# Baseline Study of the Energy Sources/Options and Planning in

# Manica and Sussundenga Districts

# Of

# Manica Province, Mozambique

Project Report Submitted to:

**PRACTICAL ACTION SOUTHERN AFRICA**
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Under the project:

**ENERGISING THE MILLENNIUM DEVELOPMENT GOALS – SETTING THE ENABLING ENVIRONMENT (E-MINDSET) IN SOUTHERN AFRICA**

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**INDEX**

## ABOUT THIS BASELINE STUDY

Energising the Millennium Development Goals – Setting an Enabling Environment (E-MINDSET) is a project funded by EU (Intelligent Energy Europe) in Southern Africa. It is a local level capacity building project with the objective of creating awareness and capacity in the linkages between energy and the attainment of the Millennium Development Goals (MDGs). One of the key entry points is the understanding of existing planning processes at the lowest planning units within the rural areas of each of the four selected SADC states Malawi, Mozambique, Zambia and Zimbabwe.

The MDGs are about reducing extreme poverty and hunger; achieving universal primary education for both boys and girls; gender; reducing child and maternal mortality; reversing the spread of HIV/AIDS and other diseases; ensuring environmental sustainability; and developing a global partnership for development. The MDG framework, therefore, is a global attempt to operationalise a multi-dimensional approach to poverty reduction and improvement of human welfare.

This baseline report looks at the development planning in the districts of Manica and Sussundenga of Manica Province in Mozambique. The report provides a baseline understanding of the current systems and processes, gaps and opportunities presented by the current policy practices. The objective is to mainstream energy into the planning and development processes and systems of all sectors in a participatory manner. This stems from the recognition that energy is needed for the ***accelerated*** attainment of the development goals.

This report will basically serve two purposes of benchmarking and informing local rural authorities on their current development policies, plans and strategies and to be aware of the need to re-orient their current practices to align with the global benchmarks provided by the MDGs.

This study was carried out on behalf of Practical Action and the Ministry of Energy Mozambique. The primary author of this study was Mr. Pedro Wate.

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[1] "This document has been produced with the financial assistance of the European Commission. The contents of this document are the sole responsibility of Practical Action and can under no circumstances be regarded as reflecting the position of the European Commission".

**SUMMARY**

Practical Action Southern Africa commissioned a Baseline Study of the Energy Sources/Options and Planning in Manica and Sussundenga Districts of Manica Province, Mozambique. The objective of this study was to establish the current planning framework that drives the economic and social development in the targeted rural areas of Mozambique thereby giving a snapshot of the constraints and opportunities. It gives an overview of the current energy sources and uses including technologies used. Its purpose is to identify ways and means of strengthening the cross-sectoral linkages between energy and the attainment of the MDG across sectors.

The report provides a baseline understanding of the current systems and processes, gaps and opportunities. It is the intention of E-MINDSET to mainstream energy planning and management into the planning and development processes and systems in an integrated manner as energy has been recognised as a key ingredient in the attainment development goals. Thus it is important for all development sectors to have the capacity to address energy needs within sectors.

The baseline study was carried out in three stages. The first stage involved a desk study in which some documentation were reviewed. On the basis of this information, the guidelines for the interviews with the key informants were drawn. The third stage included interaction with the relevant institutions and staff at provincial and district levels. Documentation review, two day site visit and interaction with government officials allowed the evaluator to obtain some insights on the Energy Sources/Options and Planning in the target districts.

The major development needs/challenges raised by the government officials and development agencies operating in the target districts include the following: Insufficient potable water sources, food insecurity, shortage or and inadequate education facilities and poor quality of education, inadequate and poor equipped health units, inadequate and insufficient knowledge of HIV/AIDS prevention and care among community members and inadequate HIV testing facilities in the whole district. The districts also suffer from effects of deforestation and uncontrolled bush fires, which decreases soil fertility and increases soil erosion.

Over 90% of the Manica and Sussundenga District's inhabitants are involved in farming. The main produce includes tobacco, cereals, sunflower, beans and bambara nuts, vegetables and livestock rearing of cattle, goats and poultry.

In both districts the road network to the district headquarters is reasonably good. District feeder roads are poor and where roads cross rivers there are no bridges or culverts. This disrupts communication during the wet season. Government health services are scarce and of poor quality and children are the most adversely affected. Access to education, especially for girls, is unsatisfactory, with costs and distance being the main barriers.

Firewood and charcoal extraction is highly pronounced in the district of the Manica, this is due to the fact that this district is situated between two big urban settings and also Beira

Corridor passes through which put more pressure on this resource since it is the major source of energy for the majority. This situation has led to the high deforestation rates in the district.

The study shows that Manica and Sussundenga Districts have high hydro power potential due to high relief and the many rivers and water streams with permanent running water, with suitable conditions for construction of micro hydropower systems.

Manica province also bears high level of solar radiation, with an average insulation of 5.4 kWh/day and an monthly insolation varying from 4.2 to 6.3 kWh/day, which gives the province in general and to the target districts in particular high potential for solar powered energy.

Regarding wind energy, available studies in Manica province including Manica district show that the average speed of wind in this part of the country is below 4m/s. Such low speeds are no suitable for large scale electricity production but have the potential for micro battery charging systems and water pumping.

## PURPOSE OF STUDY

E-MINDSET recognises the essential role of improved modern energy access in human development in particular for the rural populace. The long and protracted civil war that only ended in early 90's has left Mozambique and in particular the rural areas poorer and without access to essential services. Fortunately the economy is on the mend following increased and sustained investments and the abundant natural resources which has seen the country turning on the path to recovery. However for complete and equitable development, there is a need for an integrated and inclusive planning process that allows and respects for the needs of the rural people and ensure that sustainable utilisation of the natural resources benefits all including the rural majority.

Traditional energy sources such as firewood, charcoal, crop waste and cow dung are common energy sources. It is thus a challenge to take the people out of the poverty cycle. In addition the rural areas of Mozambique where huge tracts of forest exist are littered by a multitude of charcoal producers and unlicensed fuel wood extractors of which forests are an important economic part of their life.

The country faces enormous challenges in harnessing the abundant energy resources, as most of the citizens, especially those in rural areas, are poor, have limited access to modern energy services. Thus their daily energy needs are met with traditional energy resources. Mozambique is the only country among the SADC region that has institutions for energy development down to the district level. However due to a number of constraints among them capacity in knowledge, non involvement of the rural people, insufficient human personnel, and limited finance has resulted in energy planning failing to recognise and emphasise the needs and aspirations of the rural population. In addition the sectoral planning at district level has failed to integrate and create the necessary linkages of energy and other sectors.

The purpose of this study is establish the current planning framework determining economic and social development in the rural areas of Mozambique (constraints and opportunities) and to give an overview of the current energy sources and uses including technologies used. This is with a view to strengthen the cross-sectoral linkages between energy and the MDG-targeted sectors of agriculture, health, education, gender and environment.

## MAIN FINDINGS

### 1. Background and Country Overview

Since the end of the civil war, Mozambique has realized significant growth in economy scoring impressive growth rates averaging 7% annually the greatest for the region. (Ministers Cabinet, 2004) However, this growth is yet to cascade to the great majority of the country's 19 million inhabitants. Approximately 57% of Mozambicans still live in a state of absolute poverty, that is on less than a dollar a day. Latest assessments by the Government of Mozambique describe the current economic growth as 'satisfactory' (Ministers Cabinet, 2004). The local currency, Metical, has also been relative stable and the annual inflation rate stands at 14% (Ministers Cabinet, 2004).

Manica Province the focus of this study was severely affected by the sixteen-year civil war during which quite a substantial number of the population took refuge in the neighbouring country of Zimbabwe and some in the city of Chimoio, the Manica provincial headquarters. Many of the target population are returnees who are attempting to re-establish their lives. During the civil war almost all social and economic infrastructures were destroyed and are now only gradually being rebuilt.

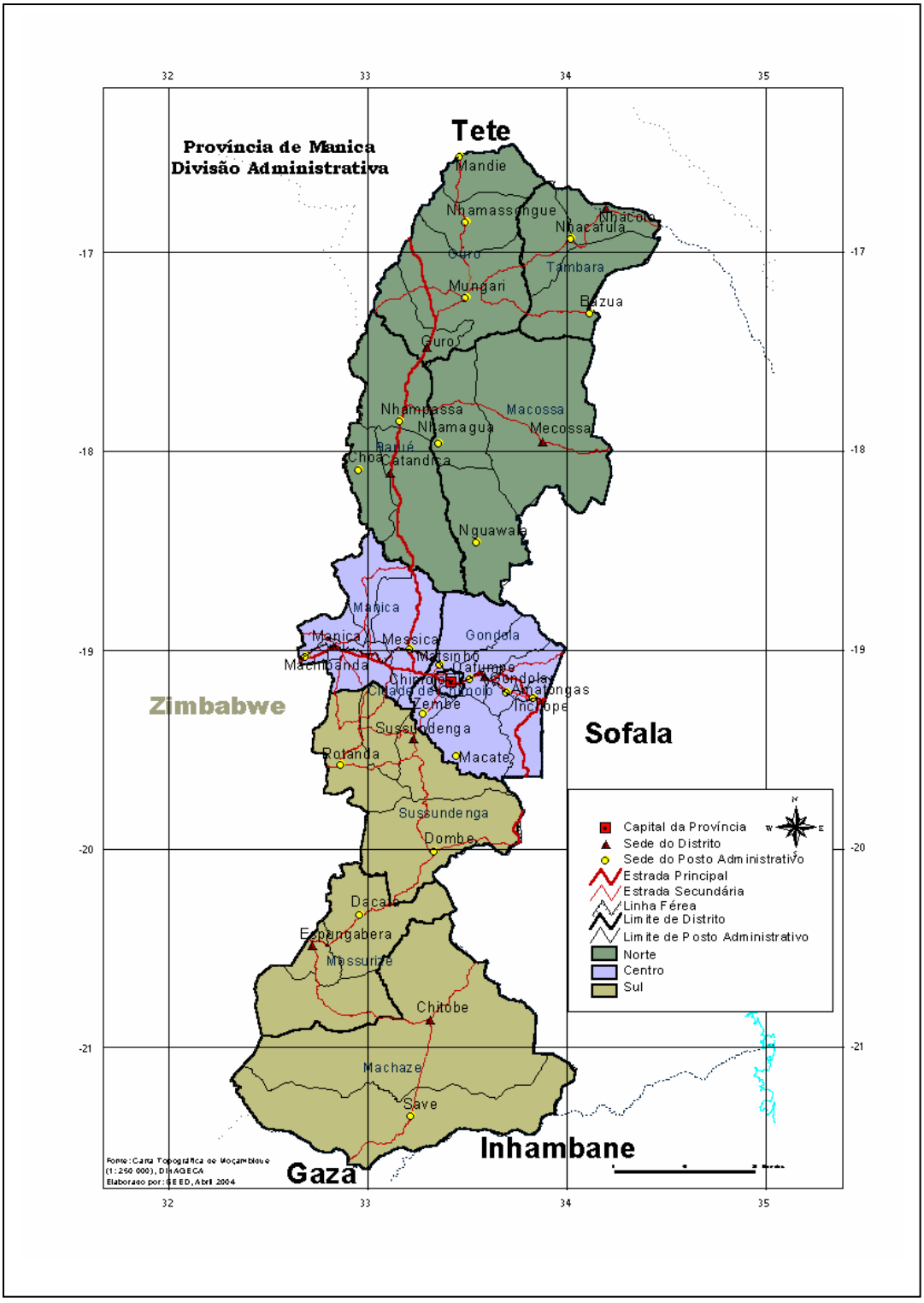


**Figure: Map of Manica Province and the Districts**

**Legend:**

- Northern districts in green (Guro, Tambara, Macossa and Catandica)
- Central districts in blue (Manica, Gondola and Chimoio)
- Southern districts in lime (Sussundenga, Espungabera and Machaze)

The food security for thousands of Mozambicans continues to be threatened by adverse weather conditions. After the devastating floods of 2000 and 2001 the past years have been characterized by poor harvests due to irregular rainfall. According to the report by the National Institute for Disaster Management up to 800,000 people lost their staple crops since September 2007, which marked the first farming season. In case the situation does not improve, it is estimated that some 840,000 people could need emergency assistance due to drought.

Despite Manica province having high agricultural and hydrological potential in some districts such as Manica and Sussundenga, the levels of poverty are high and have recurrent high levels of malnutrition. There are two major seasons characterized by a wet season from November through March and an extended dry season for the remainder of the year. As well as being highly seasonal, rainfall is often unreliable, resulting in frequent partial or total failure of staple food crops such as maize, sorghum, pulses and groundnuts. Chickens, goats and cattle are used to supplement the production of food crops. Because of a lack of irrigation, staple crops can only be grown during the rainy season and households must rely on stored food for the remainder of the year.

Over 90% of the Manica and Sussundenga District's inhabitants are involved in farming. The main produce includes tobacco, cereals, vegetables and livestock rearing of cattle, goats and poultry. There are small markets at the village level and a few shops in the district headquarters. Banking services, postal and telecommunications services are also available in the district headquarters. The road network is reasonably good in district headquarters but dstrict feeder roads are in poor condition, especially in areas where the roads cross rivers, there are no bridges or culverts. This disrupts communication during the wet season. Government health services are scarce and of poor quality and children are the most adversely affected. Access to education, especially for girls, is unsatisfactory, with costs and distance being the main barriers.

The majority of the population is concentrated in the headquarters of the districts and their livelihoods are based on subsistence agriculture. Before the economic challenges being faced in Zimbabwe, many residents of Manica Province used to cross into Zimbabwe for work. This trend has been reversed and a lot of Zimbabweans can now be found working in the district. The cross border trade that once flourished where goods where often bartered along the border has been disrupted which in effect has affected local livelihoods.

Mostly men now migrate either to the provincial capital of Chimoio or Beira and other even as far as Maputo seeking for better job opportunities.

The information on the average income for the district s is not available, however for the

Province of Manica it is estimated at approx $196, lower than the national average of $350 per annum.

The effects of recurrent natural disasters such as droughts and the abysmal social indicators coupled with the negative impact of the HIV/AIDS pandemic is putting a heavy burden on the economy of Mozambique. It is estimated that up to 16% of the population is infected and UNICEF statistics put at least 350,000 the number of children who have lost either their mother or both parents to AIDS.

### 1.1 Governance Systems of Mozambique

Mozambique with an estimated population of 19 200 000 according to preliminary results of the 2007 Census, is divided into eleven provinces (Fig. 1) which consist of 147 districts. The districts are further divided into administrative posts and localities.

Mozambique is a multi-party democracy in which constituencies elect the President and Members of Parliament (MPs) every five years. The districts administrators, the heads of administrative posts and those of localities are appointed by the ruling party. The President of Mozambique appoints Cabinet, Deputy Ministers and governors to head line government ministries and provinces respectively. The districts are politically headed by District Administrators. In terms of the Civil Service structures, however, the national administration is headed by the Minister for State Administration, while Provincial Governors are in charge of provincial administration. District Administrators are in charge of urban and rural districts. Organisationally, therefore, development planning in Mozambique is clustered into central (national), provincial and district levels.

### 1.2 Central and Provincial Administration

Central administration stands at the apex of the development and policy processes of Mozambique. It mainly comprises Cabinet, Cabinet Office and Prime Minister Cabinet. Cabinet provides leadership and decides on new policy directions and priorities for national development interventions. It also proposes annual national budget which is thereafter approved by the Parliament. Cabinet Office provides supervisory functions in policy development and implementation.

The Ministry of Planning and Development (MPD) is the focal point for national development planning. In collaboration with the Ministry of Finance (MF) it is responsible for preparing budget and policy guidelines to direct line ministries, provinces, districts and spending agencies (MPSAs) in the preparation of their respective annual development budgets. It also monitors the national budget implementation process. The role of sector ministries is to formulate sectoral policies, programmes and projects which are then forwarded to the MPD and MF for consolidation into a national development plan and budget. The annual national budget is presented by the MF to the National Assembly (Parliament) for discussion, comments and formulation of legislative instruments required to support the implementation of the policy decisions of the budget.

The Provincial Administration co-ordinates implementation, monitoring and evaluating of development programmes through the Provincial Development Coordinating Committee (PDCC) chaired by the Provincial Permanent Secretary. PDCC scrutinises and harmonises development plans from districts and ensures their consistency with national development priorities. The PDCC operates and implements its functions through various sub-committees that have been formed based on priority issues in the respective provinces.

### 1.3 District Administration

E-MINDSET is being implemented in Manica and Sussundenga Districts. Consequently district administration in Mozambique will be discussed with reference to Manica and Sussundenga Districts. Manica District is composed of 4 Administrative Posts and 11 localities. Sussundenga District has 4 Administrative Posts and 15 localities. Each of the Administrative posts is headed by an appointed chief of Administrative Post and the localities are headed by the leader of Locality. The community representatives from the Administrative Posts and localities together with the District administration, which is the apex public institution in the district, legally constituted with wide ranging jurisdiction to coordinate local development planning and implementation process, and provision of social services within the district. The major role of this body is to make local policies and by-laws that promote and guide development activities in the district. The District Administrator, who is appointed by the Minister of the Ministry of State Administration in consultation with the provincial and district administrations, heads the District. In addition the District has three standing departments, namely:

1. Economic Activities (includes agriculture, public work, water and sanitation, commerce and finance)
2. Education, Culture, Sports and Youth
3. Health and Social Welfare

The Manica and Sussundenga Districts employ management staff in order to manage the district. The District management staff members are responsible for executing district duties and all decisions made by the district council. The head of the district management staff is the District Administrator who is assisted by the Permanent Secretary and the three district department directors.

### 1.4 Sub-District Structures

Under the current administrative arrangement, the participation of the local people in shaping the nature of development in their communities at Administrative Post and Locality level is expected to be coordinated by the Administrative Post, Locality Committees and Village Committees. These committees should participate in the implementation and monitoring of district plans by ensuring that the implementation is consistent with their local needs and priorities. Their participation is enabled through the District Development Co-coordinating Committees (DDCC).

Traditional authorities also play a very important role, at community level, in the governance systems of Mozambique and Manica in particular. This is due to the fact that the government realized the importance of the role played by the traditional chiefdoms which were used by the colonial government in terms of community mobilization. That is why the traditional leadership structures were recently re-installed to support the government structure. The traditional leadership structures are highly respected by communities to whom they show confidence and loyalty. Currently at the locality and village levels the government and traditional leadership interface in order to insure good governance.

### 1.5 Constraints of Existing Governance System

A review (SOURCE) of the performance of the governance structures of Mozambique revealed that in spite of the changes to the local government system,
A number of factors explain the poor state of service delivery by district administration. These include the following:

1. Poor knowledge about the functioning of democratic institutions due to the fact that democracy is fairly new;
2. Inadequate funding management capacity at the district level;
3. Inadequate and late disbursements of funds; and
4. Delays in the implementation of the decentralisation policy, particularly fiscal decentralisation at district level.

### 1.6 MDG Outcomes for Mozambique

In the context of this report, the MDG target indicators can be used as proxy measures for assessing the impacts of existing national policies on human development in Mozambique and Manica province in particular. Mozambique has been monitoring its progress (Table 1 below) towards the achievement of the Millennium Development Goals (MDGs). According to the 2005 MDG report (United Nations, 2005).

**Table 1: MDG Target-indicators for Mozambique**

| INDICATOR | 1990/1992 | 2002/2003/2004 | 2015 MDG-TARGET |
|---|---|---|---|
| Proportion of people living in extreme poverty | 69.4% | 54.1% | 24% |
| Proportion of people living in extreme hunger | | | 14% |
| Literacy rates (15 - 24 year olds) | …. | 54% | 44% |
| Ratio of literate females (15 - 24 year olds) | | | 100% |
| Under-five mortality ratio(per 1,000 births) | <178/1000 | 145/1000 | 55/1000 |
| Infant mortality ratio (per 1,000 births) | <122/1000 | 100/1000 | |
| New malaria cases per 1,000 population | | | |
| % of households with access to improved water source | …. | 43% | 80% |
| % of households with access to improved sanitation | …. | 53% | |

**Source: United Nations (2005)**

## 2. Manica District

### 2.1 District Background

Manica District is situated in the central part of Manica Province. It borders in the north the district of Barue, in the south the district of Sussundenga, in the west the Republic of Zimbabwe and in the east the district of Gondola.

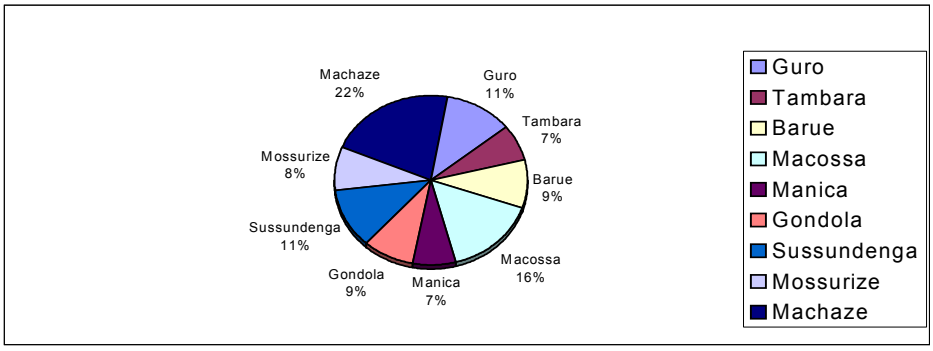


Fig.1 Districts of Manica Provinces (% of total land size)

The district headquarters have access to electrical power supplied by the Revue Hydro-electrical with an installed capacity of 66KV. This dam also supplies electrical power to the Republic of Zimbabwe.

The major development needs/challenges raised by some of the government officials and development facilitators operating in the area include the following: Insufficient potable water sources, food insecurity, shortage or and inadequate education facilities and poor quality of education, inadequate and poor equipped health units, inadequate and insufficient knowledge of HIV/AIDS prevention and care among community members and inadequate HIV testing facilities in the whole district. The district also suffers from effects of deforestation and uncontrolled bush fires, which decreases soil fertility and increases soil erosion.

Access to education, especially for girls, is unsatisfactory, with costs and distance being the main appointed barriers. Most of churches have no Sunday school programs, missing on a great opportunity to bring the Gospel to the little ones.

### 2.2 General Demographic and Economic Aspects at District

There are 246,574 inhabitants in the district and the population density is 56 inhabitants per sq Km far above the provincial density of 28 inhabitants per square km. The total area of the district is 4,391 sq Km which represents 7.1 % of the total area of the Province of Manica. The average household size is 6.2 to 6.5 members.

### 2.3 Agriculture and Livestock

According to the district statistics 90% of the households depend on subsistence agriculture for their livelihoods. The main crops in the area are maize, sunflower, benas and bambara nuts. Other seasonal crops include sorghum and sweet potatoes. Among the cash crops grown in the area tobacco is grown by the highest number of households. In addition households also grow fruits such as bananas, paw paws, oranges, lemons, mainly for own consumption, with little for cash.

The main constrains in agricultural production include pests and diseases, lack of improved seeds and seed banks for timely distribution to farmers and lack of farm implements in most households. The production of the main cash crop tobacco has been negatively affected by the low price imposed by the Mozambique Leaf Tobacco Company, the sole buyer of this crop. Lack of knowledge in improved crop production techniques is also a major constraint to agricultural production in this area. This is aggravated by the farmers' dependency on seasonal rains, which are most of the time erratic. These factors have led to most households having very low agricultural yields. According to district agriculture officials, lack of water storage facilities especially for capturing rainwater runoff poses the greatest challenge to agriculture production.

Agriculture problems include reduction of productivity due to lack of farm implements and lack of improved seeds, attack of pest and diseases.

## 2.4 Education

The literacy level in Manica District stands at 55.5 % while the national rate is 51.7 %. There are 65 public primary schools in the whole district of which 26 are full primary schools teaching from grade 1 up to grade 7. There are 4 secondary schools teaching from grade 8 to grade 10 and 1 teaching from grade 8 up to grade 12. There is one private primary school and one private secondary school. These schools represent 15 % of the existing schools in the entire province. There are no tertiary education institutions in the District.

Primary schools are well spread out in Manica District. Most of junior primary schools are of makeshift nature (made of poles and thatched with grass). This makes studying conditions very difficult and uncomfortable, especially when adverse weather conditions such as rains or thunderstorms occur. It is estimated that more than a quarter of school going age children are not attending school. Nevertheless, it is encouraging that parents in this district realized the importance of education, as signified by their free labour contribution during the construction of the makeshift school structures and teachers houses.

Another important aspect is the government's commitment to ensuring that the nation is educated as demonstrated by the introduction of free primary education initiative in 2004. The Ministry of Education also supports primary school education by providing basic education materials such as teacher and pupil's textbooks. In spite of these efforts the children of Manica District still need additional support in order to achieve their full potential in education. According to the district education officials the other major problem hindering quality education is the high number of untrained teachers in the District. In addition the officials also cited shortage of classrooms as a barrier to improved education services. This fact was also confirmed during the interviews with some of the students in Jecua Secondary School in the surroundings of the Manica District headquarters. The other need mentioned by both the officials and pupils is the great need for more secondary schools especially in the remote rural areas of the district. Currently pupils who complete grade 7 have either to move to district headquarters or to another district for secondary school education or give up studying.

Interviews by the author with government officials and some community members identified the following challenges to the enhancement of education: early pregnancies, long walking distances to and from school, shortage of school materials, lack of official identification documents (ID), lack of sports equipment/material for extra-curricula activities among others.

## 2.5 Health

Government health services are limited; those available are inadequate with children being the most adversely affected. Inadequate staffing levels hamper the effectiveness of the health services. According to 2004 government statistics there were 80 health staff in the whole district, including one medical doctor, nine medium level health technicians, 43 nurses who

have gone through basic training in nursing and 27 nurse assistants who have gone through elementary training only to provide elementary health treatments. Each health centre is staffed by one nurse and supported by health assistants with elementary training. There is a district hospital with low capacity of handling patients and 17 health centres in the whole district.

The medical doctor is based in the district health centre and is overburdened as all serious cases in the remote areas of the district are referred to him and is also in charge of the entire district. Very serious cases have to be referred to Chimoio Provincial Hospital, which is about 70 kilometres from the Manica district headquarters.

These problems have led to high levels of infant mortality rates. Although the infant mortality rate has decreased from 115.7 deaths per 1000 inhabitants in 2000 to 106 deaths per 1000 inhabitants is still high compared to the national figure of 97 deaths per 1000 inhabitants. In addition most women give birth with the help of traditional birth assistants (TBAs), which endangers the lives of both mother and child in complicated pregnant cases. Due to shortage of health staff and scarcity of health facilities preventable and easily curable diseases such as malaria, diarrhoea, respiratory infections, meningitis, conjunctivitis and sexually transmitted diseases are prevalent in the community with very little control which often lead to death.

Through the author's interaction with government officials and a few community members has shown that the communities have demonstrated eagerness to participate in the solutions to their health problems. Currently local volunteers are involved in midwifery services as traditional birth attendants and ministry of health has used this opportunity to extend its services by training and providing them with hygienic tools. Traditional medicine people have been involved in disease treatment in Manica for many centuries mostly on voluntary basis.

## 2.6 HIV/AIDS

Mozambique is one of the 9 hardest hit African countries by the HIV/AIDS epidemic. The current average national adult infection rate is 16.2%. Half of those living with HIV/AIDS are between the ages of 15 to 29 years. Manica Province in which the Manica District is situated has a rate of 19% infection, which is higher than the national average.

Although there are no reliable statistics in the District, there are signs that the prevalence of HIV-AIDS in the area is alarming. An example, the current average adult infection rate in the Province of Manica is 19% and the most affected age group are those between the ages of 15 to 29 years (CNCS, 2005). This in part has to do with the fact that the Beira Corridor, that links Beira to Zimbabwe, Malawi and Zambia makes the young women of the area vulnerable especially to the truck drivers. This to some extent explains the increasing number of Orphans and Vulnerable Children (OVC) in the area.

There are only 22 HIV testing facilities in the whole province of Manica, which makes determination of infection rate difficult. Given the limited medical extension services it is

difficult to control HIV/AIDS related diseases since the community members living in the remote rural areas have to walk long distance to the nearest testing facilities. Apart from this there is no culture of voluntary testing and disclosure resulting in a number of cases of infection and death remaining unreported. HIV/AIDS has become on the leading killer disease in the province of Manica, according to government statistics 14% of deaths in 2007 were related to HIV/AIDS.

## 2.7 Energy Use in the District

Manica province in general and the district of Manica in particular has high density of forests and this is the primary source of energy of the local communities. The total area of Manica Province is 61,661 $km^2$ and forestry formations cover an area of about 47,592 $km^2$, which represents about 77% of the total area of the Province (SPFFB Manica, 2005). Forestry resources apart from being the main source of energy are also the major source of income for local communities. According to government statistics 16 million cubic meters per year of fuel wood are used as source of energy by 90% of the Mozambican population.

Charcoal, firewood represents 81% of the energy consumed in Mozambique and the district of Manica the percentage is even higher. The urban centers exert high pressure on the biomass energy resource, thus producing negative effects on the natural forests as well as on the soils and this constitutes a major challenge for the district.

On the other hand more than 80% of the primary biomass energy is lost during the transformation (burning) of the trunks into charcoal. There is need to improve the burning techniques by building the capacity of the local communities on improved techniques as to ensure efficiency and higher productivity in charcoal production.

The Germany Development Agency (DED) is funding in Manica Province low-biomass consumption project. The project has introduced improved stoves which are being gradually adopted by the communities in different districts with Manica being one of them. According to reports by the project savings as much as 70% of the energy when using firewood in improved stoves compared to the traditional stoves are being realised.

Firewood and charcoal extraction is more pronounced in two districts in Manica Province (the Manica and Gondola districts), this is due to the fact that these two districts are between two big urban settings and also Beira Corridor passes through. The provincial forestry authorities are under pressure since the number of people willing to acquire firewood extraction licences has been increasing in the recent years. Past firewood extraction has been done in a disruptive manner without observing the existing forestry legal framework. This situation has led to the high deforestation rates of the district and that of the entire province.

Although the government of Mozambique has developed forestry and wildlife policies such as: Forestry and Wildlife Legislation, Forestry and Wildlife Regulation and Forestry and Wildlife Policy and Strategy there are still a lot of irregularities going on throughout the district and the province as far as utilization of forestry resources is concerned. Law enforcement is still an issue in the district of Manica and in the entire country.

**Table 2: Manica Province ; Licenses requested**

| Type of product | Number of licenses requested Total (per year) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
| **Firewood (esteres)** | 42 | 41 | 52 | 36 | 50 | 54 | 47 | 275 |
| **Charcoal ($m^3$)** | 81 | 180 | 235 | 111 | 173 | 390 | 117 | 1170 |
| **Total** | 123 | 221 | 287 | 147 | 223 | 444 | 164 | 1445 |

According to Forestry legislation of Mozambique, it is not allowed by law, the utilization of timber species (1st, 2nd and 3rd classes) for production of firewood and charcoal. This law is also applied for endangered species, those protected or of historical or socio-cultural value. The following are the species commonly used for fuel wood in the Province and district of Manica.

1 Tchuanga (*Pericopsis angolensis*)
2 Mutoa (*Diplorhynchus condylocarpus*)
3 Messassa (*Brachystegia speciformes*)
4 Nfuti (*Brachystegia bohemia*)
5 Mucarate *(Burkea africana)*
6 Mugodo
7 Mpopera (*Pteleopsis myrtifolia*)
8 Tchicombego

Source: SPFFB Manica

Liquid fuels such as paraffin for domestic use, diesel and gasoline are available at the district headquarters and are supplied by two fuel stations, the A Comercial and Manica Fuel Station. The district headquarters has access to electrical power supplied by the Mavuze and Chicamba Hydro-electrical dams. Mavuze dam has an installed capacity of 69.9 MVA and

the available capacity is 36 MVA while the Chicamba has an installed capacity of 38, 4 MVA and available capacity of 34 MVA. According to local statistics there is use of solar energy in a few schools and health units in the rural area of the district.

### 2.8 Hydro Power

The mountainous zones of the western part of Manica Province receive high rainfall and part of Manica District lies in one of these zones. There are many rivers and water streams with permanent running water, with suitable conditions for construction of micro hydroelectric dams.

According to Manica Province Energy Strategic Plan so far a few places have been identified for the implementation of the electric power production projects in Honde, Bárue District, and Rotanda, Sussundenga District

**Table 3: Identified areas for the construction of mini hydro electric dams**

| River (water stream) | Zone | District | Capacity (kVA) |
|---|---|---|---|
| Dawawa | Mavonde | Manica | 16,6 |
| Mussambizi | Honde | Bárue | 70 |
| Mussambizi | Panze | Bárue | 60 |
| Rotanda | Rotanda | Sussundenga | 30 |
| Bonde | Sembezeia | Sussundenga | 60 |
| Nhamangwena | Sembezeia | Sussundenga | 30 |
| Nhamutsawa | Chôa | Bárue | 200 |
| Nhazónia | Nhamussarara | Bárue | 15 |
| Revúe | Mucudo | Manica | 8 |
| Revúe | Mucudo | Manica | 8 |
| | Maridza | Manica | 12 |

### 2.9 Solar Energy

The Manica province bears high level of solar radiation, with an average insulation of 5.4 kWh/day and an monthly insulation variation of 4,2 to 6,3 kWh/day.
This type of energy can be harnessed to serve rural communities out of national electric grid and with low energy demand, specially the health centres, boarding schools and schools.

At least a health center is being electrified using solar energy in Manica District

### 2.10 Wind Power

According to studies conducted in Manica province including Manica district the average speed of wind in this part of the country is below 4m/s. Such low speeds are no suitable for

large scale electricity production abut have the potential for micro battery charging systems and water pumping.

## 3. Sussundenga District

### 3.1 District Background

Sussundenga District is situated in the southern part of Manica Province. It borders in the north the district of Manica, in the south the district of Mussurize, in the west the Republic of Zimbabwe and in the east the district of Gondola.
The Sussundenga District although has got high agricultural and hydrological potential still shows high level of poverty and has recurrent high levels of malnutrition. Rainfall is heavily seasonal with a wet season from November through March and an extended dry season for the remainder of the year. As well as being highly seasonal, rainfall is often unreliable, resulting in frequent partial or total failure of staple food crops such as maize, sorghum, pulses and groundnuts. Chickens, goats and cattle are used to supplement the production of food crops. Because of a lack of irrigation, staple crops can only be grown during the rainy season and households mostly rely on stored food for the remainder of the year.

The district headquarters have access to electrical power supplied by the Revue Hydro-electrical and receives **22** kVA of energy. The provision of electric power is done through the National Electric Power Company (EDM).
The major development needs/challenges raised by some of the government officials and development facilitators operating in the area are to certain extent the same as those for Manica District, which include the following: Insufficient potable water sources, food insecurity, shortage or and inadequate education facilities and poor quality of education, inadequate and poor equipped health units, inadequate and insufficient knowledge of HIV/AIDS prevention and care among community members and inadequate HIV testing facilities in the whole district. The district also suffers from effects of deforestation and uncontrolled bush fires, which decreases soil fertility and increases soil erosion. It was also observed by the consultant the poverty is more pronounced in the Sussundenga district than in Manica District.

Access to education, especially for girls, is unsatisfactory, with costs and distance being the main barriers. Most of churches have no Sunday school programs, missing on a great opportunity to bring the Gospel to the little ones.

### 3.2 General Demographic and Economic Aspects at District

There are 136,730 inhabitants in the district and the population density is 30 inhabitants per sq Km a little above the provincial density of 28 inhabitants per square km. The total area of the district is 7,060 sq Km which represents 8.3 % of the total area of the Province of Manica. The average household size is 6.2 to 6.5 members.

Over 95% of the District's inhabitants are involved in farming. There are small markets at

the village level and a few shops in the district headquarters. Banking services, postal and telecommunications services are also available in the district headquarters. The road networks in district headquarter are in poor condition. Government health services are scarce and of poor quality and children is the most adversely affected. Access to education, especially for girls, is unsatisfactory, with costs and distance being the main appointed barriers.

### 3.3 Agriculture and Livestock

According to the district statistics 95% of the households depend on subsistence agriculture for their livelihoods. The main crops in the Sussundenga District are maize, sorghum, millet, beans, sunflower, vegetables and others. Among the cash crops grown in the area tobacco and sunflower are grown by the highest number of households. In addition households also grow fruits such as oranges, lemons, mainly for consumption, but also for cash.

The main constrains in agricultural production include lack of resources to rehabilitate some of the irrigation systems which used to be in place, pests and diseases, lack of improved seeds and seed banks for timely distribution to farmers and lack of farm implements in most households. The production of the main cash crop tobacco has been negatively affected by the low price imposed by the Mozambique Leaf Tobacco Company, the sole buyer of this crop. Lack of knowledge in improved crop production techniques is also a major constraint to agricultural production in this area. This is aggravated by the farmers' dependency on seasonal rains, which are most of time erratic. These factors have led to most households having very low agricultural yields. According to district agriculture officials, lack of water storage facilities especially for capturing rainwater runoff poses the greatest challenge to agriculture production.

Agriculture problems include reduction of productivity due to lack of farm implements and lack of improved seeds, attack of pest and diseases.

### 3.4 Education

The literacy level is at Sussundenga District is at 21.3 % while the national rate is 51.7 %. There are 55 public primary schools in the whole district of which 9 are full primary schools teaching from grade 1 up to grade 7. There is 1 secondary school teaching from grade 8 to grade 10. There is no private owned school in Sussundenga. These schools represent 12.9 % of the existing schools in the entire province. There is no tertiary education in the Sussundenga District.

Primary schools are poorly distributed in Sussundenga District. Most of junior primary schools are of makeshift nature (made of poles and thatched with grass). This makes studying conditions very difficult and uncomfortable, especially when adverse weather conditions such as rains or thunderstorms occur. It is estimated that more than a quarter of school going age children are not attending school. Nevertheless, it is encouraging that

parents in this district realized the importance of education, as signified by their free labour contribution during the constructions of the makeshift school structures and teachers houses.

Sussundenga still needs additional support in order to achieve their full potential in education. According to the district education officials the other major problem hindering quality education is likewise Manica District the high number of untrained teachers in the District. In addition the officials also cited shortage of classrooms as a barrier to the education for all initiatives. The need for at least more secondary schools with boarding house for students from remote areas was pointed out by the district government officials.

### 3.5 Health

The health services in Sussundenga are even in worse condition compared to Manica District. The few health units in this district offer poor services. Women and children are the most adversely affected. Inadequate staffing levels hamper the effectiveness of the health services. There is an ill equipped district hospital and 14 health centres in the whole district. According to 2004 government statistics they were 38 health staff in the whole district, including one medical doctor, six medium level health technicians, 12 nurses who have gone through basic training in nursing and 19 nurse assistants who have gone through elementary training only to provide elementary health treatments.

The medical doctor is based in the district health centre. Very serious cases have to be referred to Chimoio Provincial Hospital, which is about 41 kilometres from the Manica district headquarters. The road linking Sussundenga district headquarters with Chimoio is an earth road.

Due to poor health network much more women give birth with the help of traditional birth assistants (TBAs) than in Manica District, which endangers the lives of both mother and child in complicated pregnant cases. Due to shortage of health staff and scarcity of health facilities preventable and easily curable diseases such as malaria, diarrhoea, respiratory infections, meningitis, conjunctivitis and sexually transmitted diseases are prevalent in the community with very little control which may lead to death.

Traditional medicine plays an important role in health provision in Sussundenga where the government health service is poor.

### 3.6 HIV/AIDS

In Sussundenga District although there are no reliable statistics, the prevalence of HIV-AIDS in the area has reached an alarming level.

There are only three testing facilities in the whole district of Sussundenga, which makes determination of infection rate difficult. It is difficult to have control over the HIV/AIDS related diseases since the community members living in the remote rural areas have to walk long distance to get in to the nearest testing facilities or medical centre.

### 3.7 Energy Use in the District

Liquid fuels such as paraffin for domestic use, diesel and gasoline are available at the district headquarters and are supplied by the only existing fuel station in the district, the Chirindza Petrol Station.

The district headquarters have access to electrical power supplied by the Revue Hydro-electrical and receives **22** KVA of energy. The provision of electric power is done through the National Electric Power Company (EDM).

According to local statistics there is use of solar energy in a few schools and health units in the rural area of the district.

### 3.8 Hydro Power

The mountainous zones of the western part of Manica Province exhibit high rainfall levels, being part of Sussundenga District one of these zones. There are many rivers and water streams with permanent running water, with suitable conditions for construction of micro hydroelectric dams

According to Manica Province Energy Strategic Plan so far a few places in Sussundenga District have been identified for the implementation of the electric power production projects one in Rotanda (30 KVA) and two in Sembezeia (60 and 30 KVA).

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