income expenditures per village. Four villages out of 15 spend less than 50% of their incomes, while one village spent 198% of its income. The extra income is said to come from villagers' contribution and/or borrowing from rich people in the village. Increasing money for development projects is perhaps the major incentive for villagers to feel sense of ownership for the

proposed WMA. It is not clear whether the balance is saved or used elsewhere. It is important for VGs to have a culture of doing some savings for the part of the money earned annually to meet emergencies and other developmental issues. Saving could also be used for lending money to villagers in the long term, which could have a positive impact on poverty reduction at household level.

Natural resource use patterns

An examination of the natural resources use in villages surrounding the proposed Idodi-Pawaga WMA show a range of items, including fish, charcoal, honey, building poles, thatching grass, minerals, medicine,

Interactions between economic agents and local people

There is no direct link between these economic agents and the local people in the area. Although, villagers might be getting some incomes as commission/fee paid to the village government authorities by investors which is then partly channeled back to the local communities in the area, their role to villages are not yet well defined.

Financial facilities

Formal financial credit is not available in the villages visited. People rely on informal credit, which is limited to a few thousand shillings. The demand for credit is high and the main source of credit is family member or friends. High transaction cost related to formal credit both for lenders and borrowers limits the establishment of these institutions in rural areas. Also low money circulation and lack of collateral for rural communities create disincentives for financial institutions to provide services in these areas.

Poverty levels

Poverty is widely spread and pervasive in the villages visited. Using their own criteria the local show that over 75% of the households in Idodi-Pawaga face relative poverty. This number is likely to be higher when one compares with the national as well as international standards of poverty monitoring indicators such as access to health services, education, life expectancy, under five mortality rate and access to clean water. These findings are consistent with the household surveys where assessment on income poverty show over 80% of the respondents are poor earning less than one dollar a day.

The poverty levels were also revealed in terms of food consumption patterns. Although people appear to have wide range of food consumption patterns, food composition is dominated by starchy foods with very little protein and fat sources. Many villagers have only two meals a day, which is reduced to one meal during lean periods.

Economic opportunities to increase VG incomes

A high proportion of the villages visited do not have any idea on how they could increase their incomes from wildlife utilisation following the implementation of the concept WMA. Indeed, many villages were not able to say anything on how they are going to improve their VGs' incomes from the proposed WMA. After brainstorming with the researchers the villagers were able to mention economic opportunities such as ecotourism, tourism related to water falls attractions, hot springs tourism and cultural utilization, climbing hills, campsites, optimization of game meat quota's and business on live birds and photographing. People expressed interest in practicing beekeeping. Currently, very few appear to practice it due to lack of knowledge on the sector. Also fishing is one of the potential areas to increase wildlife income and nutrition by villagers.

0.4 Ecological Aspects

Vegetation

This ranges from Acacia to miombo woodlands with interspersed riparian vegetation, bushland and thickets. Some of the areas are open grasslands

Wildlife Populations

Table 1 illustrates population estimates of large mammal species and densities in the proposed WMA.

Table 1: Comparison of Large Mammal Population Estimates in Idodi-Pawaga Area

Species	1990# estimated	Density # km2	1994-95 # estimated	Density # km2
Buffalo	2240	0.67	63	0.02
Impala	2457	0.74	916	0.28
Zebra	397	0.12	249	0.08
Giraffe	777	0.23	358	0.11
Elephant	0	0	888	0.27
Kudu	0	0	220	0.07

Level of knowledge and awareness regarding these new concepts of WMA and AA by villagers including village governments is very low or non-existence. This may affect local communities bargaining power relative to investors and joint ventures related business.

Natural resource use by villagers is considerable but difficult to quantify and to put in money terms because is used mainly on subsistence levels or used illegally.

Most of the natural resources is extracted free of charge because either by-laws are not developed or they are not enforceable.

The capacity to keep records for incomes and expenditure by households and village governments is very poor and in some villages not transparent enough.

A good proportion of the VG incomes seem to have been used in administrative matters rather than villages' development projects.

Capacity to identify economic opportunities for their WMA by villages is low which may undermine their bargaining power with investors.

The benefits accruing from WMA are likely to benefit the community rather than individual households especially in the initial years of implementation. Families that depend on natural

incomes and expenditures. This work should be implemented by DW in collaboration with Ministry of Finance or Cooperatives.

The MNRT need to contract another firm (economic) to undertake a detailed study in the proposed WMAs case by case to establish cost benefit analysis and comparative advantages for each participating village. This is important for each village to operate in economic areas, which is more efficient and competitive. Comparative advantage could be in terms of wildlife resource endowed, transport advantage, time invested in the business, etc.

The WD should look onto ways of compensating households whose livelihoods to a high extent depend on natural resource extraction/use. This could be through providing alternative livelihoods.

Improvement of good governance at the village level is crucial. There is need for transparency and

1.0 INTRODUCTION

1.1. Background

The government of Tanzania through its Wildlife Policy (1998) is advocating the establishment of Wildlife Management Areas (WMAs) as a means of effectively implementing Community Based Conservation (CBC) activities in Tanzania. The underlying assumption is that WMAs will be established where there is a 'health' population of wildlife. WMAs, despite their conservation roles, will run as business entities parallel to other production systems in village lands, as will be determined by land use plans. The new policy stipulates that local communities will benefit directly from wildlife conservation economic opportunities through direct management of WMAs. Benefits are expected through formation of joint ventures and benefit sharing. In this process the CBC in WMAs will be implemented by Authorized Associations (AA). The AAs are basically individual groups and designated organizations within the villages. The AAs will be given authority by the Village Council to manage wildlife outside NPs and GRs. About 15 sites will implement WMAs on a pilot basis for the period of three years.

The concept of WMAs is to be implemented under the Wildlife Conservation Act (1974) as translated in the Wildlife Management Authorities (WMAs) Regulations of 2002, and the Guidelines for designation and management of WMAs which support the implementation of the Wildlife Policy of Tanzania (1998). The Guidelines are administrative rules, which are intended to rationalize in practical terms the Wildlife Conservation (WMAs) Regulations, 2002.

Much of the initial focus of CBC has been on wildlife, which is threatened with displacement by illegal use and growing rural human populations. The new policy approach underlying the WMA concept devolves rights over wildlife to local communities and aims to make wildlife conservation part of the rural poverty alleviation process. In this context, the WMA initiatives must be financially attractive for the community, economically efficient for the nation and financially viable for donors and

the government. Without these incentives, WMAs will not be sustainable, and will not alleviate poverty or conserve wildlife.

1.2 Study Objective

The main objective of this study was to facilitate the collection, analysis and compilation of baseline information from 15 pilot WMAs. This information is intended to be the basis for the development of Monitoring Indicators and Monitoring Plans during the implementation of the WMAs.

Hereunder we present the results of the baseline survey done in villages surrounding the proposed Idodi-Pawaga pilot WMA. This report is divided into four sections. The introductory section is followed by a second section that provides the sociological aspects of the survey. The third section then discusses the economic aspects of the communities, while the fourth and last one presents the ecological aspects of the proposed pilot WMA.

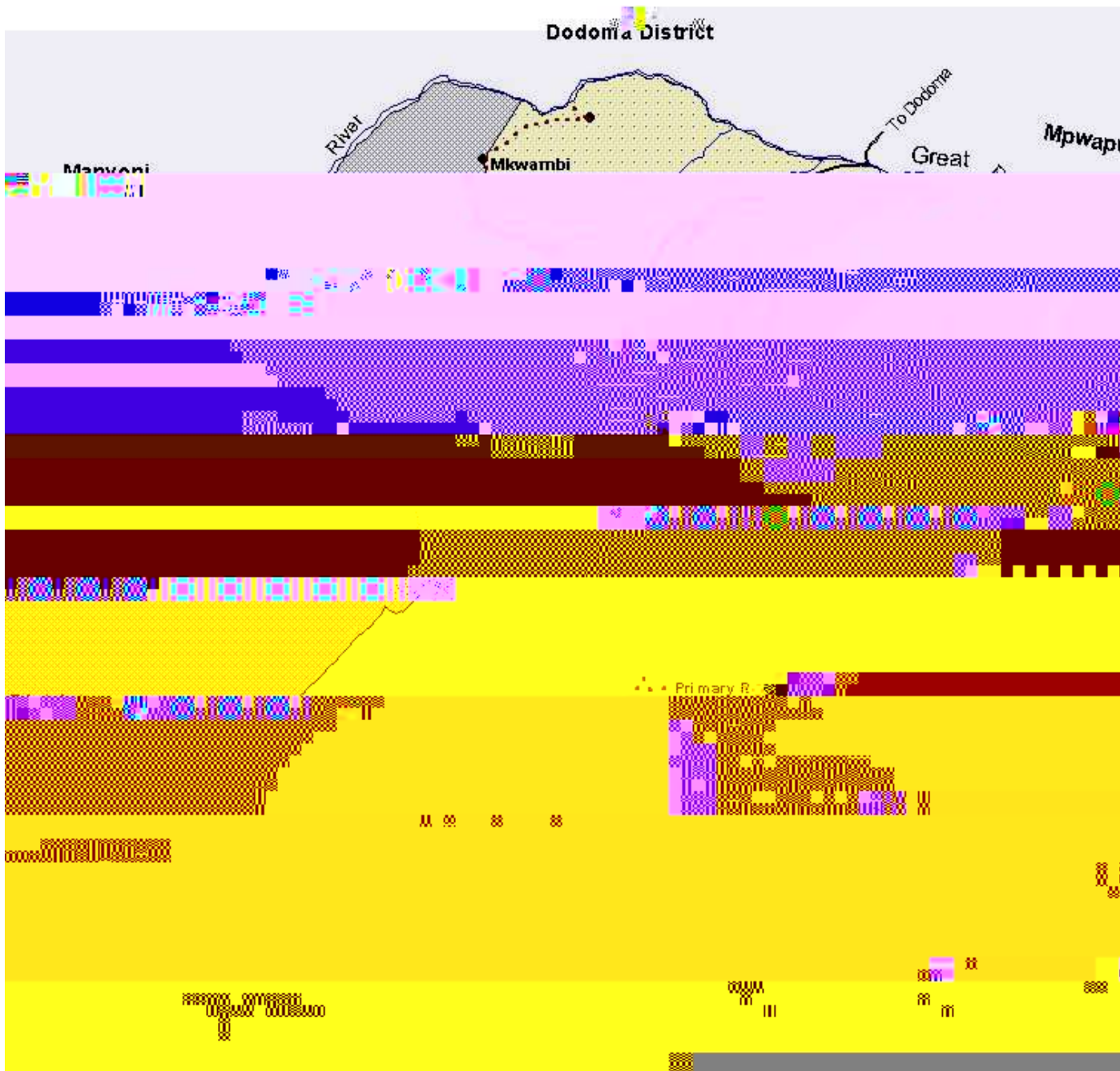
1.3 The Study Area

The proposed pilot WMA is within the Lunda-Mkwabi Game Controlled Area (LMGCA). The communities have developed a memorandum of understanding to jointly manage the area as a Wildlife Management Area. The total area of the Game Controlled Area is 4,046 km² (Map 1). The proposed pilot WMA has both ecological and social benefits to Ruaha National Park. The biological, or ecological benefits are a result of the territorial expansion of the protected area that keeps human impact further away. Some of these benefits are:

- Physical barrier from human encroachment

- Enlargement of the natural habitat and reduction of edge effects

- Enhancement of the environmental services provided by the reserved area.



1.4 Literature Review

1.4.1 The concept "Community Based Natural Resources Management" (CBRNM)

Recognition that successful management of protected areas ultimately depends on the

Management Plan for Indigenous Resources (CAMPFIRE) in Zimbabwe and the Luangwa Integrated Resource Development Project in Zambia have been established under such an assumption and have recently taken the limelight as models of this supposedly new outlook in the management of natural resources in protected areas (Wells and Brandon, 1993).

This outlook is not new to Tanzania. The problem of environmental degradation has been the concern of the government for a very long time. Since the colonial period widespread efforts have been made to conserve and improve natural resources such as forests, wildlife and land. Generally, three types of conservation initiatives and programmes can be distinguished. These are the preservation of forests and wildlife, the rehabilitation and improvement of degraded lands, and environmental resource improvement efforts undertaken at the initiative of local communities and grassroot organizations with varying degrees of financial support of central government, local and foreign donors (Mung'ong'o, 1996).

The forests then14(.)10()and35JTJETBT(.)10(50(l)18(i)8(f)13(e)14(,)10()-229(t)8(h)110(50(BT1 0 .g(

have also virtually fostered the emergence of a new rural development paradigm in Tanzania.¹

The underlying assumption of the paradigm has been that local communities will best manage natural resources such as wildlife and forests if they are assured of clearly defined user rights, proper incentives, information and the know-how to do it. The local people are thus expected to participate in the process of design, establishment and management of the conservation areas.

The aim of such a participatory approach to decision-making is to allow the stakeholders to express their objectives in natural resource use and management, and to decide on how these can best be achieved. It furthermore allows the stakeholders to evaluate the alternative uses of the ecosystems according to their specific rationales; hence also effectively empowering the local people to make better use and protection of their environment. At a more theoretical level it provides better information to be used in resource management as a result of the intermarriage between indigenous knowledge and scientific knowledge (Tacconi and Benett, 1995:93).

1.4.2 Problems and prospects of CBNRM

Of recent wildlife conservation in Game Controlled Areas (GCA) and communal lands has become difficult to implement in a centralized manner. It has also become difficult to justify in economic terms. In the preceding paragraphs we have highlighted the changing perception and approach among natural resources managers and conservationists at both the national and district levels towards a recognition that successful management of protected areas ultimately depend on the cooperation and support of the local communities. We have noted the underlying assumption of the emerging paradigm as being based on a belief that local communities value natural resources such as wildlife and forests and would manage them best if they were assured of proper incentives, information and the know-how to do it.

1. The NCA has, for example, retained some of the most spectacular combination of scenic, wildlife and archeological qualities in the world so as to acquire the status of a World Heritage Site in 1979 and a Biosphere Reserve in 1982.

1.5 Methodology

Both primary and secondary data were collected from all villages surrounding the Idodi-Pawaga WMA. The methodology used in accessing these data is detailed in Vol. I of this four-part report.

FINDINGS

2.0 SOCIOLOGICAL ASPECTS

2.1 Demographic Trends

Table 2 illustrates the population change in communities living around the Idodi-Pawaga WMA. Data from the 1988 and 2002 census years show that the population in the area is

2.2 *Migration Patterns*

The original ethnic groups to inhabit the villages of Idodi and Pawaga Divisions were the Hehe and Gogo, but many other groups have settled in these divisions in recent years, including the Bena, Wanji, Kinga, Safwa, Sangu, Kimbu, Nyamwezi, Ngoni and Sukum

2.3 *Household Characteristics*

2.3.1 Type of households

Rural households in Tanzania are normally headed by male members of the community. If not a husband then it is a close kin - a son, a brother, or an uncle. Such is the situation in two divisions. According to interview data 70.1% of the respondent households were headed by males. Only 29.9% of households were headed by females as a result of divorce or widowhood.

2.3.2 Household size and composition

Household sizes in the village vary greatly depending on the type of household. In well-off households where polygyn, extended families and bonded labour arrangements are the norm many people tend to stay in one household. On average, however, the household size ranging between 3.7 and 4.6 people with an average of 4.2 people. Aggregately, in an average household between 1 and 5 of the resident people would be women and between 3 and 4 would be men. The age breakdown in such a household would be 5 children (aged between 0-15 years), 4 adults (aged between 16-59), and 1 elder (aged 60 and above).

2.3.3 Dependence ratios

2.4 *Natural Resource Use Patterns and Access Mechanisms*

According to the interview data the main natural resources, other than land, used by the people of the two divisions from the local forests is fuelwood, building poles, timber, wild vegetables, rope, medicine and thatch grass. Others are honey and fruits. The local forest is depended upon by the local people for woodfuel (78%), for charcoal (8%) and for building poles, timber and/or thatch grass (8%). Because of the activities of MBOMIPA wildlife is recognized as an important natural resource in both divisions.

Access mechanisms for the various natural resources are discussed in detail in Section 3.12 of this report. However, in accordance with the tradition of ethnic groups resident in the two divisions the man controls all resources, including land and income generated in a household. The interview data demonstrate that despite the woman's equal contribution to the household income the main decision-maker in the household is always the man. Only a few respondents indicated that both the partners shared the decision-making process, or that the woman made the major decisions in their households. The latter responses came from polygynous or female-headed households. Women in this community are aware of this anomaly. Women representation in the village government and other leadership positions was, for example, suggested as one of the solutions for the problems identified at the women focus group discussions.

2.5 *Institutional Set-Up*

In all the villages visited during this survey the standard village government (VG) structure was prevalent. Below the Village Assembly (Box 2) the VG was headed by an elected Village Chairman. The Chairman was supported in their day to day activities by an appointed Village Executive Officer. These people were in turn supported by three Village Committees (VCs) for Plannin Use buelected Villapol(C)for. These p-9()6(hold) e

Although local governance is problematic in all the study villages, it is more so in semi-arid Pawaga Division villages than in sub-humid Idodi Division. In the former villages there is a major rift between the village council leaders and the villagers, supporting the contention that poor people are vulnerable to political marginalization and alienation. People's participation in decision-making and leadership accountability in resource allocation is at its minimum in these villages. Meetings are not called and in04 Tmnomcnd iETBT1 0 0 .

Underlying resistance at the local level to democratisation of local government is a deep-seated distrust in central and local government of pluralism and public dissent. A low tolerance for difference and alternative views reflects not only formal 'modern'

2.11 The Way Forward

In the foregoing discussion two points have been raised as the way forward. These are:

Capacity building should be a major activity in the pilot WMA.

The establishment of the WMA should go parallel with the employment and training of enough wildlife officers, especially at the ward level to facilitate supervision of village game scouts.

3.0 ECONOMIC ASPECTS

3.1 Level of Development of the WMA

The Idodi-Pawaga WMA has made considerable progress. The Community Based Conservation (CBC) started in 1993 and the MBOMIPA project came in 1997. Starting from 2002, the MBOMIPA was converted into CBO, which forms the umbrella organization for all villages surrounding the WMA. Every village supplies 2 game scouts to undertake patrol activities for 10 days on rotational basis. The game scouts are paid little allowances for the job, which according to them, are too little to meet basic needs. In every village there is natural resource committee for natural resources related matters. However, poor working facilities such as transport, communication, uniform, food have constrained performance of wildlife protection against poaching.

3.2 Land Use Pattern and Availability

According to villagers, land use pattern is divided into residential, agriculture, livestock and conservation (WMA). Few villages have set aside land for later use and some have areas set for cemetery purposes. Except for WMA conserved land, there was no any land reported to have been conserved for ecological purposes e.g. catchment areas.

There was no village that was able to provide quantitative data (area under different land

than pure stand. In addition, data on the quantities of fish caught are not easily available at village governments. This is mainly because most of the fishing activities are undertaken on subsistence levels and no records are kept for catch volumes. To have such data it needs a separate detailed study, which starts with awareness raising on the

Table 3.1: Land availability, cost and livestock population by village.

	Average acreage	Land availability	Renting cost per acre	Livestock population
Mahuninga	1-2	Not adequate	Rice =20,000/=	Moderate
Makifu	1-2	Not adequate	Rice =20,000/= Maize = 6,500/=	High
Tungamalenga	3-4	Not adequate	Rice =20,000/=	Moderate
Mapogoro		Not adequate and unevenly distributed	Rice =20,000/=	High
Idodi	2-3	Not adequate	-	High
Malinzanga		Not adequate	Rice =30,000/=	High
Nyamahana	2	Not adequate	Rice =20,000/=	High
Luganga		Adequate for cultivating but not for fallowing	Rice =15,000/=	Low
Magozi	1-2	Not adequate	Rice =15,000/=	Low
Ilolo Mpya	1-2	Not adequate	Rice =15,000/=	Low

3.3 Village Economic Status

People in Idodi-Pawaga are principally agriculturalists. Almost 99% of the population is either pure farmers or mixed farmers. Other economic activities include livestock keeping mainly by Masai, Sukuma and Barbaig. There is also petty business especially during dry season. Fishing and beekeeping are operated on subsistence levels.

3.3.1 Agricultural practices and farming technology

As already pointed out, almost all population in the Idodi-Pawaga WMA is involved in farming. Study at household level show more than half of the respondents are farmers (54.6%) or mixed farmers (13.4%) where they practice both farming and livestock keeping while others practicing farming and business (18.6%) and; farming and beekeeping (7.2%) (Table 2.0). This suggests that improving agricultural productivity out of WMA initiatives has a big impact on household poverty reduction.

3.3.1 Farming technology

The farming practice is both rainfed and irrigation. Available information show that the irrigation potential of the area is 325 ha and 10,000 ha for Idodi and Pawaga respectively. However, area under irrigation cultivation is 275 ha and only 1,250 ha for Idodi and Pawaga, respectively (URT 1996).

The main crops grown are maize, rice, groundnuts and sorghum. Each household usually cultivates 1-4 acres depending on the farming technology and availability of family labour. A high proportion of farmers use hand hoe, few use oxen and very few can manage to use tractors. Nevertheless, the choice for a technology to use is not determined entirely by the poverty levels but also farmers' perceptions about the technology do matter. Many people claim that ploughing with tractors dig too deep, which brings the sand to the surface and takes the fertile soil down too deep where the crops can't use it. Tractors are also seemed to be too expensive for many people to afford. Ploughing one

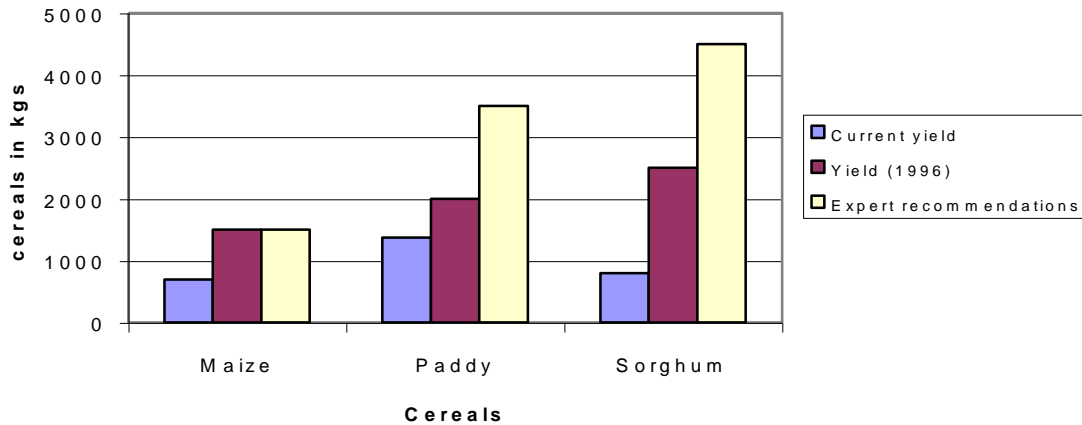
other hand, poor record keeping on incomes and expenditure by households makes the assessment of this information rather difficult.

Average income per village government per year is only T.shs 1,634,711. This is very little to have any significant impact on villages' development. Most of the income comes

people especially livestock keepers in the area. If productivity continues to decline the chances for people to invade virgin land in the WMA are high. Table 3.1 illustrates production trend for the Idodi-Pawaga WMA. This also suggests the importance of

Ilolo Mpya	1-2	10*	Sorghum 10-20	increasing	Good rains
Mkombilenga (P)	2-3	10*	Sorghum 20-30	increasing	Favourable weather
Mbuyuni (R)	1-2	12-15	Rice 13.5-27	decreasing	over cultivation
Mboliboli(R)	1-2	6-7	15-20 Maize 6.5-13 Rice 17.5+35	increasing	Irrigation practices
Kimande (R)	1-2	6-7	15-20 Maize 6.5-13 Rice 17.5 - 35	increasing	Irrigation practices
Itunundu	1-2	18-20	Rice 18-40	decreasing	Reduced water drougbs{)0.31 57J

**Figure 3.1: Cereal Yield Trend between 1995/96-2002/2003
(in kgs)**



3.5 Incomes and expenditure at the household and VG levels of over time

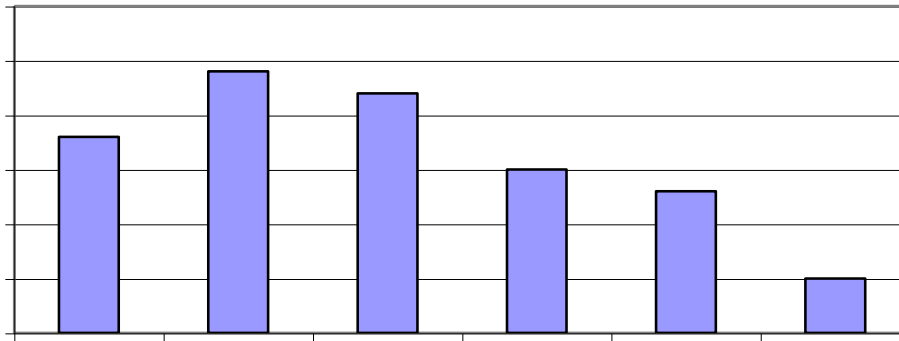
3.5.1 Sources of income

Income sources at household level are mainly from agriculture and related activities. Other activities include business, fishing, beekeeping, carpentry, and charcoal and fuel wood.

Income earning by villagers show over 79% out of the 97 of the respondents are earning less than one dollar a day. Most of the income comes from agriculture and related activities. Only 4 households out of the 97 interviewed reported to have income from employment and business by some members of their families. Once, again this suggests that a high proportion of dwellers depend on agriculture directly or indirectly. When asked whether they receive income in the form of remittance 31.6% of the 97 sample size reported to have access to remittance incomes, while the high proportion of 68.4% do not. Nevertheless, income from remittance sources was considerable amounting to T.shs 41,956 per annum on average, ranging from T.shs 5000 to T.shs 300,000 per annum.

Income from agriculture and related activities is the main source by a high proportion and is highly varied ranging from T.shs 5,000 to T.shs 1 000 000 with any average of T.shs 168,795/= per annum. Income from agriculture is influenced mainly by land accessibility especially land for rice and vegetable farming, family labour availability and technology used e.g irrigation against rainfed agriculture, level of input use, ox-ploughing against hand hoe etc. These findings are consistent with those highlighted by the PSRP (2000), which states that poverty is largely a rural phenomenon and that the poor are concentrated in smallholder and subsistence agriculture and facing the youth, the old and the large household. Although, female-headed households are not necessarily poorer than male-headed households women are generally perceived to be poorer than men (PSRP 2000).

Figure 5.1: Income (cash) earnings by households in



Income sources are mainly from agriculture where 61 out of 97 of the respondents depend on agriculture as their main source of income followed by remittance and finally non-farm incomes, which seem to be insignificant (Table 4.0).

Table 5.1: Main source of Income

Source	
Households with income from non-farm activities (%)	4.1 (4)
Households with accessibility to Remittance Money (%)	24.7 (24)
Amount received from Remittance (T.shs)	41,956 (24)
Average income from agriculture (Tshs)	168,795 (61)

Source: Survey data

3.5.2 Expenditure at household level

Information on household expenditure was not easily available especially in quantity terms because farmers do not have a tradition of keeping records for their incomes and expenditures. Rather, villagers were able to list areas for income expenditure, which included, buying domestic goods (e.g soap, sugar, cloth), health issues (e.g buying medicine, paying fare for visiting hospitals), education services (paying school fees for their children, buying uniform and other contribution to education) and farming cost (hiring rice fields, ox-plough, labourers etc). Health and education consumes a lion share of the households' incomes. Common diseases are water borne diseases (e.g diarrhea, typhoid, dysentery) and malaria. Thus improving water sources, providing health services and controlling malaria has big impact on peoples' welfare.

3.5.3 Income sources by VG

In many villages visited, it is only sources of incomes, which was easily provided but not the quantities as well as money income per activity. The income sources for village governments depend very much on development levy (10% of the collected), cess from petty trade in the villages, fines for by-laws violators, wildlife quota and other natural resources uses. In 2002 villages received on average of T.shs one million each, the highest being T.shs 1,500,000 and the lowest being T.shs 700,000. One of the problems realized

priorities by WMAs. Without proper record keeping by households and villages monitoring and evaluation of the impact of the WMAs initiatives may become difficult.

In many villages income from wildlife accounts for high proportion of the VG incomes ranging from 55% to over 80% (Table 5.1). Overall, income from wildlife utilization is 73.5% of the total VG incomes for Idodi Pawaga WMA. This suggests that proper utilization of wildlife has the potential to increase VG incomes and therefore reduce poverty in the villages through construction of schools, health centers and reducing pressure on local people contribution to the development activities. In the long term, income from wildlife by the VGs could also be used as a source of credit to villagers or establish what is known as SACCOS. Currently, many villages' wildlife incomes come from MBOMIPA quotas with very little coming from other resource utilization such as fishing, carpentry, artisan etc. This occurs due to either lack of by-laws or inability to enforce them. Increasing income from other sources need to be strengthened under these WMAs new approach and this could form a monitoring indicator for future WMAs.

3.5.4 VGs expenditures

There is great variation of the GVs income expenditures. Four villages (Luganga, Magozi, Mboliboli, Kimande and Magozi) out of 15 spend less than 50% of their incomes while one village (Mkombilenga) spent 198% of its income. The extra income is said to come from villagers' contribution and/or borrowing from rich people in the village.

Overall, Idodi-Pawaga WMA spends 64.2% of their annual earned incomes. The VG was

many villages were not ready to mention or provide actual figures due to the fact that it is performed illegally. As a result, they are feared that our investigations might be for the government. Results from households show that over 80% of the population most of this being used in subsistence level. Any attempt to capture natural resource consumption rates failed because: First natural resource is used mainly on subsistence level. Where it is used on business, people are reluctant to disclose quantities and money incomes due to fear of arrest by the government. Also farmers do not have tradition of keeping records.

3.7 Mechanisms for Natural Resource Access

All villages have almost similar procedures for natural resource extraction. Natural resource for home use e.g fuelwood collection, building poles, thatching grass, food etc, the villagers do extract them without any permission. For petty business related resources, the villagers need to apply through the village governments and pay a fee. For certain type of natural resource e.g wild animals or cutting trees for timber the permission has to come from the director for wildlife and District Natural Resource Office, respectively. Nevertheless, despite the existing laws and by-laws for natural resource use, there is illegal extraction of resources in many villages visited suggesting that either the laws/by-laws are not available or there is no incentive to enforce them due to reasons such as the cost of enforcing outweighs benefits.

3.8 Marketing

Most of the product that goes through markets is maize, rice, beans and millets. Also live animals and livestock products such as meat, milk, skins etc.

3.8.1 Transport as market availability factor

Generally, transport system is very poor. The Idodi-Pawaga villages are far from town on a road, which becomes very difficult to pass during the wet season. Each division of Idodi and Pawaga depend on one bus only. A 90.02m0()-29.r7 T3d(iss,)-ofthis ansp(rt)369(c)4(stst)-3()23

3.8.2 Marketing

Agricultural products are marketed by private traders and periodic markets (*magulio*). The major complains from farmers is low prices offered by traders relative to the cost of production. During the harvesting periods prices are very low and farmers sells their rice at a price of 7000/= per one sack while the same quantity is sold at 16,000/= during the scarcity period. For maize it is 6000/= and 10,000/= during harvest and lean seasons, respectively . Nevertheless, due to high demand for cash as well as lack of efficient storage facilities, a high proportion of farmers sell their produce immediately after harvest and as a result, they get very low prices. Villages which are located off from major roads and towns (e.g Mboliboli) are the most hit by marketing problems. Poor roads and infrastructure also limits farmers from producing potential high value but perishable crops such as tomatoes and vegetables because they can't sell easily (URT 1996).

The marketing situation is also not favourable for livestock keepers who complain that prices are so low that they can't sell their cows for enough money to buy food. The prices for livestock keepers are very varied ranging from as low as 30,000/= to 150,000/= depending on the size of the cow and buyers availability. According to the livestock keepers, cattle buyers come from Iringa town, they know to each other and the auctioneer, and therefore they can easily collude for low prices.

	students. About 4 students per parish/year
Luganga	MBOMIPA, RC-paying fee for secondary school students, constructed a nursery school CONCERN-agricultural irrigation and marketing.
Magozi	MBOMIPA, Anglican-Church provides mosquito nets, Concern-irrigation canal

channeled back to local communities in the area, their role to villages are not yet known by villagers. Villagers as government are not involved whatsoever in these investments although some individuals are getting employments both skilled and unskilled. It is clear that there is no any sort of joint venture in the villages visited. For the case of facilitators/donors there is some cost sharing mechanisms. The donors are paid funds for technical support or material purchase and the local communities are contributing in kind by providing labour power. They can also contribute financially from their VG earnings.

3.10 Financial Facilities

Formal financial facilities do not exist in Idodi-Pawaga WMA. This is because the money circulation is very low to attract financial investors. Also many villagers do not have collateral for loans applications in formal financial institutions, which creates disincentives for establishing financial institutions in rural areas both for local people and for financial agents.

However, informal money lending is quite common in the WMA. About 40% of the respondents had access to money borrowing where a high proportion received from family member and friends and only one person out of 97 households had a loan from Bank. The money borrowed ranged from T.shs 5,000 to T.shs 20,000. These findings suggest that the demand for credit is high and the main source of credit is family member or friends. One focus of WMAs could be for the villages to lend money to their people to help eradicate poverty. The WMAs also could be playing a role of providing guarantee to

Table 9.1: Household Percentage Distribution by Credit Sources

Source of credits	%
Total household sample (respondents)	97

3.10.2 Poverty levels

Poverty as per National Poverty Eradication Strategy (1998) is defined as a state of deprivation prohibitive of decent human life. In thus includes both inadequate income as well as deficiencies in non-income human development attributes. The key dimension of

level where 100% of the respondents reported to have been using fuel wood as main source of their energy for cooking. Health services are also very limited. Some villages such as Makifu, Nyamahana, Mbuyuni and Magozi do not have any health centers. Even in villages where health services exist they are under staffed and there is no medicine. The same applies to education services. Mkombilenga and Mbuyuni do not have any school while the rest villages have at least one primary school in their villages. However, teachers, classrooms, desks were reported to be inadequate in every school. Shops and kiosks exist in many villages but they are not sufficient both in number and facilities provided. Consequently, most villagers depend on periodic markets, which occur once per month or they have to travel to Iringa town for attaining consumer goods and other necessities. Table 9.0 displays social services in Idodi-Pawaga WMA.

	condition)	enough			for 1 p
Pawaga					
Luganga	Road service which is not sufficient	Firewood and is easily available	Tape water but not sufficient	One dispensary but not sufficient in terms of drugs and staff	1 p suf des an
Magozi	Road service which is not sufficient	Firewood and is not easily available	Tape water but not sufficient	No health service except in the neighbouring village	
Ilolo Mpya	Road service which is not sufficient, few use waterways	Firewood and is not easily available	Tape water and river water	One dispensary	On

	which is not sufficient	easily available	river water	health centers, no laboratory	
Itunundu	Road service which is not sufficient	Firewood and is not easily available, few use charcoal and kerosene for cooking	Tape water and river water	One mission dispensary mission	2 no ter cla an

3.12 Household Poverty Levels

Basing on PRA approach poverty in Idodi-Pawaga is widely spread and pervasive. Using their own criteria (e.g ownership of large number of land, cattle, shops, modern house, milling machine, cars) a high proportion of over 75% of the villages are poor with very few appearing to be better off. This number is likely to be higher when one compares with the national standard as well as international standards of poverty monitoring indicators such as access to health services, education, life expectancy, under five mortality rate and access to clean water. These findings are consistent with the household surveys where assessment on income poverty show over 80% of the respondents are poor earning less than one dollar a day.

The poverty levels were also revealed in terms of food consumption patterns. Although people appeared to have wide range of food consumption patterns, food composition is dominated by starchy with very little protein and fat sources. Many villagers have two meals a day i.e Lunch and Dinner, which is reduced to one meal during lean seasons. The few with three meals per day make a small proportion of the villagers of the area and in most cases these are civil servants employed by the local government or by NGOs in the area.

As already pointed out, many villages do not have health services and the few with them are lacking qualified personnel and drugs. Common diseases were reported to be malaria, dysentery and typhoid. It was reported that at least half of the vill

increases poverty levels in the area. Trend on the levels of poverty as well as diseases

		50+		(5+)	sacks of rice		
Kisanga							
Kinyika	420						
Mboliboli	700	Shops	Livestock 100+	M/Machine	Farm land (5+)	Harvest sacks of rice	50+

3.13 Opportunities to Increase VG Incomes

3.13.1 Introduction

Given their similar ecological background, economic opportunities are likely to be similar in all WMAs. Nevertheless, the efficiency in running these economic activities is likely to differ from one WMA to another depending on different reasons including wildlife richness, type of wildlife existing, infrastructure, knowledge and experience in conservation. To understand which WMA is efficient in what economic activity may need a detailed study cost benefit and comparative advantages.

A high proportion of the villages visited do not have any idea on how they could increase their incomes from wildlife utilisation following the implementation of the WMAs. Indeed, many villages were not able to say anything on how they are going to improve their VGs' incomes from WMA. Rather, they were asking the consultants to help them identify the opportunities on their behalf. Nevertheless, after brainstorming with the researchers the villagers were able to mentioned economic opportunities such as ecotourism, tourism related to water falls attractions, climbing hills, campsites and business on live birds and photographing. People expressed interest of practicing beekeeping. Currently, very few appear to practice it due to lack of knowledge on the sector. Also fishing activities is one of the potential areas to increase wildlife income and nutrition by villagers. The economic potential are explained in details in the following sections.

3.13.2 Fishing

Idodi Division has got a big number of water sources and fish farming is a viable activity. It is anticipated that fishing and fish farming activities will improve the welfare of those who are involved and thus improve the living standard. Currently, fish farming has been started in Idodi Division. There are 16 ponds in 5 villages (Isack 2001).

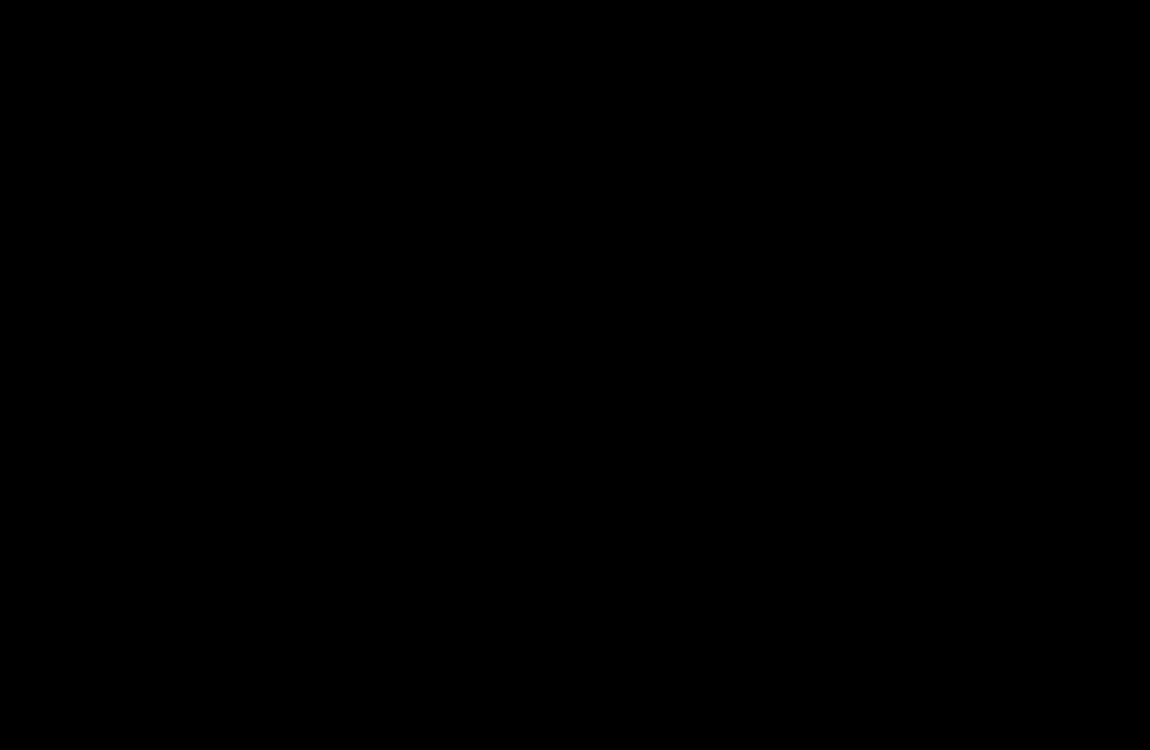
Also fishing activities is taking place in little ruaha where people catch fish for subsistence use. These include *kambale*, *tilapia*, *katoga* and *nchema*. However, fish are

only available during rainy season when river fills up. In some villages fishing is said to be destructive and unsustainable. The fishermen build barriers across the river, use spears, set up fish traps, use nets or *kangas* and sometimes use poisoning materials.

In Tungamalenga village, fish are caught from the river Tungamalenga and also sometimes from irrigation canal in the rainy season. The fish caught are mainly *kambale*, *dagaa*, *ngogo*. They catch fish using hooks, *khangas*, and traps. Constraint towards fishing is lack of expertise. They catch fish indiscriminately, even the little ones. In the months when fish are available people eat fish every day. Table 11.1 the scale of fishing activities in Idodi-Pawaga WMA.

Table 11.1: Fishing Activities

Villages	Whether available	Scale	Type of fish	Constraints
Mahuninga	Not available			



Getting license, presence of crocodile, fishing expertise and material
Fishing expertise and material
Fishing expertise and material

Mafulu38f*34 re

3.13.4 Tourism

There are initiatives to establish a local tourism association where 2 members from each of the 19 villages would join the association. The planned tourism activities includes the conservation and better control of game and investments in campsites, guided photographic tours and craft. The benefits from tourism enterprises will be going to village councils to support community development. They had decided that funding for the tourism projects should come from money raised through their wildlife quota, they were also looking for some support from NGOs community.

3.13.5 Tourist and resident hunting

Currently, the Idodi-Pawaga WMA through MBOMIPA sells its quota based hunting rights to the tourist hunting companies and/or resident hunting. This activity should be enhanced as it provides economic opportunity for the WMA. Hunting has the advantage of generating considerable revenues right from the beginning with little or no investments needed by the AA. The resource is already presented and available for operation. Hunting can generate profits early that communities can and should reinvest into the other economic opportunities. Nevertheless, hunting tourism to be sustainable, consumptive use of wildlife should not jeopardize the biological and ecological basic requirements. This could be achieved through the systems of monitoring the game populations, and must be jointly developed and implemented by the WD and the AAs along with the system of enforcing quotas.

3.13.6 Photo tourism

Photo tourism is another opportunity for income raising in Idodi-Pawaga WMA. The high densities of wildlife areas or attractive birds could be targeted for photographic operations. Christopherson *et. al.*, (2000), proposes for example to extend buffer zone around national parks from one kilometer to five kilometers. Where a WMA is situated directly adjacent to a national park a small area of 5km wide buffer zone around national parks could be zoned for limited photo tourism. In this respect, photo safari companies should have small-tented camps located well inside such extended buffer zones, whose guests remain inside the small-gazetted photo tourism area and only access the camps

through the park and only venture inside the park or protected area. These small-gazetted areas would have to be off limits for the hunter. To avoid conflicts between the two operations, conditions for hunting and photo safari companies should be clearly spelled out in the lease contracts and be in compliance with the Tanzania law. Also tented camps should not be too many in the buffer zone to avoid hindering the movement of the game between the protected area and the WMA hunting block.

3.13.7 Sport hunting

Sport hunting could be potentially another major earner of revenues in the WMA. For instance, a report by MNRT (1996) estimates such an activity to generate revenue up to US\$ 40,000 per block per annum for surrounding communities in the SGM bufferzones. The study also proposes that for such an activity to be efficient market forces should be allowed for allocation and pricing of hunting blocks.

The issue of increasing supply of meat for community surrounding WMA could also come from meat recovery from sport hunting. The great deal of the meat arising from sport hunting operations is presently wasted, for various practical reasons (MNRT 1996). Given the nutritional status of the surrounding communities where meat is scarce, this could help reduce the gap.

3.13.8 Live animal capture and Sale

This activity AA could be receiving quota from WD to capture and export live animals.

affect local communities bargaining power relative to investors and joint ventures related business.

Natural resource use by villagers is considerable but difficult to quantify and to put in money terms because is used mainly on subsistence levels or used illegally.

Most of the natural resources is extracted free of charge because either by-laws are not developed or they are not enforceable.

The capacity to keep records for incomes and expenditure by households and village governments is very poor and in some villages not transparent enough.

A good proportion of the VG incomes seem to have been used in administrative matters rather than villages' development projects.

Capacity to identify economic opportunities for their WMA by villages is low which may undermine their bargaining power with investors.

The benefits accruing from WMA are likely to benefit the community rather than individual households especially in the initial years of implementation. Families that depend on natural resource for subsistence may suffer following WMAs implementations.

The efficiency in running economic activities is likely to differ from one WMA to another depending on comparative advantages.

3.15 Conclusion

The Idodi-Pawaga WMA has made a good progress administratively. The original MBOMIPA project has been converted to a CBO, which also acts as a facilitator. Natural resource committees have been established in each village. Every village supplies 2 game scouts for 10 days on rotational basis. They are only paid little allowances, which is not

enough to motivate them, and make them active for the job. Also poor working facilities such as transport, communication, uniform, food have constrained performance of game scouts in performing anti-poaching business.

During this study there was no any joint venture existing between villagers and investors. What was seen is cost sharing between government/donors and local communities e.g in areas of education, health and irrigation projects. In most cases the donor/facilitator provides funds or expertise and the communities provide labour force.

MBOMIPA on behalf of the villages sells the quota to the professional hunting companies for money. The earned money is then distributed to all villages equally. About T.shs 1 000 000 per year is given to each village. Income from other wildlife not channeled through MBOMIPA is very low due to either non-existent or weak/un-enforceable by-laws.

Incomes and expenditure by village governments are not clear and transparent enough in some villages . Also income from natural resource for developmental projects is not clearly indicated which is difficult to make a follow-up. Proper monitoring of the impact of WMAs concept will only be possible if there is proper record keeping in villages' incomes and expenditures.

Although many villages are likely to benefit from WMA implementation, most of these benefits will be accrued at communal level and not household. There will be losers from natural resource livelihoods e.g food extraction and this category of people may need to be compensated.

Crop destruction by wild animals is considerable in all villages visited. These affect villagers' crop harvest and incomes. The destruction by wild animals is also experienced by livestock keepers where several animals has been killed by wild animals such as Lion, Leopards etc.

- Physical barrier from human encroachment
- Enlarge the natural habitat and reduce edge effects
- Enhance the environmental services provided by the reserved

The institutional set up put in place to manage wildlife resources is very well organized, and the level awareness seems to be high. If given the necessary financial and technical support, these communities can manage wildlife resources reasonably well.

4.2 Ecological Data and Analysis

4.2.1 The Current Ecological Status of the Area

Overview

The area is characterized by semi-arid to arid climate, with a rainfall of approximately 500mm per rainy season. The vegetation is varied ranging from Acacia woodlands to miombo woodlands dominated by Acacia, Commiphora, Combretum and Brachystegia species. Land use is extensive, ranging from subsistence agriculture, agro-pastoralism, to pastoralism.

The area is within the miombo woodlands zone. Ecological studies indicate that, the dynamics of Miombo are strongly influenced by human activities. The structure of the woodlands tend to be substantially modified through slash and burn agriculture, harvesting for fuelwood and charcoal, frequent burning and heavy grazing by livestock. Transformation and modification of the woodlands increase as population grows and economic conditions change. Potential environmental impacts affect biodiversity, ecological functioning, carbon storage, trace gas emissions, hydrology and regional climate.

The vegetation communities in the study area represent two phytocoria, namely the Southern Zambezian *Brachystegia* woodland and Northern dry Somali-Maasai *Acacia-*

Commiphora. The two phytocoria are regional centers of endemism, but species richness is relatively poor compared to other moist vegetation communities.

4.2.2 Trends and Use of Wildlife

Trends in Wildlife Populations

Several censuses were conducted in the area, and below is the trend in wildlife populations in the area.

Table 4.1: Comparison of Large Mammal Population Estimates in LMGCA

Species	1990# estimated	Density # km2	1994-95 # estimated	Density # km2
Buffalo	2240	0.67	63	0.02
Impala	2457	0.74	916	0.28
Zebra	397	0.12	249	0.08
Giraffe	777	0.23	358	0.11
Elephant	0	0	888	0.27
Kudu	0	0	220	0.07

Hartebeest

large game species such as buffalo were generally depleted for a number of reasons including over hunting and human densities estimated to have reached 18 persons per square kilometer. Systematic Reconnaissance Flight Method Censuses conducted by REWMP in 1994 and 1995, showed a marked increase in settlements and clearing of land for agriculture and livestock.

Surv

Appendix 1: African Elephant (with recent proviso permitting some trade of elephant products originating in some African States), Wild Dog and Leopard.

Appendix 11: Hippopotamus and Crocodiles

There are no records for the status of small mammals, amphibians and reptiles in the area. In this case therefore it is also difficult to conclude if there are any endemic, threatened or endangered species among these three groups. Detailed studies are therefore required to document the status and threats of small mammals, amphibians and reptiles.

Wildlife Utilization

The form of wildlife utilization in the proposed pilot WMA is mainly tourist hunting. Records indicate that, tourist hunting in the Lunda Mkwabi Game Controlled Area (LMGCA) started in 1993, but was stopped shortly in LMGCA South due to depleted wildlife populations. At present, tourist hunting continues in LMGCA north. The main species hunted are lion, leopard, buffalo, greater kudu and impala. From the safari operator's perspective, hunting is satisfactory to good but is reliant on and complemented by hunting blocks adjacent to Rungwa Game Reserve.

Hunting quotas for previous years has been as follows:

Table 4.2: Hunting Quotas

	Phragmites bushes	These form dense cover along streams, stream banks and stream beds where there is soil deposit and silting. Assists protection against soil erosion and is refuge for wildlife and birds' nestings. Reeds useful for housing
Woodland Vegetation	High altitude Brachystegia woodland	The Brachystegia woodland represents the climatic climax vegetation on higher altitudes in the mountain ranges at the top and on the flanking, escarpments. Crown cover 50%. Usually evergreen, e.g. <i>Afzelia</i> , <i>Brachystegia</i> , <i>exep</i> <i>IB</i> <i>(a)</i> <i>13Q</i> <i>2345</i> <i>1602'</i> deciduos. Burning and fire-protection experiments in Zambia suggest that some woodland is secondary and some represents an ecotone betweenoto a3.81 189..81 * 1

Scrubland bushland	and	lying areas Acacia dominants	dominant genus is Commiphora. <i>Acacia nigrescens</i> with <i>Terminalia spinosa</i> on
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There are two permanent rivers in the area, namely Great and Little Ruaha. The Great Ruaha is one of the Tanzania's largest rivers. It starts in the highlands of the Usangu catchment. From here it flows through Usangu wetland-home to 350 species of birds, and onwards to the Ruaha National Park and Mtera Reservoir. The river is said to have dried every dry season since 1993, with the dry period (July to September) tending to start earlier and last longer. This has a lot of severe impacts on the wildlife, including aquatic fauna, and may threaten the tourist potential of the proposed pilot WMA. Over-extraction of water for irrigation in the dry season, compounded by deforestation in the upper catchment are believed to be the main causes of this problem.

This information could not be mapped, as it is considered too raw. Adequate time and synthesis is required before mapping the actual corridors.

4.2.6 Status, trends and use of fisheries, forests and bee keeping resources

Fisheries

There is a subsistence level fishery activities taking place in the rivers. Main species of fish harvested are covered in the economic part of the study. The level of fishing taking place is so small, that communities do not pay attention to it. There are therefore no proper records to indicate the problems and potentiality of this sector.

Forests

In the miombo woodlands there is a natural diversity of trees, providing local people with a wide variety of products, including wood, fuel, fruits, fodder and medicinal plants. A study by Nahonyo, et al (1998) indicate that the Acacia-Commiphora vegetation communities are under pressure from livestock grazing, fuelwood and cultivation. On the other hand, miombo woodlands are under pressure mostly from cultivation, timber harvesting, charcoal processing and fuelwood collection.

Commercially harvested trees, which require immediate attention, are:

Brachystegia species which are mainly used for charcoal and commercial fuelwood

Pterocarpus angolensis which is used for timber

Azelia quazensis which is used for timber

Entandrophragma bussei which is used for timber.

The most important fuel wood species (in descending order) for each village in Idodi and Pawaga Divisions are provided in Tables 1.13 and 1.14 in Appendix 1.

Pastoralists against Community Wildlife Management Area Leadership

Pastoralists have a tendency of grazing in the proposed pilot WMA due to availability of pasture and water. This creates conflicts in resource use as they are limited.

Illegal/Over Utilization of Forest Products

As indicated above, there is a problem of illegal harvesting of forest products in the proposed WMA, and most likely over utilization of forest products in the surrounding communities. This threatens the ecological integrity of the area.

4.3 Emerging Issues: A Discussion

4.3.1 Ecological Isolation

It was reported during the field visit that there are ecological links between Ruaha Park and Udzungwa National Park. Wildlife is believed to move from these areas to Twatwatwa area. However, wildlife corridors for these areas are not known. The intensity of land use in between these two areas puts a lot of doubt on the possible continued ecological links.

The major effects of ecological islands of wildlife or forest are the decline of species. There may also be local extinctions of especially rare species and small populations as habitats become more isolated. There also be local extinctions of especially rare species and small populations as habitats become more isolated. Because of discontinuous habitat, dispersal of both animals and plants becomes difficult, and this has more effect on amphibians and reptiles than mammals and birds. Habitat isolation also reduces plant diversity and quality and hence animal diversity will also be affected.

4.3.2 Drying up of water in Great Ruaha during the dry season

Drying up of Great Ruaha river threatens the possibilities of maintaining the potentials of

levels downstream. As a catchment area, there are also threats which impact the water yielding capacity of the area. Among those, the most important are;

4.3.3 Timber Extraction

Timber extraction is contributing to deforestation. For quite sometimes there have been no controls in place and the extraction was done in unsustainable manner.

4.3.4 Clearing of woodland and bushland for agriculture

Acacia/Commiphora/Lannea woodland and bushland is found on alluvial soils of low slope and is often cleared to open up new land for cultivation. Because few or no inputs are made in the form of fertilizers to increase and/or maintain soil fertility, the plots are abandoned after a few years.

4.3.5 Overgrazing

Overgrazing on the Usangu plains is a serious problem. Overgrazing has direct impacts on the vegetation and tend to compact the soil. All these affect water filtration and retention capacity.

4.3.6 Crop damage

Crop damage is rampant in most villages in the area. While communities now are appreciating the value of wildlife, the continued problem of crop damage may negate these values, especially if the benefits obtained from wildlife are small compared to damages made.

4.3.7 Water pollution through fertilizers and pesticides

Tobacco farming which is taking place in some villages adjacent to the villages surrounding the proposed pilot WMA tend to use a lot of chemical fertilizers and pesticides. Most of these chemicals are poisonous and may have long term effects to wildlife if discharged to Little and Great Ruaha.

4.4 Conclusions and Recommendations

The proposed WMA has most ecological qualities which make it qualify to be designated as a pilot WMA. The communities are also well prepared and the level of institutional development is encouraging. In order

REFERENCES

- Baldus R.D., Hahn R., Kaggi D., Kaihula S., Murphree M., Mahundi C.C., Koettcher K.,
Sieve L and Zacharia M (2001): Experience with community based wildlife
Conservation in Tanzania: Tanzania Wildlife Discussion Paper No. 29.
- Boshe, J.I. (1989). Wildlife conservation in the Ngorongoro Conservation Area in

APPENDICES

Appendix I: Im

Table I.5: Population Estimates of Hartebeest in LMGCA

Year	Number	95% Confidence Level
June 1995	0	
April 1999	7	366
October 1999	0	
May 2000	0	
November 2000	0	
April 2001	0	
October 2001	0	

Table I.6: Population Estimates of Impala in LMGCA

Year	Number	95% Confidence Level
June 1995	916	
April 1999	690	55
October 1999	419	154
May 2000	743	85
November 2000	446	64
April 2001	1028	60
October 2002	234	105
Merged Estimate	453	44

Table I.7: Population Estimates of Kudu in LMGCA

Year	Number	95% Confidence Level
June 1995	220	
April 1999	116	124
October 1999	119	185
May 2000	10	186
November 2000	91	86
April 2001	37	108
October 2002	81	107
Merged Estimate	22	95

Table I.8: Population Estimates of Reedbuck in LMGCA

Year	Number	95% Confidence Level
June 1995	0	
April 1999	22	199
October 1999	5	358
May 2000	0	
November 2000	0	
April 2001	0	
October 2002	0	

Table I.14: The Most Important Fuel Wood species in Pawaga Division

Isele Kisanga