CHIMANIMANI CONSERVATION AREA

MANAGEMENT PLAN

VOLUME 2

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Index to Volume 2

1 Programme 1 - Limits, zoning and administrative structure

1.1 Revision of the boundaries

1.1.1 Introduction

The boundaries of both the *reserve* and the *buffer zone* are defined by the Decree No. 34/2003[1]. These boundaries need however to be revised as the decree contains some contradictions. For example, in the first article of the Decree, the eastern border of the reserve is defined as a straight line going from Mount Banya south up to where it would cross the Mucutuco river; the eastern boundary indicated in the map and defined by coordinates supplied in the annex of the decree, however, never crosses the Mucutucu river. According to these coordinates, the eastern boundary goes in a straight line for about 9 km south of Mount Banya to an arbitrary point and from there it goes about 7 km in South-eastern direction to another arbitrary point, and then again about 5.5 km south to yet another arbitrary point, close to, but not even reaching the Mucutuco river.

Moreover, as the current boundaries do not follow natural landscape features, it is impractical to re-enforce these in the field and consequently neither local residents nor the staff of the reserve know where the boundaries are.

In line with *Activity 4* of the TFCA-TDP World Bank Project ("Protected area creation and review of limits"), it is therefore proposed to make minimal adjustments to the limits such that the boundaries would follow as much as possible landscape features such as rivers, valleys and mountain crests.

1.1.2 Guiding principles

- The revision of the boundaries is a necessary step for better long term management of the Reserve.

[1] Boletim da Republica. 17 Setembro 2003. 1 Série – Numero 38

- To complete this process it will be necessary to carry out further consultations with authorities and local stakeholders and ground checking of ecologically significant areas that should be preserved.
- The final re-alignment of boundaries has to be agreed upon with the local communities directly affected.
- New boundaries should ~~New boundaries should~~:
    - as much as possible follow the original boundaries but,
    - are adjusted such as that they would follow features easily identifiable in the field such as, rivers, roads, valleys or the base mountains;
    - exclude people as much as possible from the Reserve (the core zone of the Conservation area);
    - include ecologically important areas.
- In the present proposal, the total area for the Reserve will remain approximately the same, passing from 645 km2 to 683 km2, with a new perimeter of 172 km.
- For the new limits to be effective, it will necessitate formal amendment by means of a further Decree published in the Government Gazette (Boletim da Republica).

1.1.3 Objective

- To facilitate the management of the Reserve by making its boundaries unambiguous and visible and by excluding most human settlements from the protected area.

1.1.4 Proposal for adjusting the Boundaries of the Reserve

As a starting point of discussion we propose here new limits of the Reserve and Buffer zone (see next chapter).

The new proposed boundaries for the Reserve exclude most settlements currently in the reserve, except for two villages. The two remaining villages of Nhabawa and Ferreira (Chikukwa community) are in areas of high potential for attracting tourists and can be integrated into community eco-tourism projects.

The total area for the Reserve will remain approximately the same passing from 645 km2 **to 683 km2**, with a **new perimeter of 172 km**.

Once the proposed boundaries are agreed upon with communities, they must be demarcated on the ground, either using roads/rivers like a boundary and/or implementing beacons. In grassland or in open miombo areas, demarcation can be done by slashing a 3-meter wide strip of grass. This will make limits clear and will also act as a firebreak for wildfires coming from outside the reserve. This type of demarcation has to be maintained seasonally. In other areas demarcation can be done paintings larger trees or placing sign boards (particularly along footpaths) or stone/concrete marks (according to what is more practical in each location). All beacons must be regularly maintained and be capable of withstanding the effects of regular bushfires and, in Moribane forest, the attention from elephant.

Demarcation should be done, as much as possible, in a participatory way, i.e. with the help and collaboration of local people. This will have the double objective of making sure people know where the boundaries are and also providing them a seasonal salary.

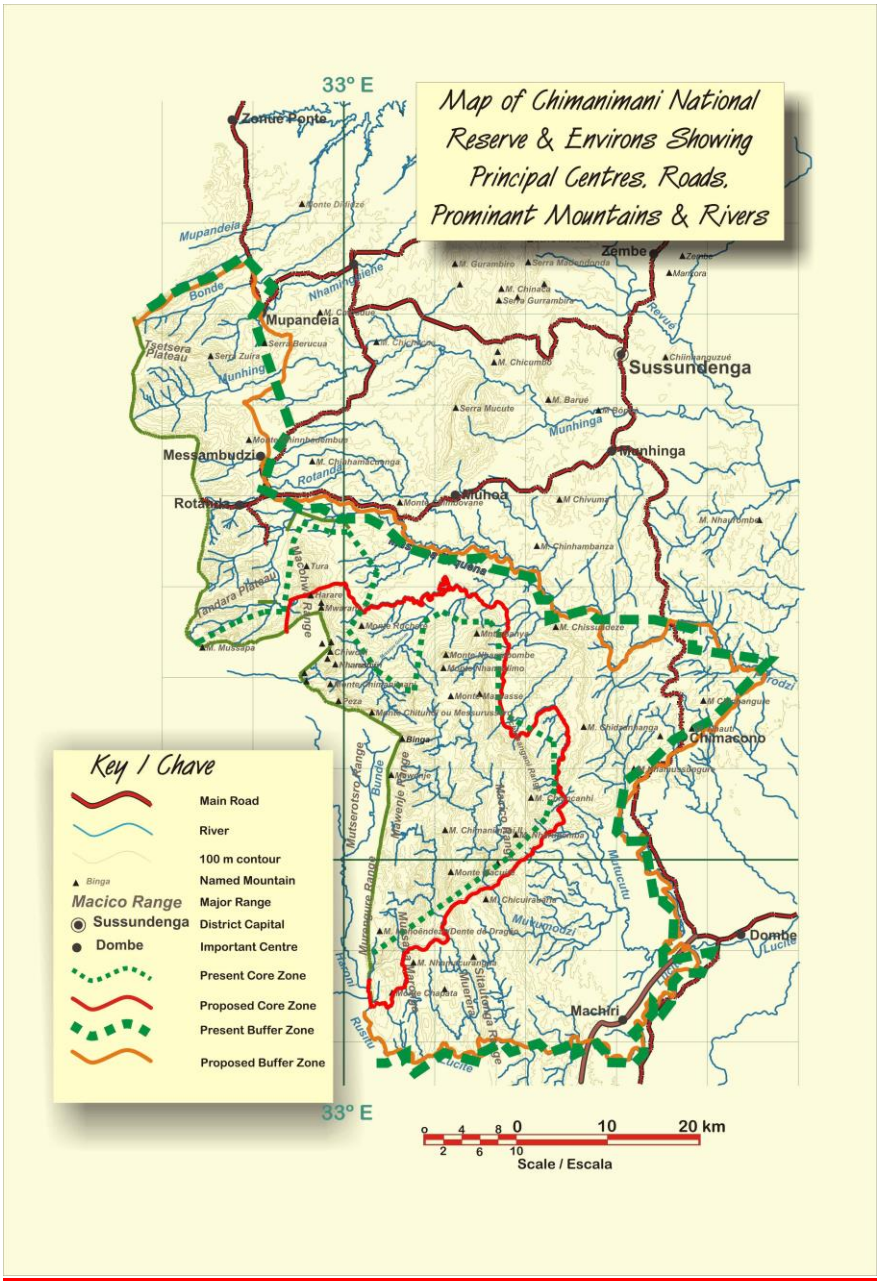
The work of demarcation can be financed by the TFCA-TDP project being included among the foreseen activities of the project ("Boundaries demarcation where needed", under *Component 4: Protected Areas management*).

1.1.5 Proposal for adjusting the Boundaries of the Buffer Zone

In the buffer zone the new proposed limits will also follow as much as possible the natural or artificial existing features of the landscape. Some of the more important characteristics are the following:

- Retain in the northern parts, Mt Tsetsera, as well as the area of Rotanda, including the Tandara plateau; but leaving some more densely populated areas out;
- In the eastern parts, Moribane forest is retained in its whole, both the parts which fall in the land of the community of Chicuizo, Mpunga, Zinguena and Chinda;
- In the South eastern part, the community land of Zomba is retained – including the forests of Zomba;

- In the South Eastern parts, in Muoco, some more densely populated areas along the Muvumodzi and Mussapa are left out;
- In the south western part, the former Maronga forest reserve is retained in the buffer zone as well as the northern parts of the Sitatonga ridges;
- The Makurupini forest is now included in the proposed new limits for the Reserve
- The total area of the buffer zone remain about equal, passing from xxx km2 to 2300 km2, while total perimeter of new proposed buffer zone will be of 343 km.



Map showing proposed new limits – Core and buffer zones - for the Chimanimani Conservation Area

Description of proposed boundaries for the buffer zone (all coordinates in decimal degrees, with WGS-84 as ellipsoid; LandSat TM image of c2000 - downloaded from zulu\nasa - and SRTM4 - downloaded from CGIAR website - were used as topographic reference base):

- In the north, starting from the boundary with Zimbabwe, at coordinates (E 32.82019388, S 19.32563003), the boundary of the buffer zone follows the Mupandei river up to the road coming from Manica town and going to Tsetsera and Rotanda (E 32.89893465, S 19.29337442).
- From this point, the boundary follows the road in South direction, up to the junction where the track starts going up on Mt Tsetsera (32.91127946,-19.35177034))
- From this point, the boundary follows the base of the mountains, going in ESE direction up to point with coordinates (E 32.94222568, S 19.36757360)
- From this point, the boundary goes up the mountain, in a SW direction, crossing the mountain ridge at (E 32.91127946, S 19.35177034)
- From this point, the boundary continues in the same direction, now following a valley and crossing the Munhena river at (E 32.93485742, S 19.40906777) and joining a dirt road on the right margin of the river at (E 32.93195223, S 19.41494232)
- From this pint, the boundary follows this road in WS direction up to a point at (E 32.89304085, S 19.43512097)
- From this points turns, to the boundary runs in roughly S direction, following another dirt track until it joins the Rotanda road at (E 32.91315167, S 19.50621206);
- From this point, the boundary follows the road, further South to Rotanda, up to the junction with the Sussundenga road at (E 32.92643413, S 19.53332913)
- From this point, the boundary goes eastwards, following the road going to Sussundenga up to a point at (E 33.05969845, S 19.55746314)
- From this point, the boundary joins the Mussapa pequeno river, at point (E 33.06141526, S 19.55963145)
- From this point, the boundary follows the Mussape pequeno river, and down further downstream the Mussapa river, up to its confluence with the Murira river at point (E 33.28446355, S 19.70364620)
- From this point, the boundary goes in NE direction, following the valley of the Murira valley, up to a point where it crosses the Sussundenga-Dombe road at (E 33.28446355, S 19.70364620)

- From this point it follows a valley (? Name), first in N direction to point at (E 33.34336026, S 19.65628017)
- From this point following a valley (? Name) going to the E, up to the Forozi river at (E 33.38480724, S 19.65927130,540338.986)
- From this point, the boundary goes in SE direction, following the Forozi river, until it Zinguena at point (E 33.44369787, S 19.71286924)
- From this point, it joins the road the Chimokono-Mavuzi road at a point with coordinates (E 33.44317983, S 19.71574846)
- From this point it follows the road, in WS direction up to Chimokono at (E 33.35204625, S 19.78601774)
- From Chimokono, the boundary follows the road to Dombe, in same SW direction up to the spring of the Mpunga river at (E 33.30821237, S 19.82555980)
- From this point, the boundary follows the Mpunga river until it joins the Mussapa river at (E 33.29285879, S 19.84058418)
- From this confluence, the boundary follows the Mussapa river in S direction, up to its confluence with the Muvumodzi river at (E 33.33770897, S 19.98716762)
- From this point, the boundary follows the Muvmodzi downstream to its confluence with the Lucite river at (E 33.33786000 S 19.98703000)
- From this point, the boundary follows the Lucite river, going upstream, up to the boundary with Zimbabwe and the confluence with the Haroni river at (E 33.02784873, S 20.03375508).

Proposed Activities

- Carry out further consultation with relevant authorities and stakeholders to discuss on the readjustment of the limits. To accelerate the consultation process and to reach a final agreement in the shortest time, consultations should be based on the revision proposal presented in this plan. The preliminary version of this realignment proposal was agreed by the stakeholders at the Sussundenga meeting
- Inform of, and agree upon, final positioning of new limits with concerned communities.
- Demarcate limits on the ground either using roads/rivers like a boundary and/or implementing beacons. In grassland or in open miombo areas,

demarcation can be done by slashing a 3-meter wide strip of grass. This will make limits clear and will also act as a firebreak for wildfires coming from outside the Reserve.

- Demarcate the limits, as much as possible, in a participatory way, i.e. with the help and collaboration of local people. This will have the double objective of making sure people know where the boundaries are and also, considering the need of their annual maintenance, providing them a seasonal salary.
- Follow up the formal amendment process until published in the Government Gazette.

1.1.6 Proposal of reclassification of the conservation area according to the new Politica de Conservação

The new Politica de Conservação will be the guiding document for the future new Mozambican law on protected areas. It is than expected that the denomination of "National Reserve" will not exist any longer and that Chimanimani will be reclassified into one of the new categories of conservation areas (the formal procedures for the reclassification of conservation areas are not know yet).

~~In our opinion t~~The most appropriate legal status for Chimanimani is the new category of Transfrontier Conservation Area *(Áreas de Conservação Transfronteiriças*) for the following reasons:

- the description given by the Policy of this new land category, although brief, fits exactly with the reality of Chimanimani. According to this document a Transfrontier Conservation Area is "part of an ecological region crossed by international frontier(s) that encompass one or more conservation areas and an area of natural resources' multiple use" (*Área de conservação que é parte de uma região ecológica que atravessa fronteiras de dois ou mais países, envolvendo uma ou mais áreas de conservação e área de uso múltiplo dos recursos*);
- it stress the importance of managing the Chimanimani ecosystem in a coordinated manner with the Zimbabwean counterpart;
- it will not bear the word Reserve, with holds the idea of exclusion, for a place that is considered by local people a sacred site and a central part of their culture.

Under the new classification, what is today the Reserve should still form the "Core Conservation Area" and the present Buffer Zone should again be the zone of "multiple uses" where agricultural and tourism development should be integrated with community based conservation efforts.

Proposed Activities

- When the new *Politica de Conservaçao* will be effective, reclassify the Chimanimani National Reserve as: "Chimanimani Transfrontier Conservation Area (Áreas de Conservação Transfronteiriça de Chimanimani).

1.2 Zonation

1.2.1 Background

Formally at least, three zones are legally distinguished in the Chimanimani Transfrontier conservation area:

- The Chimanimani National Park in Zimbabwe (155 km²)
- The Chimanimani National Reserve, which forms the core zone of the conservation area in Mozambique (634 km²)
- The Buffer Zone of the Chimanimani National reserve (1723 km²)

Furthermore the buffer zone comprises three former forest reserves

- The Moribane forest reserve (162 km²)
- The Zomba forest reserve (27 km²)
- The Maronga forest reserve (145 km²)

The legal status of these forest reserves is unclear given that the concept of "forests reserves" is not defined in the Forest and Wildlife Law (Lei n° 10/99) nor are they defined by any of the subsequent decrees governing the implementation of the Forest and Wildlife Law (principally, Decreto n° 12/2002; Decreto n° 11/2003; Diploma Ministerial n° 57/2003; Diploma Ministerial n° 96/2003). To further complicate matters, the original decrees defining the forest reserves are rather vague and imprecise on both their location and extent.

Additionally, a concession area of about 100 km² is being exploited by the forestry company IFLOMA for producing mainly pine trees, and in the lower parts also eucalyptus. Besides, there are some minor agricultural and livestock production in Tsetsera. Other agriculture, or mostly livestock production, are located just outside the buffer zone.

1.2.2 Guiding principles

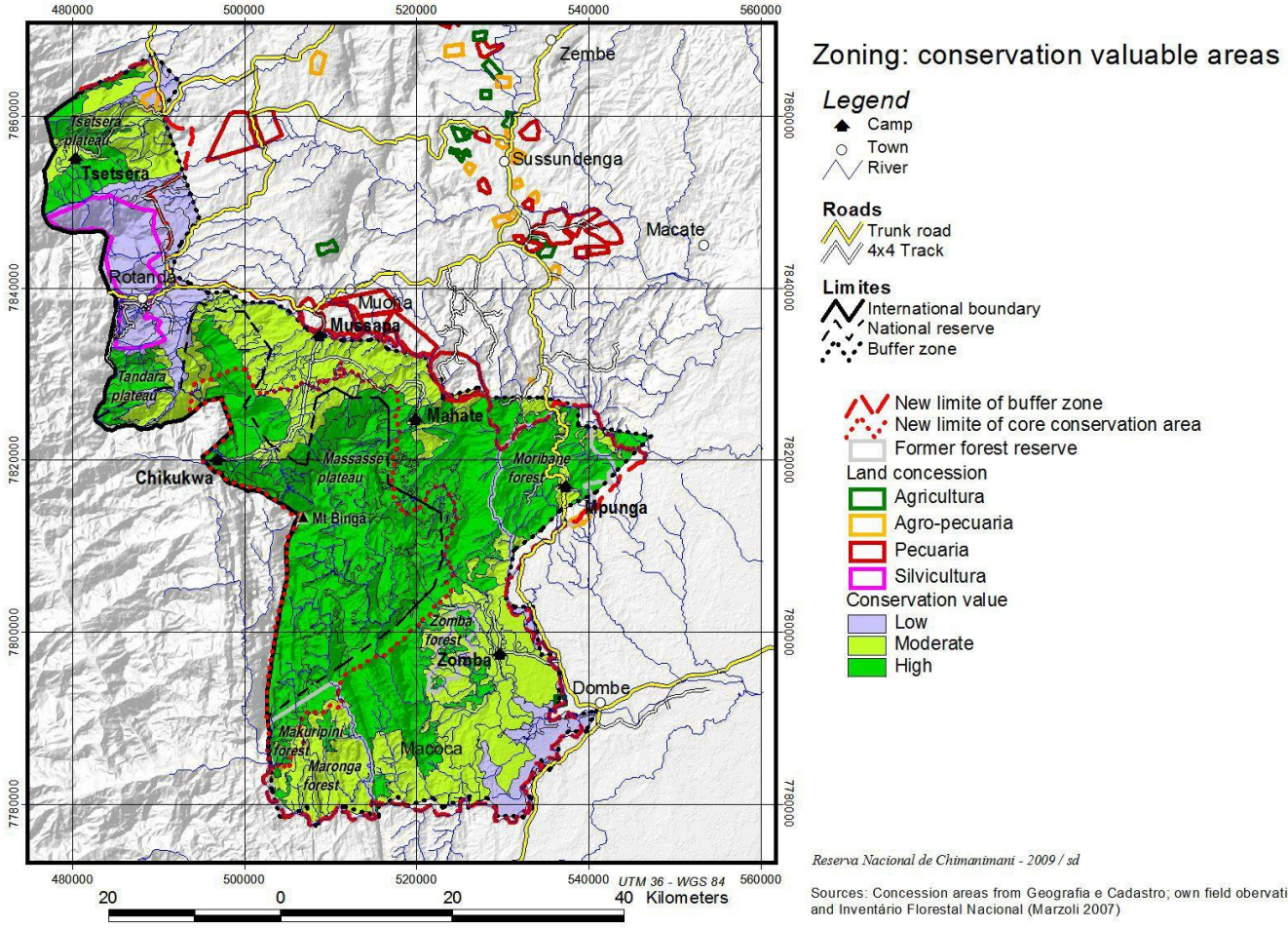
- The gazetted Core area of the Chimanimani Conservation Area (the actual Reserve), should be managed with the prime objective of maintaining it in a pristine state.
- Core area should also be the prime zone for development of eco-tourism activities (low impact, exclusively on foot, no permanent infrastructures).
- Areas inside the Reserve of highest conservation priority and sacred places (where access is not allowed to foreigners) should be mapped and given a special protection status ~~classified as "Special protection zones"~~.
- Zoning in the buffer zone, which in Chimanimani is the largest part of the Conservation Area, should be worked out with communities during the preparation of the "Community owned land use plans" (see Programme 3: "Community based management and sustainable use of natural resources in the Buffer Zone").
- Each "Community owned land use plans" should include a community zoning with the following zonation categories:
  - Areas which require special protection, for thier ~~Special protection zones, with special~~ ecological and/or cultural values, ~~that~~ should be classified as "Community Reserves" or "Areas of historical and cultural value" (see also Programme 3: "Community based management and sustainable use of natural resources in the Buffer Zone")
  - Areas of high potential for tourism development
  - Areas of value for agricultural and forestry development
  - Areas for residential areas and infrastructure (houses, schools, health centre, grain mills, …)
- The sandy-clay soils of grasslands on the Tsetsera plateau have a unique potential for the production of first generation seed potatoes. The isolation of the plateau will permit the production of disease free seeds, which would be to the benefit of hundreds of thousands of farmers in the country. Agricultural development of this area can be integrated with the conservation effort: to ascertain that the seed potatoes would remain unaffected by any disease, agriculture activities on the forested slopes of the plateau should be forbidden, a measure which will be of direct benefit to the conservation of the ecological most valuable parts of this mountain.

A zoning of the Conservation area should help conservation managers and land resources users to develop a common vision on development and conservation strategies. A detailed zoning of the Chimanimani Transfrontier Conservation Area would however require a comprehensive inventory of the occurrence of plants and animal species. As such an inventory has not yet been done, only some broad principles can be worked out at this stage.

As the largest parts of the Chimanimani Conservation Area, including some areas of high value for biodiversity conservation and eco-tourism development, detailed zoning and land-use planning will have to be worked for each of the communities involving all stakeholders.

1.2.3 Objectives

- To assure the conservation of areas harbouring endemic or threatened species
- To define areas for the development of economic activities which are not directly threatening the key conservation areas: particularly agriculture and forestry
- To assure the development of community based tourism activities



Zoning: conservation valuable areas

Legend

- Camp
- Town
- River

Roads

- Trunk road
- 4x4 Track

Limites

- International boundary
- National reserve
- Buffer zone

- New limite of buffer zone
- New limite of core conservation area
- Former forest reserve

Land concession

- Agricultura
- Agro-pecuaria
- Pecuaria
- Silvicultura

Conservation value

- Low
- Moderate
- High

Reserva Nacional de Chimanimani - 2009 / sd

Sources: Concession areas from Geografia e Cadastro; own field obervations and Inventário Florestal Nacional (Marzoli 2007)

1.2.4 Major zones

1.2.4.1 Areas of high value for nature conservation

In general all the vegetation types covered in the core conservation area, particularly the grasslands, scrublands and montane rainforest on the **Chimanimani mountains** should be conserved as they harbour most of the endemic plant species. On the Chimanimani highlands, the **Massasse plateau** should get more protection, i.e. more patrols than currently done, should be done in this area, as it is the largest area on the highlands least affected by the uncontrolled gold mining.

Outside the core conservation areas there are large swaths of **montane rainforests** on **Tsetsera plateau** and on the escarpments of the **Tandara plateau** which also deserve high priority for conservation.

Additionally, the **grasslands of the Tandara plateau** are of great importance as this is the about the only known breading area of the endangered blue swallow (*Hirundo atrocaerulea*) within the Chimanimani Transfrontier Conservation Area. The blue swallow is the rarest of the swallows in southern Africa. It favours unspoilt, mist-belt grasslands characterised by high rainfall, frequent mists, and deep soils as found on the Tandara plateau. Mozambique, having signed the convention for biodiversity conservation is hence obliged to protect such an area. The grasslands of the Tandara plateau are also rich in endemic plant species.

The **evergreen forests and woodlands** of low to mid-altitude also deserve to be as much as possible conserved. These forests represent the largest swath of tropical lowland rainforest of Southern Africa. The flora of these forests is still poorly known, but includes some of the locally threatened or endemic plant species. This vegetation formation also harbours the largest concentrations of larger mammals of the conservation area such as elephants, blue duikers, bush pigs, pangolin and clawless otters. These forests include the former forest reserves of Moribane, Zomba and Maronga. It also includes some large parts of forest on the community land of Macoca as well as the Makuripini forest on the southern slopes of the Chimanimani mountains. As these forests are mostly found in the buffer zone of the Chimanimani reserve, their conservation will have to be assured by involving the local

community and motivating them to conserve these forests as community based conservation areas.

1.2.4.2 Areas of value for agricultural and forestry development

The **valleys at the base of the Tsetsera and Tandara plateaux** are already well used for agriculture; the presences of perennial streams allow dry season cropping of wheat, "Irish" potatoes and onions. Most recently the cultivation of soya beans has been promoted in this area as an additional cash crop in these areas. Improvement and intensification of agriculture in the valleys is of prime importance to reduce demand for land on the upland and slopes.

The sandy-clay soils of grasslands on the **Tsetsera plateau** have a unique potential for the production of **first generation seed potatoes**. Plans are being developed by the Ministry for Agriculture and Rural Development to have about 50 ha of the current grassland for the production of seed potatoes which would be produced from disease free tissue cultures. The isolation of the plateau will hence permit of disease free seeds, which would be to the benefit of hundreds of thousands of farmers in the country. To ascertain that the seed potatoes would remain unaffected by any disease, agriculture activities on the slopes of the plateau should be forbidden, a measure which will be of direct benefit to the conservation of the ecological most valuable parts of this mountain.

A similar development scheme could be considered for the **Tandara plateau** which could be suitable for second and third generation seed potatoes. This should however only be considered if the cultivated area would be not the breeding grounds of the blue swallows and which would mean that it should not exceed 50 hectares.

The hills north and south of the town of Rotanda are principally used as **pine plantation by IFLOMA**. The management of these plantations is of no direct conflict to the conservation objectives of the Chimanimani Conservation Area. As IFLOMA is hoping to qualify for FSC certification the ecological value of these plantations will increase, as e.g. they will have to clear exotic tree species if they are exploited and as will not be allowed to plant along streams. The plantation and the infrastructure of IFLOMA could be additional assets for tourism development, e.g. by offering wood cabins where tourists can stay and the forest trails may be attractive for mountain bikers.

The **lowland areas** around Zomba and Dombe having rich alluvial soils and the presence of the major rivers represent great potential for irrigated agriculture. These areas have already high population concentrations of substance farmers. These farmers are mainly engaged in subsistence farming and a most interesting development is the resurgence of the cultivation of sesame as a cash crop. The warm climate and fertile soils are particularly suitable for this crop. An economic viable cash crop in this area may help reduce pressure on the rainforest parts.

1.2.4.3 Areas of high potential for tourism development

The mountain range of the Chimanimani conservation area offers unequivocal potential for attracting tourist interested in hiking in high mountains and appreciating its unique flora and fauna. Given the current difficulties for access the three sites where eco-tourism activities can most easily be developed in partnership with local rural communities are Tsetsera and Moribane in the buffer zone, and the community of Nhabawa-Chikukwa in the core conservation zone. Developing these sites will give tourists access to:

- the montane rainforest and afro-alpine grasslands in Tsetsera
- the evergreen tropical forests in Moribane and
- the highlands and of the Chimanimani mountain range

If more roads and bridges can be constructed improving the access to Mahate this would make the eastern parts of the highlands and plateaux accessible which are rich in forests, woodlands and grasslands. Improving the access to the area of Zomba would make the southern parts of the evergreen forests and mountains accessible to tourists.

1.3 Coordination of management in the conservation area

1.3.1 Introduction

At present the coordination between various governmental agencies (e.g. Provincial Services, District Authorities and Administration of the Reserve) and non-governmental (donors, NGOs) actors involved in the CCA is weak. The lack of an approved management plan for the conservation area had certainly played an important role. In the absence of a long term vision and of an agreed management strategy it was difficult to communicate a consistent message to all stakeholders and to enforce rules that by law are delegated to the management plan.

In the past there has, at times, been insufficient liaison between the project and other government technical agencies and non governmental organizations. Projects have been started in the buffer zone without the knowledge of the reserve administration. One of the roles of the proposed *Conselho de Gestao* should be to encourage coordination between all the actors involved in the reserve, both governmental and non governmental. (On the *Conselho de Gestao* see below)

Thus, in the past years projects have been developed in the buffer zone without prior consultation with the reserve authorities. A quite successfully project was developed by an international donor through the introduction of sesame as cash crops among farmers in Sussundenga district, including farmers of Chimanimani. This project was developed without involving ChNR administrators, who could have provided help and support and steer the project toward the conservation area objectives.

Recently, in 2008, a forestry annual licence has been assigned to a private company inside the ChNR buffer zone, in the Muoco community. This was without any prior consultation with the Reserve administration. The existence of this licence was only accidentally discovered during the consultations for the preparation of the management plan, when logging activities where already going on since few months.

Coordination and understanding between the Reserve administration and local communities also need to be improved. This was obvious during the interviews carried out in the preparation of this plan; for example:

- Local people had almost no knowledge of the activities, plans and long term strategies for Chimanimani.
- People were generally unaware of the boundary between the conservation zone the buffer zone, and the outer boundary of the buffer zone. At times people did not know if they lived in the reserve or were outside of it.
- In many cases rumours on the possible future developments involving local people and their rights and use of land circulate to the detriment of good collaboration and trust between them and the reserve authorities.

1.3.2 Guiding principles

- Management of the Reserve needs to be done in the most transparent way.
- ~~All~~ Local stakeholders will be represented in the new management board (CGAC) of the Reserve.
- Local communities will be, at least in the medium/long term, fully involved in the co-management of the buffer zone.
- Local communities, as custodians of the Reserve, will regularly be informed of the decision taking process of the conservation area~~Local communities, as custodians of the Reserve will actively be involved in the decision taking process of the conservation area and be involved in that at all levels~~.

1.3.3 Objective

- To have all stakeholders informed on and involved, although at different level and with different tasks, in the management and decision-making process of the Chimanimani Conservation Area.

1.3.4 The Management Board of the Chimanimani Conservation Area

To ensure an integrated management between reserve staff, local governement extension services, communities, NGOs and private investors, so that development and conservation interventions in the Chimanimani conservation area are undertaken in a coordinated it will be necessary to create a "Management Board of the Chimanimani Conservation Area", (i.e. a "*Conselhos de Gestão de Áreas de Conservação*", CGAC) as foreseen in the "~~*Proposta de*~~ *Política de Conservação e Estratégia de sua Implementação*".

According to the *Política de Conservação* it is specific task of the new National Administration of Conservation Areas (*Administração Nacional das Áreas de Conservação*, ANAC) to create the CGAC in order to ensure the participation of all stakeholders in the Conservation Area.

For Chimanimani it is recommended, in line with present Decree12/2022 and in line with the future "*Política de Conservação e Estratégia de sua Implementação*", that this board will include representatives of the local government authorities (provincial level, district level, sub-district, locality level) as well as community leaders and representatives and community based organisations, besides representatives from the private sector, NGOs, the administration of the reserve and representatives from the Chimanimani National Park in Zimbabwe.

At the Sussundenga meeting it was suggested that, besides Chimanimani Reserve managers, ~~agreed that t~~the following parts will be incorporated in the CGAC:

- Communities:
  - *Régulos* and *chefes dos grupos*;
    - Sembezia
    - Mussimua
    - Nahhedzi
    - Mahate
    - Mashonga
    - Mpunga
    - Zomba
    - Muoco

- Mcoca
- Maronga

▪ *Comité de Gestão dos recursos naturais*

- Darue
- Muoco,
- Mussapa
- Mupandeia

➢ Local administration:

▪ DPTUR
▪ SDAE (*Serviços Distrital Actividades Economias*)
▪ SDPI (*Serviços Distrital Publica Instrução*)
▪ Recursos Minerais
▪ Geografia e Cadastro

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➢ NGOs (e.g.: Fundação Micaia, Pamberi, KSM/AMBERO, Magariro ….)
➢ Private sector (e.g.: EcoMicaia Ltd, Ifloma, RDI (Monthy Hunter), Fourie ….)

For Chimanimani the main function of the proposed Board will advisory. They will for example: i) evaluate the annual report and work plan of the reserve administration as well as ii) formulate technical recommendations, including proposals for approvals or disapprovals, concerning development initiatives and related requests of licences and concessions in the buffer zone of the reserve.

Moreover, and according with the specification given by the new *Política de Conservação* , the CGAC will :

- Ensure that the management of the conservation area answers the needs of developing communities that are legally residing in them;
- Participating with the local and provincial authorities in drafting the strategic development plans;
- Oversee the implementation of concession contracts with operators aiming at maximizing the area under their responsibility without undermining the goals of conservation in the development of public private and community within the current rules on public procurement;
- Implement other measures to strengthen the capacity of conservation within the context of approved management and business plans.

Proposed Activities

- Create a "Management board of the Chimanimani Transfrontier Conservation Area", i.e. a "*Conselhos de Gestão de Área de Conservação*" (CGAC, as foreseen by the *Política de Conservação*) that will include representatives of the local government authorities (provincial level, district level, sub-district, locality level), community leaders and community based organisations (e.g. *Comités de Gestão dos Recursos Naturais*), representatives from the private sector, NGOs, the administration of the Reserve and (without any vote) representatives from the Chimanimani National Park in Zimbabwe. Function of the CGAC will be to evaluate the annual report and work plan of the Reserve administration as well as to formulate technical recommendations, including proposal for approvals or disapprovals, concerning development initiatives and related requests of licences and concessions in the buffer zone of the Reserve.
- Work with communities at all levels, not only at the Management board level. This is necessary to make sure that their opinions and interests are taken in due consideration and not overshadow, as not infrequently is the case, by the other parties/stakeholders.
- Coordinate actions with the Zimbabwe Chimanimani National Park. That in particular refers to:
    - Plan cross border patrolling for control of poaching and illegal mining (see "Law enforcement")
    - Stimulate and facilitate trans-boundary tourism (see "Tourism development")
    - Put up a coordinated programme for the management of natural resources (e.g. wildlife management and fire control programme – see "Wildlife management" and "Fire management")
    - Exchange of experiences between the staff of the two protected areas.

2 Programme 2 - Infrastructures and tourism development

2.1 Infrastructure development

2.1.1 Background

Despite 15 years of international support to the Chimanimani Conservation Area the area is still relatively underdeveloped. Local government authorities have been looking at international donors for taking more assistance to developing infrastructures in the concerned communities. As a consequence, at present, very little infrastructures exist in the area. In some part of the buffer zone, basic infrastructures as roads, bridges, schools and health posts are lacking. The only existing tourist facilities of the Reserve were built during the first phase of the TFCA project and are now in precarious conditions (in Mahate and Chikukwa) or completely unusable (in Zomba).

2.1.2 Guiding principles

- Priority should be given to build those infrastructures in the Reserve and the Buffer Zone necessary to achieve the proposed objectives of tourism development and ecosystem conservation.
- Infrastructures inside the Reserve (i.e. inside the core zone of the conservation area) should be kept at the minimum necessary in order to maintain the landscape and environment of the high plateaus and evergreen forests in as pristine a state as possible.
- All tourist camps and other buildings should be built of non-permanent materials (i.e. not including concrete, bricks, steel sheeting). All buildings and tourist facilities shall be constructed following the criterion of minimum visual and ecological impact on the surrounding environment.
- Government of Mozambique through local district and province government authorities is responsible for developing other major infrastructures of the Buffer Zone for the direct benefit of local communities.

The infrastructure requirements for the Chimanimani Conservation Area have been divided into two sections:

1) First those directly connected with the conservation area, the development of tourism, access to it and administration (i.e. connected to the TFCA project),
2) And secondly infrastructures within the Conservation Area and its Buffer Zone the latter consisting of road, bridges and social infrastructures not necessarily linked directly with the project. These infrastructures, when not implemented by the project, should be incorporated in the new Sussundenga development plan (which is under preparation and will be completed in 2010 with the support of GTZ) and the financing be then responsibility of the government or other party/donor/institution.

2.1.3 1 – Infrastructures connected to the project

Objective

To improve the access to the conservation areas of interest to tourists and to facilitate law enforcement and community based eco-tourism development.

Entrances to the Reserve

It is proposed to create four main entrances to the Reserve.

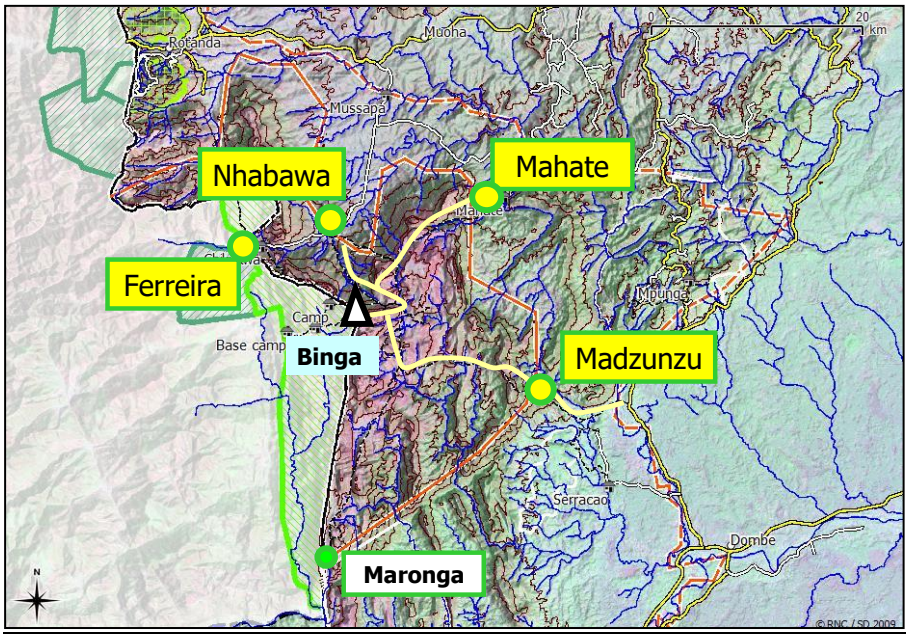
1- Nhabawa entrance (northern sector)
2- Mahate entrance (eastern sector)
3- Madzunzu entrance, on the Madzunzu route to the High Chimanimanis (south-eastern sector)
4- Ferreira/Chikukwa entrance (after agreement with the Zimbabwe authorities on border crossings).

Entrances will consist of a permanent ranger posts for 4 rangers each and a simple office for clearing tourists' entrance formalities (payment of fees, registration) and providing information to tourists.

At Ferreria and Mahate permanent huts already exist while a private sector-community joint venture camp is planned for Nhabawa, at the Mussapa Grande-Nhamnazi confluence, and

schedule to open early in 2010 (the "Binga" camp, run by the joint venture between Micaia and Nhabawa community). At Madzunzu it is recommended to make plans for a basic camp site near the entrance gate.

In the long term, and when road access will be available, an entry gate can be foreseen in the southern sector of the Conservation Area in Maronga. This gate, as for the Ferreira camp, would probably involve agreement with the Zimbabwe authorities on border crossing, and/or boat crossing across the Lucite river from Mossurize - from Mutowe or Mafusse.



MAP OF ENTRANCES (EXISTING AND PROPOSED)

Access to entrances

Access to Mussapa, Mahate, Nhabawa and Ferreira is at present only possible by four-wheel drive cars. This limits visitors' presences, makes the work more difficult for the reserve staff and increase the cost of the staff's car maintenance.

1- The drift crossing the “Mussapa pequeno” river at the current entrance (the so-called “portão”) needs to be repaired and elevated
2- A bridge, or a substantial drift, is required over the Mussapa Grande river towards Mahate plus a drift over the Nhamare river further down on the same road.
3- The current 4x4 tracks to Nhabawa and Mahate need to be improved
4- The drift over the Mussapa Grande on the road to Ferreira camp (Chikukwa) should be improved.
5- The road from Nhabawa to Ferreira and the Zimbabwe Border should be rehabilitated.

It is important to highlight the potential dangers of having such works inside a protected area. The Reserve should supervise and make sure that all the works are carried out at the minimum impact, not only on the natural environment but also on the historical buildings. Years ago, during the construction of a culvert on the road to Nhababwa, the workers made use of the stones forming the ancient walls of the Mudzi We Mahanda Great Zimbabwe culture historical site.

Tourist camps

Tourist camp facilities in the buffer zone need to be established in collaboration with the resident communities (see also the "Tourism management" chapter). Currently three such camps are foreseen by the two enterprises[2] interested in deploying eco tourism activities in the Chimanimani conservation area. The community broker[3] could also help the communities of Mahate and Ferreira (Chikukwa) to rehabilitate and revitalise the camps which had been build there during the first phase of the project. The project could financially assist this process in the short term provided that the ownership of those facilities, owned now by the GOM, will be passed to the communities. It is strongly recommended that the ChNR and government promote tourism but not be involved in either ownership or management of tourist facilities or operations.

All tourist camps should follow minimum impact constructing standards and be built of non-permanent materials (i.e. not including concrete, bricks, steel sheeting).

Trails

Walking trails need to be worked out and marked so to offer the tourist a wider variety of possible circuits and experiences – this is particular so in the parts of the buffer zone such as in Moribane forest and Tsetsera. On the other hand, the presence of high numbers of illegal gold miners inside the reserve since 2003 has the side effect that many footpaths are now open and easily recognisable. In this case only marking of trails can be necessary at crossings to indicate directions.

Sign posts, trails and protective measures need to be put in place at sites of historical interest such as around the rock paintings and the ruins of the Great Zimbabwean culture.

Ranger posts inside the Reserve

As mentioned in the section on the law enforcement, it is proposed to have six rangers post on the Chimanimani highland inside the reserve.

In order to maintain the high plateaus in as pristine a state as possible, but considering the short term need of having a permanent presence of guards inside the Reserve to protect it from illegal activities (particularly gold panning), it is recommended to build only two posts

2 These are Eco-MICAIA in Moribane forest (Mpunga community) and in Nhabawa (Chikukwa community) and RDI on Mt Tsetsera.

3 The consortium AMBERO-KSM has this role

in semi-permanent materials (wood and stones should be used whenever possible instead of concrete, bricks and steel sheeting), one in the northern sector along the trail going up Mt Binga and one in the southern sector along the Zomba trail. These should be constructed in such a manner to affect as little as possible the aesthetic appeal of the landscape:

- Keeping the size as small as possible - for accommodating maximum 5 guards each,
- Using materials of low visual impact - e.g. local stones or timber and ~~possibly~~ no concrete and steel sheeting,
- Building in concealed places;
- Exploring the possibility of building the huts following traditional architectural standards, e.g.: stone buildings of roundish shape (following the "Great Zimbabwe style")
- Respecting the ecological value of some places (e.g. preserving streams, water springs, patches of evergreen forests etc.) and the spiritual importance of the area (for this local community must be consulted before choosing the final placement of the huts).

Combustible litter may be burned on site using and incinerator of approved design. Non combustible litter should be stored in bags in scavenger-proof cages until removed to solid waste dumps outside ChNR.

~~The posts should **not** have electricity.~~ Gas, paraffin heaters and solar power should be preferred to firewood for cooking and water heating. No diesel or gasoline electric generator should be installed in these posts. It is preferable not to have electricity at all in the posts but if deemed necessary by Reserve administrators, the necessary minimum light inside the huts could be produced by solar panels exclusively

The other four camps should be temporary shelters, caves or just mobile posts.

Infrastructure for the administration of the reserves

It is proposed to install the headquarters of the reserve at the "Mussapa camp", a site which now serves as the entrance of the reserve. This site is however not in reserve but merely at the border of the buffer zone. Given its central location in the wider conservation area – the reserve and the buffer zone together – it is indeed recommendable to have the reserve's administration and a meeting room in such a location. It should consist of an administration

block, staff housing, water reticulation, information centre, toilets, and some basic camping facilities which could be available for example to researchers and other reserve visitors **(but not for tourists)**.

Solar power should be preferred to diesel generator for generating power and gas, solar power and paraffin heaters should be preferred to firewood for cooking and water heating.

This site should however **not be developed into a major base for rangers** as they have to be spread over the wider conservation area, mostly in the actual reserve and some in the areas where they have to give support to community based conservation initiatives such as in the southern forests (Moribane) and on Mt Tsetsera.

Visitor centre

A possibility to be explored is to have an information/visitor centre of the Reserve at the administrative post of Muhoa. Muhoa is on the road from Rotanda to Sussundenga in between the northern and southern parts of the conservation area. This would also be convenient for visitors. The headquarters of this administrative post, will soon be transferred to the village of Mupandeia, hence a house and office space could be readily available. Alternatively, the remains of a colonial house in Muhoa could be rehabilitated to serve as a more attractive tourist information centre. It is also foreseen that the village will soon be connected to the electricity grid, avoiding the need of running a generator.

Proposed Activities

- Create four entrances to the Reserve.
- Improve the road access to the entrances.
- Supervise that works are done with minimum impact on natural environment and historical sites.
- Procure and facilitate the creation of private-community joint ventures responsible to build tourist infrastructures in Chimanimani.
- Work out and mark trails inside the reserve.
- Build ranger posts, in non permanent materials, inside the reserve.

- Complete the infrastructure for the administration at the Mussapa portao.
- Explore the possibility of creating an information/visitor centre in Muhoa.

2.1.4 2 – Other important infrastructure within the Conservation Area and its Buffer Zone not necessarily linked directly with the project

- *Bridges.*

    i. A bridge over the Mussapa into the Zomba area. This is very important both in respect of access to the southern part of the Conservation Area and the large resident population in the Zomba area. At present there is no access by vehicle to the whole of this large area. There is an old bridge site just north of Dombe Mission and the river can sometimes be crossed for a couple of months at the end of the dry season by 4x4 cars at a place just south of Muwawa.

    ii. A bridge over the Mutucutu to the west of the Zomba Area, this links in with the bridge over the Mussapa.

    iii. A bridge over the Muvumodzi from the Muoco area in to the Zomba area (Mapira). There is an old bridge site here.

- *Roads*

The general consideration is that the Mozambican government should be responsible for constructing and maintaining roads and bridges inside the buffer zone. TFCA project is assisting the district in this task but long term responsibility should definitely be of the ANE (*Administração Nacional de Estradas*). Priority in this sector should be give to the following:

    i. There are quite a number of roads in the Zomba area in flat areas, which could be relatively easily opened up; for example the road from the Mussapa river to Zomba Serração.

    ii. The new bridges over the Mussapa Grande and the Lucite on the road to Espungabera open up access to the Muoco, Nhamussissua, Machiri areas. However secondary road to the west of the main road between the two rivers are really only open as far as the Cahora Bassa power lines. (It was possible to get to Muoco School in a 4WD car but this was the first vehicle that the school children had ever seen!)

iii. Following on from the above there was a road that went from Machiri via Muoco, Sitautonga Mountains to Maronga on the Zimbabwe border where there was a serração. Several bridges and drifts have been destroyed by floods on this road, which followed the following route from Machiri, on the main road, to Munamasse, thence to the Rio Chidza, thence to the Sitautonga Range and the Rio Murera, the Rio Murera Grande, to Maronga, then to the Rio Mussapa, then to Murongozdze, the to the Haroni River on the Zimbabwe border. Again this is an important road going to the southern part of the Conservation Area and also heavily populated areas along the several river valleys and the Rio Lucite. At present much of the access to this area is via canoe across the Lucite river from Mossurize.

Besides, Reserve managers should explore with the provincial authorities the possibility of upgrading the Chimoio-Sussundenga road. The upgrading of the present Chimoio-Sussundenga dirt road to a tar road would undoubtedly strongly boost the tourism in Chimanimani and revitalize all the economy of the area.

- *Schools and Health Facilities*

  i. All the schools in the Zomba, Maronga, Macoca, Mahate, and Nhaedzi are constructed of grass or wattle and daub.

  ii. There again are no substantial health posts in the Conservation Area.

Proposed Activities

- Liaise with Sussundenga district authorities to include other main infrastructures of the buffer zone in new the district development plan (foreseen to be ready by late 2010).
- To discuss with provincial authorities the possibility of upgrading the Chimoio-Sussundenga road.

2.2 Tourism developement

2.2.1 Introduction

The long-term objectives of the TFCA Programme are "to conserve the biodiversity and natural ecosystems within the TFCAs, and to promote economic growth and development based on sustainable use of their natural resources by local communities, with a particular emphasis on ecotourism"[4]. Increasing community benefits from growth in environmentally sustainable tourism in TFCAs is one of the main objectives of the TFCA-TD project.

Eco-tourism is the form of non-consumptive use of natural resources that holds the highest potential for generating an income to the Reserve. At the same time, as a development strategy, tourism can provide economic opportunities, offer direct benefits to environmental conservation and empower local communities to manage their own resources in a sustainable way.

2.2.2 Assets and potential for tourism in Chimanimani

Chimanimani holds very high potential for tourism. It offers vast inhabited areas, spectacular landscapes, coupled with a wide variety of unique and pristine habitats. The lack of tourist infrastructures might be a limiting factor for tourism development but on the other hand this gives the visitors a real sense of discover and wilderness that is almost impossible in the other well organized protected areas of southern Africa.

Both the reserve and the buffer zone of the Chimanimani Conservation Area consist of scenic landscapes of high value for biodiversity conservation. The vegetation harbours more than 200 threatened or endemic plant species, and is the habitat of rare or endangered animals such as the blue swallow, the Swynnerton's robin besides large mammals such as elephants, eland and sable antelopes. The area, rich in endemic plant species and various exceptional birds and endangered species, with several important evergreen forests, patches of evergreen

4 The World Bank (2005) – Transfrontier Conservation Areas and Tourism Development Project. Project appraisal document.

montane forest, as well as medium level evergreen forests, is potentially of great interest for nature lovers.

A distinctive tourist asset of Chimanimani is the rich cultural and historical background. Chimanimani has a long and rich human history stretching over thousands of years. Evidence of this can be seen in well preserved rock paintings found in the area made by hunter gatherers some 20000 – 2000 years BP[5] and in old stone walls and building ruins dating back to the time of the Great Zimbabwe Culture of the 14-15th century.

Rural communities still maintain a traditional lifestyle, with picturesque villages and a highly evolved spiritual landscape with many sacred areas, burial sites and sites of importance for various ceremonies.

The position of the area on the border with Zimbabwe also gives the opportunity to take advantage of trans-boundary tourism.

2.2.3 Present tourism development in Chimanimani~~CA~~

In spite of this, tourism in the Chimanimani Transfrontier Conservation Area is very low at present. Records from the Chimanimani National Reserve indicate that number of visitors ranges between 74 and 84 per year over the last three years (2005-'08)[6]. Tourist numbers in Chimanimani National Park in Zimbabwe are also low today. Until the year 2000 the park used to receive more than 10.000 tourists per year, while in 2008 only about 600 tourists visited the Park. This numbers are well under the actual carrying capacity for this trans-boundary protected area and this is even truer for Mozambique where tourism is at present a lot below its potential.

To some extent this might be explained by the geographical location of the area (i.e. far from the southern and northern coasts where all the main tourist sites of Mozambique are found) and the lack of easy road access. The tarmac ends just after Chimoio at some 90 kilometres

[5] Garlake P. (1995) – The hunter's vision: the prehistoric art of Zimbabwe. University of Washington Press, Seattle, 176 pp.
[6] Source: MITUR (2009) - Transfrontier Conservation Areas and Tourism Development Project: mid term report.

from the Reserve and access to the Reserve and to most of the BZ (e.g.: Muoco area, Mussapa gate, Mahate camp, Tandara plateau etc.) is only possible with a 4WD vehicle. But several parks in east Africa have long and difficult road access, yet they receive thousands of visitors per year.

The main reason of the very low tourist numbers is probably a combination of being so far off the beaten track, the absence of organized transport to the Reserve and, probably above all, the lack of promotion of the Reserve. Monte Binga is the highest peak of Mozambique, known by almost every Mozambican and by most of the foreigners living in or visiting the country. Yet Chimanimani, the conservation area that encompass it, is one of the least known protected areas of Mozambique. This is a crucial point: at present very few people in Mozambique know of the existence of a place called Chimanimani, let alone outside the country. Even the majority of people living in Chimoio do not know of the existence of this conservation area. So far promotion has been made, and money spent, on glossy local magazine usually not circulating beyond some offices of Chimoio and selected places in Maputo – none in international publications and none on more widespread much cheaper flyers. Promotion of the Reserve at local level is non-existent: no sign board or road sign advertising the reserve exists in and around Chimoio. Three peace-corps volunteers who had lived for more than 2 years in Gondola and Chimoio did not even know about the existence of such a protected area.

TOURISM IN CHIMANIMANI
SWOT ANALYSIS

	S	W
O	How to use these strengths to take advantage of these opportunities?	How do I overcome the weaknesses that prevent me taking advantage of these opportunities?
T	How do Ii use my strengths to reduce the likelihood and impacts of these threats?	How do I overcome the weaknesses that will make these threats a reality?

Strengths

1. Spectacular and unique landscapes
2. Natural habitat still well preserved and unique (endemic species). Recognized as an IBA by Birdlife International
3. Great diversity of habitats (evergreen forests, miombo, high-altitude prairies, high mountains, large rivers)
4. Authentic wilderness area
5. Cultural richness in the area: Bushmen rock paintings, ruins of the Great Zimbabwe culture, traditional lifestyle.
6. Compared to the other Mozambican protected areas, Chimanimani offers to the tourist unique attractions (high mountains, evergreen forests, large waterfalls, ancient rock paintings and old stone ruins) and unique activities (mountain hiking, rafting, rock climbing, cultural visits, and horse riding…).
7. Financing of ChNR guarantee for the next 3 years

Weaknesses

1. Conservation area almost unknown at national and international level
2. Conservation area outside present beaten tourist tracks (beaches, coastal cities, the EN1 axe…).
3. No international flights to Chimoio and usually expensive domestic flights from other Mozambique cities.
4. Little tourist infrastructures in the Reserve and the BZ.
5. Poor access and transport to the Reserve and the CA in general
6. At present almost no benefits for communities from tourism
7. No local information for tourists (including trained guides)
8. Wildlife practically absent and not visible.
9. Control of illegal activities almost non-existent.
10. Some foreign tourists believe Chimanimani is a dangerous area for presence of land-mines
11. Funds secured only for the next 3 years

Opportunities

1. Reestablishment in the near future of the tourism industry in Zimbabwe (and hence in the CNP).
2. Expansion of tourism industry in Mozambique
3. Possible long term refinancing of the project.
4. Possible private investments in the tourism sector in Chimanimani.
5. Potential easy links with other areas: (beach – cultural sites – game parks, other tourist attractions in Zimbabwe and Malawi – overland route of tourists from SA going up north.

a) Empower local communities in the management and ownership of tourist facilities
b) Attract private investments through clear rules and secured ownership
c) Build only essential and law impact infrastructures inside the reserve
d) Collaborate with CNP to develop and facilitate trans-boundary tourism
e) Develop itineraries in the different habitat and landscape of the CA so to offer a wide range of attractions to tourists
f) Develop community based cultural tourism

a) Advertise conservation area mainly though Internet web pages etc.
b) Built necessary but low impact infrastructures
c) Maintain and improve road network inside the CA and built airstrips in the BZ
d) Create local communities/private sector partnerships to own and manages tourist facilities
e) No consumptive use of wildlife to allow increase of numbers
f) Organize proper control of illegal activities, particularly illegal gold mining, poaching and illegal logging.
g) Launch in the short term a de-mining campaign in the CA and advertise the result on the international circuits (internet, tourist agencies etc.)

Threats

1. No increase of tourists numbers in the next years.
2. Tourism industry in Zimbabwe very low in the future.
3. Negative impact of tourism on ecosystems and culture
4. No funding for the conservation area after end of present phase of the TFCP.
5. Private sector investments for tourism very low or absent.
6. Local people do not get benefits from CA in the future and keep on doing destructive activities.
7. Habitat destruction by outsiders for increasing illegal activities, particularly illegal gold mining, poaching and logging.

a) Attract tourists by advertising Chimanimani at national and international level
b) Develop high quality ecotourism maintaining relatively low densities of visitors and low impact
c) Make sure local communities get benefits from tourism activities through direct involvement in management of facilities or partnership with privates.
d) Local people employed by Reserve and private investors
e) Organize proper protocol and strategy for control of illegal activities in the short term using the current secured funding

a) Advertise Chimanimani at both national and international level
b) Improve road access to Chimanimani
c) Plan the building of one or more airstrips in the CA
d) Procure tour operators willing to organize dedicated "Chimanimani tours" from main Mozambican cities
e) Set a strategy for long term financing of ChNR
f) Create partnerships between the private sector and local communities to own and manage tourist facilities
g) Organize a long term strategy for gold mining control
h) Launch in the short term a de-mining campaign in the CA and advertise the result on the international circuits (internet, tour

8. No support from local communities in the future 9. Incidents between tourists and illegal gold miners in the Reserve. 10. Land mine accidents in the region	f) Keep illegal gold mining at very low level and off the tourist tracks g) Launch in the short term a de-mining campaign	operators etc.)

2.2.4 Tourism management in Chimanimani: guiding principles

- Tourist development in the ChNR should be carried out in such a way that it does not interfere with, or alter, the natural ecosystem and scenery of the area. It should also respect its cultural values and historical heritage.
- Tourism development in Chimanimani should largely be to the benefit of local people, being the most important economic incentive for communities to make sustainable and non-destructive use of the natural resources.
- The general approach of tourism development strategy is that the ChNR and government should support and procure for private-community joint ventures and promote tourism in Chimanimani but not be involved in either ownership or management of tourist facilities or operations. Benefits for the ChNR and GoM (how ChNR and GoM will share benefits will also depend on the institutional arrangement of the new Agency for the Management and Development of Porotected areas in Mozambique) will thus be generated by entrance fees and taxes.
- Communities' associations will be actively involved in the development of and trained to manage tourism in Chimanimani in partnership with the private sector (as private sector-community joint ventures) and under the supervision of the Management board (*Conselho de Gestão* - CdG).
- The long term objective is for the community to raise their participation in the management of tourist operations thus increasing their stake in the tourism business.~~The long term objective is for the community to take over the management of tourist operations.~~
- The role of the Reserve in the tourism development should be the one of marketing the Chimanimani brand and advertising it; while at the same time guarantying/creating the conditions to offer a quality product to tourists through law enforcement, infrastructure maintenance and community involvement
- The provincial directorate for tourism (DPTUR) must make a clear distinction between facilities for tourists (to be owned and operated by the communities' associations, most likely in partnership with private investors) and facilities to be used by government agencies for their own staff accommodation and other activities. In locating, constructing and using facilities for their own purpose in the buffer zone, Government Agencies should remember that these activities are being carried out on land owned by the community concerned and should not be initiated without consultation and agreement. Use of Land (DUAT) permits must

be obtained by the Reserve to secure those areas in the buffer zone from being allocated to other uses in the future.

2.2.5 Objectives

- The long term goal of tourism management in Chimanimani should be to give to local communities an alternative (in conjunction with other initiatives) to the destructive, or unsustainable, use of natural resources while at the same time, generating enough income to the Reserve to secure its functioning.
- In the short/medium term this means attracting a higher number of tourists than at present while preserving the cultural and aesthetic values and minimizing environmental impact. This can be achieved through:
    - Offering tourists an ample variety of possible activities and attractions (from adventure to relaxation to cultural tourism);
    - Offering a quality product in the form of infrastructures but also of services, such as good information to visitors and well trained local guides;
    - Linking Chimanimani to other regional, national and international tourist circuits;
    - Better advertising of the area at local, national and international level through flyers, national magazines and newspapers, internet, international tourism fairs, specialized international travel magazines, documentaries etc.

- It is hoped that tourist numbers will substantially increase in the next 5 years. In order to preserve the cultural and aesthetic values of the area, the long term objective should be to develop an alternative to the present tourist offer developing a high quality and specialized type of tourism, where visitor densities and structures are maintained relatively low. This means developing in Chimanimani the “ecotourism” type of tourism gradually upgrading the tourism infrastructure in such a way that the upper end of the ecotourism market can also be attracted.

2.2.6 Tourism development in Chimanimani

Chimanimani offers a wide variety of tourist attractions. Possible tourist activities that could be promoted within the CCA are the following:

a) Hiking. Chimanimani Reserve is a spectacular mountain environment with hundreds of kilometres of possible tracks in the wilderness, from high peaks to vast inhabited highlands to pristine river valleys and forest trails. Hiking and camping is indeed the best way of visiting the Reserve. Forest tracks are also open in the buffer zone, particularly in Moribane (where the presence of the only elephant population of the region add a very high value for tourism), Mahate and Tsetsera.
   In order to tap from the existing and future tourism industry in Zimbabwe, trans-boundary hiking circuits in Chimanimani should be developed using the existing international border crossings across the two protected areas (see below).

b) Cultural tourism in Chimanimani, with its very rich history, spiritual and traditional lifestyle background can be a major tourist attraction. Moreover, it is a tourism component that can be directly managed by the communities thus generating direct benefits for local people.

c) Horse riding. This activity has been experienced in the past and holds potentials to attract tourist and/or to make them stay longer in the Reserve. As an example, horse rides might be organized on the grassy plateaus of Tandara and Tsetsera, but also to get tourists from Mussapa Gate to main camps in Mahate, Nhabawa and Ferreira .

d) Mountain biking in remote areas is becoming a popular sport all around the world and tourist might like to experience it in Chimanimani. In July 2009 a group of tourists from Chimoio planned a bike tour in the Reserve. Mountain biking will most likely be done along existing vehicle tracks in the central and northern buffer zone. With the only exception of the road to Ferreira, all footpaths entering the Reserve are generally to steep and rough for riding a bike on them. In the southern buffer zone of Zomba, on the other hand, tracks pass in flat or hilly plains and are certainly suitable for biking

although parts of this are intensively farmed by local people, especially along the major rivers.

e) Canoeing and rafting. The larger rivers of Chimanimani could be exploited for canoeing and rafting. Routes for these sports need to be identified and tested. Potential places for these activities are the Mussapa river after the confluence with the Mussapa Pequena and the Mucutco river.

f) Rock climbing, bouldering, abseiling (*rappelling*). In view of selling a diversified variety of possible activities and attractions, climbing activities holds potential for attracting a certain number of specialized visitors. Areas for these activities must be selected, avoiding for example sacred or ecologically fragile areas, and strict rules on the use of climbing equipment shall be defined.

Proposed Activities

(See "Footpath demarcation" and "Trans-boundary tourism activities" chapters below for proposed activities)

2.2.7 Tourist infrastructures

Camps

Tourist camp facilities in the buffer zone need to be established by private investors in co-management with the resident communities. Currently three such new camps are foreseen by the two enterprises interested in deploying eco tourism activities in the Chimanimani conservation area. These are Eco-MICAIA in Moribane forest (Mpunga community) and in Nhabawa (Chikukwa community) and RDI on Mt Tsetsera.

It is also proposed to build a camping site with basic facilities at the new proposed Madzunzu entrance, as in the short term this is going to be the only entrance to the southern part of the reserve.

A medium/long term objective could be to have a slightly more up-market hotel/lodge in Chimanimani. It would not have to be in the ChNR but near it and with good mountains views. A possible area could be Muhoa, which is on a major road, at the foothill of Serra Macute and with good view of the Chimanimani range. Again, the lodge ideally should be built by the selected community in partnership with a private investor.

The community broker[7] could also help the communities of Mahate and Ferreira (Chikukwa) to rehabilitate and revitalise the camps which had been built there during the first phase of the project. The TFCA project should financially assist this process in the short term. At present camps are owned by the GoM, but it is recommended that this will pass the ownership to local communities, that could run the tourism business in partnership with private investors.

Proposed Activities

- Promote and facilitate private investors-communities joint ventures for co-management of tourist facilities.
- Pass ownership of Mahate and Ferreira/Chikukwa camps to local communities and rehabilitate and revitalise them through a joint venture with private investors.

Road access and transport to Chimanimani

As mentioned in the "Infrastructure" chapter, access to camps shall be improved. At present Mahate and Ferreira are only to be reached with good four-wheel drive cars off the high rainy season. The precarious conditions of these tracks also prevent any possibility of attracting private operators to set up a transport service to Chimanimani.

The following recommendations are given:

7 The consortium AMBERO-KSM has this role

6- The drift crossing the "Mussapa pequeno" river at the current entrance (the so-called "portão") needs to be repaired and elevated
7- A bridge, or a substantial drift, is required over the Mussapa Grande river towards Mahate plus a drift over the Nhamare river further down on the same road.
8- The current 4x4 tracks to Nhabawa and Mahate need to be improved
9- The drift over the Mussapa Grande on the road to Ferreira camp (Chikukwa) should be improved.
10- The road from Nhabawa to Ferreira and the Zimbabwe Border should be rehabilitated.

As already mentioned in the "Infrastructure" chapter, the Reserve should control that all the construction works are carried out with the minimum impact on the environment and on the historical buildings of the area.

Finally, the Reserve should establish contact with private operators in Chimoio in order to organize transport on demand to the reserve for those tourists that do not have their own transport. This will attract for example visitors from Maputo who can afford the cost of flying to Chimoio (at present return fights Maputo-Chimoio are available with LAM at US$150-250) but would not know on arrival in Chimoio how to get to the reserve.

Proposed Activities

- Improve road access to the Reserve (see chapter 2.1 on Infrastructures).
- Supervise that works are done with minimum impact on natural environment and historical sites.
- Establish contacts with private operator to provide transport from Sussundenga/Chimoio to Chimanimani.

Airstrips and air access

High quality/high cost tourism depends heavily on air access to lodges and activity areas to reduce lengthy vehicle transfers. In addition, airfields reduce the need for vehicle movements and therefore reduce the environmental impact of tourism. Air access may also extend the access season for tourism. The possibility of installing airfields in selected sites should therefore be investigated in consultation with the relevant authorities.

Recommended sites include the following:

- The north-western tablelands, (Tandara and Tsetserra). Physically, these locations provide ideal locations for airfields, which could be constructed at relatively low cost and with relatively low environmental impact. However these areas, being above 2000 m a.s.l , will need longer runways.

- The area around Nhahedzi might provide a suitable site for an airstrip through which to access the vicinity of Chimanimani camp and Mahate. The upper Mucutuco basin might provide a suitable site for an airstrip because of its relatively level topography and open vegetation; this area would repay investigation in view of the potential of the area for wildlife-based tourism, (see below).

On the question of who should cover the costs of airstrip construction, this point should be included in negotiations with private sector bidders for the lodge sites.

Proposed Activities

- Investigate the possibility of installing airfield in the area

2.2.8 Promotion of Chimanimani Reserve

On the marketing side there is a strong need to elaborate a joint marketing strategy for the destination and to create and cultivate an image and branding for ChNR. A logo of the Reserve should be elaborate in the short term and used by all private investors promotional activities of the area.

Very few (international) tourists will come, at least in the short term, for just the Chimanimani conservation area, so there is the need, in first place, for inserting or presenting Chimanimani in chain. This could be done for example by linking it to historical sites of e.g. Nova Sofala (ruins of fort in the bay, Islamic shrine and beach) and other historical sites more nearby such

as the ruins at Zembe Sanctuary (Gondola District, Manica Province) or Penhalonga and Serra Choa further north in Manica province and areas of interest for wildlife viewing in savannah landscapes (Gorongosa National Park, Rio Save Game Reserve8 – both in Sofala province).

Promotion of the Reserve must be done at international, regional and local level. Possible methods for advertising can be made through:

- Advertising on the internet. This is essential as almost any eco or adventure tourist will use the web as the primary source of information before undertaking his trip. A website9 has been developed by the TFCA project but should be updated and linked with other websites of protected areas (e.g. Gorongosa) and tourism activities advertised on the web[10]. The website shall be improved to provide more detailed information on how to get there, accommodation facilities in the Reserve and proposed activities. As GPSs and Google Earth are becoming common tools amongst eco-tourists (particularly for those coming from South Africa[11]), it is recommended to add to the website downloadable maps of Chimanimani and also geo-referenced layers of the following data: limits, tourist facilities, roads, hiking trails, human settlements, main topographic features, historical sites and other tourist attractions. All these data should be in *.shp, *.kml and *.gpx formats to be uploaded in GPSs and imported in Google Earth and most GIS programmes.

- Small leaflets/brochures need to be produced to advertise Chimanimani in the country and abroad (in Portuguese and English). More conspicuous brochures (consisting of 8 A4 pages) can be prepared to advertise Chimanimani in tourism expos/fairs (London, Berlin, Milan, Munich etc.)

- Inviting journalists of national (including "Indico", LAM on board magazine) and international magazines (particularly south African and European e.g. Travel Africa, Getaway) to visit Chimanimani and write about it.

[8] See http://www.riosavevalley.co.za/index.html and http://www.sabirding.co.za/birdspot/140113.asp
[9] http://www.actf.gov.mz/reserva_chimanimani.html
[10] Another website promoting ecotourism activities run by MICAIA in Chimanimani in will soon be available on the internet: www.mozecotours.com
[11] It must be remembered that 80% of tourists in Mozambique are from South Africa.

- Local promotion will mainly consist in the production and distribution of the small brochures in the hotels in Chimoio, Beira and Manica.

- At least 5 large colour sign boards advertising Chimanimani and giving direction on how to reach it should be placed between Chimoio and the Munhinga crossing. Possible sites for these boards are:

- At Inchope, on the EN1/Beira-Manica road crossing
- In Chimoio, possibly in the centre or along the national tar road Beira-Manica;
- On the Beira-Manica road at the junction with the Sussundenga road;
- In Sussundenga;
- At the Munhinga junction, where it should indicate the different direction for Mussapa gate and Moribane/Mudzunzu gates

It is recommended that these boards be periodically cleaned and be well-maintained by the reserve staff.

Proposed Activities

- Elaborate and promote a logo for ChNR
- Improve TFCA website of Chimanimani and create link to other websites
- Produce colour brochures for local, national and international promotion of Chimanimani
- Invite journalists to visit and write about Chimanimani
- Place at least five large colour sign boards advertising Chimanimani along main roads and in Chimoio and Sussundenga

2.2.9 On site information to tourists

At entrance gates and tourist facilities A4 size colour maps should be on sell for tourists. The maps will show the limits of the Conservation area (reserve and buffer zone), location of tourist facilities, vehicle tracks and roads, trails, main geographical features and natural attractions (name of principal mountains, rivers, waterfalls etc.), cultural and historical sites

(rock paintings, ruins). The back of the map will show the Reserve rules and give some recommendations in case of an emergency.

Eco-tourists are prepared to spend money but they demand quality information. It is recommended the Reserve to produce A4 two-fold colour brochures giving information on the different options of trails/activities and historical sites and possible cultural attractions of the area; also, simple pocket guides of the fauna and flora of Chimanimani should be produced and sold in the Reserve (an example of the "Chimanimani flora photographic guide" is given with this plan).

Proposed Activities

- Produce A4 tourist colour maps of Chimanimani (in Portuguese and English) to be sold at the Reserve entrances and camps.
- Produce A4 2-fold or tri-fold colour brochures with information on available tourist activities in Chimanimani and contacts for reservations (in Portuguese and English).

2.2.10 Community eco-guides

One of the easiest ways of giving in the short term an income to local communities is offering employment as tourist guides. Local guides and porters are already working sporadically in Nhabawa and Moribane (Binga and Ndzou camps).

It is recommended that:

I. **The Reserve rangers should not work as guides** for the following reasons:
   - Rangers, when not no leave, must be full time occupied with their task of controlling entries at gates and patrolling the reserve to reduce the impact of poaching and illegal gold mining.

- Rangers already get salary for their work and giving the possibility to specialized local guides to work with tourists will generate income for more community members thus improving the relationships between the reserve and the local people.
- Rangers have been trained for their specific duty but not to work as guides. A fundamental component of providing high quality services to tourists is the level of information they can get from guides.
- Most of the tourist will not like to be accompanied by armed rangers.

II. Each community should select 10 guides who have deep knowledge of the area and speak fluent Portuguese and English. At present rangers often work as guides since they are the only one present when a group of tourists arrive in a camp. Some of these guides should always be available near camps since often tourists will show up without notice.

III. Guides should be specifically trained to accompany tourists. Each guide after the training should have the following competences:
    - Knowledge of the geography of Chimanimani, with ability to guide visitors within at least the guide`s own area;
    - Ability to conduct a walking tour (adapt to the pace of the tourist, give reliable information about walking distances, understand the language of the tourist, be willing to translate between tourists and villagers, manage a group of people in difficult situations) including overnight camping, with special attention paid to minimising environmental impacts and litter management (being careful with fire, taking rubbish and not cutting trees to mark paths);
    - Knowledge of the ecology, biology, culture and history of Chimanimani including the ability to conduct cultural visits;
    - Be able to give Ndau and English/Portuguese names and profound information about plants, animals and mountains;
    - Know local families where tourists can stay overnight and mediate for the payment
    - First aid and basic safety procedures including use of VHF radio;

Besides that, all guides shall be able to speak good English. This is a fundamental point: most of the guides selected (particularly for those communities not close to the Zimbabwe border, e.g. Mpunga) will not speak English and a longer term and specific training will then be

needed. It should be explored the possibility of hiring a teachers of English language from the nearby community of Chikukwa in the Zimbabwe side.

In addition to the basic license, the community guide's license should be endorsed to conduct visitors in specialist activities unsupervised. For example:
- Rock climbing;
- Mountain rescue;
- Horseback safaris:
- Canoe and rafting safaris;
- Specialist biological tours, i.e. trees, birds, butterflies, elephants etc.

Community guides traversing the area on a regular basis would be well placed to monitor activities such as illegal hunting, burning etc., and the state of the environment. This should be built into their job description and be part of their training.

Training to guides must be carried out by contracted expert trainers and should be based on the learning by doing approach. It is not recommended to give purely theoretical classes. Basic training should ideally consist of at least four different modules of 5-7 days each spread over 6 months.

IV. Most tourists will need and like to have a guide when visiting Chimanimani, but some will not. Even though if it is not recommended to impose the hiring of a guide to any tourist visiting Chimanimani, the reserve should encourage tourists to hire a guide when visiting the conservation area. The reasons for this are as follows:

- Hiring a guide will generate direct income to local people, thus providing strong incentives for conservation of the environment.
- Many of the activities to be carried out in Chimanimani are off-road activities; visitors will require guides in order to find their routes. This is true for visits in the high plateaus of the Reserve as well as for hikes in the forests of Tsetsera and Moribane (particularly if the objective is elephant tracking).

- Visitors should be accompanied by guides for safety reasons: the mountainous terrain of the Reserve holds risks of accidents.
- An important part of the Chimanimani experience will be obtaining information on the area itself, its biology and cultural history, its sacred sites etc. Providing this information is a basic part of the guides' role. Community guides can also introduce visitors to community members for cultural visits and ensure that the correct protocols are followed.
- The communities of Chimanimani have expressed concern at the Sussundenga workshop that visitors might unknowingly violate sacred sites or rules. This can be avoided if they are accompanied by community guides who can explain and enforce the rules.

Proposed Activities

- Create and train a group of selected tourist guides in each community. Rangers should not act as tourist guides, and so should not follow this specific training, but should at least be able to help visitors and provide some basic information.

2.2.11 Footpaths demarcation and signalization

Hiking in Chimanimani can be done either with a community guide hired in one of the base camps or alone. Many adventure tourists in fact like to hike and camp on their own. Despite orientation in Chimanimani Reserve is often facilitated by the presence of open landscapes, clear footpaths in the grassy plains and easy recognisable high peaks, the reserve is quite vast and visibility can rapidly turn from good to very bad. As a consequence it happened that few years ago a tourist coming from Zimbabwe got lost in the Mozambican highlands before being rescued by the Reserve's guards only several days later. It is therefore recommended that main existing trails will be demarcated.
Two possible options of doing that are:

- By painting red-white-red bands on existing stones along the trail. Demarcations shall be kept at the essential, causing the minimum visual impact on the landscape. Demarcation should be done in rocky passages where it is easier to loose the way and at paths intersection by painting stones to indicate the direction to follow.
- By natural marks in form of piled stones. These type of demarcation is temporary (must be maintained by guards and guides) and low impact but it is also not as visible as the red-white-red painting.

Wherever possible it is recommended to use the piled-stone marking to reduce the impact. Local people should also be consulted on which options to select in different places since painting (which is semi-permanent) could not be accepted in certain places (e.g. near sacred places).

A solution could be the use of a combination of the two methods, where painting on rocks is used only near camps and along medium altitude tracks while in the high plateaus, sacred areas and near historical sites piled stones will be used to preserve the intact landscape.

Simple but solid wood or metal panels (this latter solution, although less attractive is more long-lasting) indicating start of the trail shall be positioned at begin of footpaths near camps, but not inside the Reserve so to preserve the integrity of the area and the sense of wilderness for the visitor. The inscription on the panels should indicate: destination(s), total length of the trail at different destinations or at relevant points (waterfalls, rock paintings, top of mountains etc.) and estimated walking time.

Proposed Activities

- Select and demarcate footpaths using piled stones and/or painting
- Install information panels at begin of each trail near camps (not inside the Reserve).

2.2.12 Visitor accommodation provided by households

Home-stays for tourists can prove to be extremely popular among the eco-tourism clientele and it would inject tourism revenues directly to the household, thus providing direct incentives for conservation.

The previous plan recommended that individual households be encouraged to put up simple accommodation for visitors in or near their household settlements. This type of accommodation consists of nothing more than a traditional hut of thatch and poles, with minimal furnishing and a latrine/shower with minimum hygienic standards. The intended market would be the backpacker market who would carry their own food, utensils, sleeping bags etc.. The household camps would be owned and operated by the household and fees would be paid direct to the household by the visitors. A proportion of the fee might be payable to the community (say 50%).

This idea of providing this type of service has been circulating in the Chimanimani area in the past years, nevertheless, even in the absence of other competing tourism facilities, has never been realized by any household of the conservation area. What are lacking are most likely the demand of market for such a service (being the numbers of visitor in the areas insignificant to day) and also the technical capability of local families to engage them in this business. If the tourism volumes will substantially increase in the future the Reserve should encourage and support local families in putting up these accommodations in the buffer zone.

This type of facility could be developed along routes for tours based on walking or horse riding over several days starting from existing facilities such as in Moribane, Muzundzu and Mahate.

Proposed Activities

- Providing technical training to local families who wish to put up home-stay accommodation for tourists**.**

2.2.13 Trans-boundary tourism activities with Zimbabwe

Chimanimani National Park has the potential of bringing important numbers of tourists to Chimanimani Reserve in Mozambique. Until few years ago the tourism industry in Zimbabwe used to be a flourish one. Still in 1999 Chimanimani National Park hosted 12.700 tourists of which 4800 foreigners. Once the economy in Zimbabwe will stabilize and come back again, the tourism industry is also expected to increase.

Trans-boundary trails can be developed in the north, from Mussapa locality, across Corner camp in Zimbabwe to Ferreira camp;

a) In the centre, crossing the international border at across Skeleton pass to reach Nhabawa (Binga camp), Ferreira, Mahate from Mutekeswani (base camp) in CNP, and vice versa. This would be indeed the main passing points for trans-boundary tourists;
b) In the south, crossing the border at "The saddle" to reach Maronga and the southern and central parts of the Reserve. Further south near the Haroni-Lucite River Junction, when a motorable track has been open to this location, a border crossing point could be opened at that location to allow crossing from Makurupini forest and Rusitu and Haroni Botanical Reserves in Ngorima Communal Land to the Maronga area in Mozambique.

The Mountain Club of Zimbabwe did a lot of organized climbing in Mozambique in the past and might be worth exploring the possibility of co-operating with them to develop trans-boundary circuits as well as rock climbing activities.

If transfrontier tourism with Zimbabwe is to become a reality in Chimanimani the immigration procedures must be made very simple. An option that should be discussed with CNP and co-ordinated with relevant immigration authorities in Mozambique and Zimbabwe, is to allow tourists to visit the other side of the "Chimanimani trans-frontier conservation area" without the need of getting an entry visa for the other country. Ideally, within the "Great Chimanimani", the international border would become purely symbolic, with immigration and customs controls being moved back to the park boundaries and uniform regulations being applicable throughout the TFCA. In this scenario the entry fees will be paid by tourists only in

the first point of entry of the Great Chimanimani. Tourists who wish to cross the border will have to pay an additional fee and the receipt of this payment will give them the right of free movement in the opposite side of the Great Chimanimani.
The protected area that issues receipts for these cross-border visits will take account of the payments fortnightly and pay, say, 80% of these fees to the counterparty. The accounts will be presented to cross-border meeting of the *Conselho de Gestao*.
Tourists from across the border will have to pay extra only for the use of tourist facilities at camps and for the provision of services (guides, porters).

After developing the protocol of agreement, the two protected areas shall include in their tourist brochures, in addition to domestic tracks of each area, the cross-border tourist circuits showing camps location, tourist facilities and attractions on the other side of the border.

Proposed Activities

- Develop trans-boundary trails with Chimanimani National Park (CNP) in Zimbabwe.
- Take contact with the Mountain club of Zimbabwe to develop trans-boundary trails and climbing activities.
- Discuss with CNP managers and relevant immigration authorities in Mozambique and Zimbabwe the possibility of simplifying movement of tourists inside the "Great Chimanimani" (CNP plus ChNR).
- Agree with CNP authorities on redistribution of entry fees for trans-boundary tourists.

2.2.14 Land mines and tourism

Central Mozambique is known for having been an extensively mined area during the civil war years. Several de-mining campaigns have already been carried out in Manica province in the past years; yet, land mines (some of them probably dating back to the Rhodesian war) still exist in some parts of the region, including some areas of the Reserve. The impact and publicity of each new discovery of a land mine on tourism is obviously quite negative. Some

websites advertising the Chimanimani National park in Zimbabwe still refer to Mozambique Chimanimani as a dangerous area for landmines and recommend not crossing the border inside the protected area.

A further de-mining campaign is foreseen to start in Chimanimani the next months. The Reserve authorities should supervise on the quality and completeness of this campaign, acknowledging that the personal unsafety of Reserve staff, local residents and external visitors is a further obstacle to the development of the area.

Once a final in-depth de-mining campaign will be completed it is recommended that Provincial authorities will formally communicate to the national press that Chimanimani is finally a mine-free area, now completely safe for tourism. The news in the national and regional press will also contribute to the promotion to the public of Chimanimani.

Proposed Activities

- Liaise with the relevant authorities to make sure that a final in-depth and comprehensive de-mining campaign is carried out soon in the Reserve.
- Encourage provincial and national authorities in formally communicating to press that Chimanimani is a mine free area once a last comprehensive de-mining campaign is completed.

2.2.15 Keep tourism on a sustainable level

For an area like Chimanimani Nature Reserve tourism is not only a chance, but also a big threat. Today Chimanimani features a wealth of local tradition and untouched natural beauty which is rare to encounter. Tourists will not only bring problems like littering or their need for infrastructure to this untouched place. The presence of tourists will also potentially have a big impact onto the local culture. It will be important to maintain as many of the cultural and traditional characteristics of the ChNR in the face of increased tourism and other development so that its unique atmosphere is maintained.

The density of visitors is hoped to substantially increase in the future to generate significant income for the Reserve administration (also in view of the creation of the independent Agency for Conservation Areas in Mozambique) and also to give incentives for conservation to local people. At the same time, with the aim of sustainable eco-tourism, the density of tourism should be kept *relatively* low. What is a "relatively low density" it is difficult to say now. The practical experience with an increasing number of visitors in the future will show which is the desired carrying capacity for each camp/area. It is obvious that the Tsetsera plateau, an inhabited area of grassland heavily transformed in the past by human intervention, could support with little impact higher numbers of tourist than, say, the evergreen forest in the Mpunga community or the pristine habitat of the high plateaus of the Reserve. Moreover, the actual impact of tourists in each camp depends not only on the mere number of people present at the same time but also on their behaviour.

Reserve managers must be aware that a limit must exist and shall be set in the future, even if this limit is hard to calculate now and numbers of tourists are at present quite far from that.

Proposed Activities

- Monitor the impact (both on natural and on historical/cultural resources) of increasing tourism in Chimanimani and, if necessary, establish a maximum carrying capacity for each camp and area.

3 Programme 3 - Ecosystem conservation and sustainable use of natural resources

3.1 Law enforcement

3.1.1 Background

Law enforcement inside Chimanimani Core conservation area (the Reserve) is low at present. Main threats are illegal gold mining, poaching, agriculture expansion (particularly in areas of evergreen forest) and illegal logging. Law enforcement is a cross-cutting issue in this plan. In this chapter are only given general principles, while specific cases are dealt with in various chapters. References of these chapters are given below.

3.1.2 Guiding principles

- Within the core area, the Reserve is responsible for law enforcement. Reserve staff should rapidly set effective strategy for controlling the illegal gold panning, poaching, expansion of agriculture, and illegal logging.

- In the buffer zone, aim is to delegate to the communities the role of protecting the environment of the buffer zone. Until there is sufficient capability and organization among communities, the Reserve will be responsible to enforce the law in all conservation area, including the buffer zone. This is necessary to achieve the objectives of protecting the ecosystem and developing tourism in the Chimanimani conservation area.

3.1.3 Objectives

To improve the control of illegal activities in order to reduce the threats to the Chimanimani natural resources.

Proposed Activities

- Demarcate the limits of the Reserve (see chapter 1.1 on "Revision of boundaries"), so to make clear on the ground the limits for agricultural expansion

- Open ranger camps in the high plateaus of the Reserve (see chapter 2.1.3 "Infrastructures") so to have permanent presence of rangers inside the reserve.
- Work out patrolling scheme to control illegal mining and poaching (see chapter 3.3 on "Mining").
- Install VHF radio stations at headquarters and main ranger camps and equip rangers with portable VHF radios.
- Coordinate law enforcement in the Reserve with CNP authorities in Zimbabwe (see chapter 6 "Cross border actions").
- Regularly patrol demarcated boundaries to control for agriculture and human settlements expansion inside the Reserve.
- Provide training to community guards previously selected by the *Comités Comité de Gestão* in each community.

3.2 Wildlife management

3.2.1 Past and present status of wildlife in ChNR

The previous Chimanimani management plan did not recommend any consumptive use of wildlife in Chimanimani (e.g. safari hunting) on the base that wildlife numbers in 1999 were already too low to support any quota and in any case very difficult to see. The suggested strategy was to protect animals as much as possible to allow population to increase. Finally, recommendation was given to review the issue after five years i.e. in 2005. In 2009, ten years later, wildlife numbers are still very low and considering the lack of effective control in the Reserve in the past years, possibly even lower.

The depletion of wildlife in Chimanimani is not just a recent history. Already in the '70 some of the larger mammals species historically present in Chimanimani were extinct from that area. The zebra *Equus burchelli chapmanni*, rhinoceros *Diceros bicornis*, African wild dog *Lycaon pictus*, lion *Panthera leo*, hippo *Hippopotamus amphibius*, Lichtenstein's hartebeest *Alcelaphus linchensteini*, warthog *Phacochoerus africanus* and the rock hyrax *Procavia capensis* were described as extinct from Chimanimani in 1973 by Dutton and Dutton[12].

Yet, in the 1970s wildlife in Chimanimani was still abundant and diversified. Dutton and Dutton after a single week of hike in what is today the Reserve were able to give direct confirmation of the presence of the following species: chacma baboon *Papio ursinus*, blue monkey *Cercopithecus mitis*, vervet monkey *Chlorocebus pygerythrus*, leopard *Panthera pardus*, hyena *Crocuta crocuta*, cheetah *Acinonyx jubatus*, side striped jackal *Canis adustus*, elephant *Loxodonta africana*, common duiker *Sylvicapra grimmia*, blue duiker *Cephalophus monticola*, klipspringer *Oreotragus oreotragus*, waterbuck *Kobus ellipsiprymnus*, common reedbuck *Redunca arundinum*, sable antelope *Hippotragus niger*, bushbuck *Tragelaphus scriptus*, eland *Taurotragus oryx*, buffalo *Syncerus caffer*, bushpig *Potamochoerus larvatus* and crested porcupine *Hystrix africaeaustralis*. During their visit they repeatedly observed most of this species, some in large numbers, both in the high altitude plateaus and the eastern lowlands along the Mucutucu and Mussapa rive basins.

[12] Dutton T.P. and E.A.R. Dutton (1973). Reconhecimento preliminar das montanhas de Chimanimani e zonas adjacentes com vista da criação duma área de conservação

Then, during the 80' and 90' war all wildlife population (in Chimanimani as in the whole Mozambique) collapsed, greatly reducing in numbers and distribution. As a consequence other species disappeared from the reserve. Cheetah is not present anymore in Chimanimani. Buffaloes, still reported by R. Bell to be present in low numbers in Zomba are today extinct from that area. Few buffaloes might only be present in the southern part of the CCA, in some of the most inaccessible parts of Maronga forest and, according to recent observations by rangers, possibly in the Nhababwa area. Sable, reedbuck, waterbuck and eland, all described as common and easy to observe in the 1970' by Dutton and Dutton are today very rare, the reedbuck and waterbuck possibly already extinct from the Reserve.

Even the klipspringer, a species until recently considered safe and abundant in the high altitude plateaus, is today hunted with dogs and snares by illegal gold panners and, although still fairly widespread, might be at risk, along with other species, if no effective protection measures are undertaken in the coming years.

3.2.2 Guiding principles

- Hunting inside the Reserve is strictly prohibited.
- Grazing of cattle inside the Reserve is prohibited.
- Considering the ecological continuity with the CNP in Zimbabwe, wildlife management and protection should ideally be coordinated with CNP authorities.
- Wildlife management include the management and understanding of human-wildlife conflicts in Chimanimani.
- In the buffer zone, the reserve management and local communities are responsible for the co-management and the protection of wildlife.
- In the long term (i.e. when they will have the technical and organizational capabilities) wildlife management and protection in the buffer zone is *de facto* delegated to the local communities.

3.2.3 Objectives of wildlife management in Chimanimani

The long term goal of wildlife management in Chimanimani is to maintain viable populations of all large wildlife species to fulfil their ecological role in the ecosystem allowing them to build up in numbers so to be abundant enough to act as both a tourist attraction and, in community areas of the buffer zone, as food resource for local communities.

Short term objectives for wildlife management are to:

i) Protect wildlife inside the Reserve against any type of off-take by setting up an effective anti-poaching system and by coordinate anti-poaching actions and cross boundary strategy with Zimbabwe CNP staff.
ii) During the land-use plan preparation process, persuade communities to include in community land areas of wildlife protection and to provide internal rules for wildlife sustainable management.
iii) Create incentives for communities to protect wildlife
iv) Mitigate and prevent human-wildlife conflicts
v) Monitor wildlife populations' distribution and trend in the Reserve and in the community protected forests of the buffer zone.

3.2.4 Actions for the management of wildlife

3.2.5 Wildlife protection in the Reserve

Maximum protection shall be provided to wildlife inside the Reserve, excluding thus any consumptive use of it. Poaching in the Reserve is at present one of the major concerns as any further off take of the larger wildlife species will probably drive them to the extinction in the near future.

To ensure the survival of the remaining wildlife effective anti-poaching control is urgently needed. Hunting of small animals such as duikers is currently done using dogs and bows and arrows; the laying of snares is also a common practise for hunting other wildlife species. Poaching control, like control of gold panning, should aim at having a stable presence of guards in the reserve, particularly in the most critical sectors. Actions planned for control of gold mining in the Reserve can also guarantee successful control of poaching in large portions of the high-altitude areas.

Nevertheless wildlife is also present at lower altitude and it is necessary to develop a specific anti-poaching strategy to protect wildlife in those areas not concerned by the gold panning activities (i.e. the high altitude plateaus), particularly in Nhabawa, the Mahate plateau, and the forests at the mountain feet in Zomba and Maronga that will be inside the Reserve according to the new proposed limits. Anti-poaching, like control of illegal mining, implicate an uninterrupted effort and not few spectacular rangers' actions.

Since animals are free to move across the international boundary, all anti-poaching actions (and law enforcement in general, see also the "Mining" chapter) should be coordinated with Zimbabwe CNP staff to be effective.

In the future consideration must be given to the possibility of reintroducing/restocking some key species, for example zebra, eland, roan antelope, sable antelope and reedbuck. The presence and easier visibility of these species would significantly add to the attraction of the area as a tourist destination.
Any future reintroduction or restocking programme in the ChNR is subordinated to preconditions. The deep causes that drove some species to the extinction or the animal populations to the decline must firstly be fully understood and removed for the programme to be successful and durable. At present, the cause of the continuous wildlife decline in the Reserve is most likely uncontrolled hunting but detailed information and driving factors of this illegal activity are not well known. Before any such programme being even planned, poaching must be under strict control and support to this initiative from the local communities must be secured.

The previous plan indicated the upper Mucutuco river basin as an area with high wildlife potential. This area, at the border of the reserve and inside the Mahate community, still holds relatively intact habitats and, despite the expanding agriculture in the eastern sector of the Reserve, is still sparsely inhabited. It is recommended that this area will be included in the **"Community Reserves" or "Areas of historical and cultural value"** (see next chapter and the "Community based conservation and development strategies") as it holds potential for wildlife expansion and it could also be a possible site for wildlife reintroduction in the future.

Managers of the Chimanimani National Park in Zimbabwe are already evaluating the possibility of restocking some species, particularly eland, in the Eland Sanctuary and also in

the Park. To be more effective any future reintroduction plan in the ChR should be harmonized and coordinated with similar actions of the Zimbabwe counterpart.

Cattle should not be allowed to enter the Reserve (the core area of Chimanimani) in order to avoid i) competition for food with wild ungulates, ii) habitat degradation due to overgrazing and iii) spread of diseases between wildlife and domestic stock.

Proposed Activities

- Plan anti-poaching activities to ensure maximum protection to wildlife
- Coordinate anti-poaching activity with CNP in Zimbabwe
- Keep cattle outside the Reserve
- In the medium-long term explore the possibility of reintroducing/restocking some key species of large mammals (herbivores, not carnivores), coordinating this with CNP authorities

3.2.6 Wildlife protection areas in the buffer zone

Protection of wildlife in the conservation areas set aside by communities in the buffer zone will be under the responsibility of community guards selected by the Natural Resources Management Committees (*Comités de Gestão dos Recursos Naturais*) during the process of delimitation and registration of the communities (see chapter 3.5.3 "Secure land right of communities"). In the process of securing the land rights of communities in the buffer zone, communities will be assisted in preparing detailed "Community owned land use plans". These plans will identify areas destined for different purposes, including conservation areas. Reserve management should assist communities to establish community-based wildlife management plans to be integrated with the community land-use plans and conform to the creation of community based conservation areas in the buffer zone (see "Zoning" chapter). The natural resources management committees shall be encouraged to set out wildlife reproduction and dispersal areas, where hunting and trapping is not permitted, to act as the reservoirs of wildlife for the rest of the community land.

Again, the upper Mucutuco river basin (the Mucutuco river marks the border between the reserve and the buffer zone) should be given priority for being included in the "**Community Reserves" or "Areas of historical and cultural value".**

It is also recommended that communities' internal rules on the use of natural resources, established during the land-use plans preparation, should provide for the banning of commercial hunting in the buffer zone. Commercial hunting for meat in the tropics (the so-called bushmeat trade) has proved to be destructive for wildlife and can rapidly cause the local extinction of larger mammal species. On the other hand hunting of small and medium sized mammals only for local consumption can be sustainable at relatively low human densities. In order to preserve an important food resource, local communities should be encouraged to allow only local resident people to hunt and to ban any export of wild meat toward the urban centres outside the conservation area.

Proposed Activities

- Encourage communities in setting aside, during the communal land zoning process, areas for conservation of wildlife in the buffer zone, making sure that the upper Mucutuco river basin is included in the community conservation areas (see also chapter "Community based conservation and development strategies").
- Support the community to establish a ban for commercial hunting in the buffer zone, allowing only local people to hunt for local consumption. The possibility of opening areas of the buffer zone to sport hunting can be reviewed in 5-10 years by the Management board of the Chimanimani Transfrontier Conservation Area, if the numbers of wildlife will warrant it.

3.2.7 Incentives for communities to protect wildlife

Incentives for protecting wildlife should be sought in vision tourism, as safari hunting is not a viable option for Chimanimani at present. The only area that holds a real potential is Moribane forest where the last elephant population of Chimanimani live. Observing large wildlife everywhere else in the Conservation area is very difficult, with the only possible exception of some remote areas of in the high plateaus of the Reserve where occasionally klipspringers and

sables can be observed. Mpunga community is at present paying the cost of having elephants on their land, mainly in the form of lost crops, but can greatly benefit from their presence in the next future once the Ndzou Camp (Ndzou means "elephant" in Chona) will be operative. That is one of the few places in the entire southern Africa where it is possible to do elephant tracking in an evergreen forest. The example of Moribane should encourage other communities to reduce pressure on wildlife once they see the benefits that wildlife vision tourism can generate in a neighbouring community. Indeed, this is a potential long term scenario. The short term future of wildlife in the Reserve should be indeed guarantee by the rangers' work.

Another incentive for communities could come from the presence of bird watchers. Bird watching in Chimanimani holds high potential at present, particularly in the high plateaus inside the reserve as well as in Tandara and Tsetsera and in the evergreen forests. The Chimanimani conservation area is regarded to be the area of greatest avian diversity within Mozambique with some rare (near) endemic and threatened bird species: the Taita Falcon (*Falco fasciinucha*), Southern Banded Snake-Eagle (*Circlets faceplates)* and the Plain-backed Sunbird (*Athletes reichenowi*) residents of lowland forest; the blue swallow (*Hirundo atrocaerulea*), a breeding migrant in montane grassland, and the Swynnerton's Robin (*Swynnertonia swynnertoni*) a resident of montane forest.

Proposed Activities

- Promote and advertising the tracking of elephants in Moribane forest;
- Promote bird watching in the evergreen forests and plateaus of Chimanimani.

3.2.8 Wildlife sanctuaries in the buffer zone

Wildlife holds a great potential to attract tourism in a protected areas. Chimanimani is not a wildlife tourism destination, his main attractions being landscapes, wilderness and culture: nevertheless the presence of wildlife in Chimanimani would indeed attract more tourists in the area. The problem is that even with total protection it will take many years before wildlife population will be easier to observe.

An area dedicated to wildlife observation exists in the CNP, the so called "Eland Sanctuary". It consists of an 18 km² fenced area (the fence is now partially destroyed) with eland (even

though now very few remain), zebras, waterbucks, duikers, klipspringers. Poaching in the past decade as taken a heavy toll and wildlife in the sanctuary is today much depleted, but in the past years the Eland Sanctuary was one of the main attractions for tourists visiting the CNP, certainly contributing to attract more visitors to the area

As a medium term objective it should be evaluated the possibility of creating a wildlife sanctuary in the buffer zone. A suitable area could be the Tsetsera plateau, where access is reasonably easy and where other tourist infrastructures are also planned. It should consist of a large fenced area where tourists could easily observe wildlife. The sanctuary will be managed by a private investor in partnership with the local community that will thus benefit from a share on the entrance fees and from employment. Species to be introduced and carrying capacity must be carefully evaluated.

3.2.9 Human wildlife conflicts

Wildlife management in a protected area involves also the management of conflicts between wildlife and people (human-wildlife conflict, HWC). Generally speaking HWC in Chimanimani is not a major problem if compared to other conservation areas in Mozambique. Nevertheless, even a low level of conflict if not tackled by the Reserve's administration, might contribute to generate bad feelings about the conservation area and with time will harm the relationships between local inhabitants and the Reserve.

Crocodile and elephant are the species causing most of the conflicts in Chimanimani and for which local people demanded help from the Reserve. These two species, even if almost certainly responsible for fewer economic damages than the other species altogether, are both difficult and potentially dangerous for people to deal with themselves and are thus perceived as the most problematic.

Crocodile attacks to people are mostly reported in the communities of Zomba (lower Mucutuco and Mussapa rivers), in Muhoco (Muvumodzi and Mussapa rivers) and in the communities living along the Lucite River on the southern boundary of the conservation area.
Two women were attacked and injured by a crocodile in the Mucutuco river in Zomba during our stay in Chimanimani and a farmer of Muhoco lost a family member to a crocodile attack in 2008.

Elephants in Chimanimani are only present in and around Moribane forest, more precisely in Mpunga and Mashonga (Mahate) communities. Elephants in these areas cause crop damages raiding banana plantations and maize and manioc fields. No recent attack to people by elephants is reported in Chimanimani

Sporadic conflicts are also reported with **hyenas** in the northern Chimanimani, in Nhabawa, Mussapa and Mussimwa communities, were occasionally calves and goats are killed by this predator. **Hippos** are reported to raid crops along the Lucite River at the buffer zone southern boundary. **Monkeys** (baboons and vervets), **rodents** (mostly cane rats and porcupines) and **bush pigs** are common crop raiders all over Africa and Chimanimani is no exception. They are probably responsible for the great majority of crop losses.

▶ *Strategies to mitigate conflicts*

The prime long term strategy used to mitigate and prevent HWC is land use planning, so to keep animals and humans as separate as possible. This aspect shall be taken into account when preparing community land-use plans in the buffer zone, trying to keep areas with high wildlife potential as separate as possible from area selected for agriculture expansion and human presence and activities. This is particularly true in Moribane were the only elephant population of Chimanimani occurs. Chimanimani is a conservation area characterised by a particularly "non-sharp" boundary between the protected area and the immediate surroundings where people leave and practice agriculture. Unlike most of the other southern Africa protected areas, it is not an "island" ecosystem. In this context of relatively low human density and well preserved natural habitat, land use planning is the most promising approach for a long term solution to the problem.

Other methods that have proved to be effective in mitigating conflicts include:

- active and passive protection of fields for crop raiding animals (various types of fences, guarding of fields, aggregation of fields)
- removal of problem animals (particularly for lions),
- off river methods of collecting water and barriers in the rivers for crocodiles
- awareness campaigns.

However, any measure to be effective and durable must be based on the detailed knowledge of the nature of conflict in a specific area. Until details on the nature of HWC in Chimanimani are

not well understood it is recommended not to carry out any administrative shooting of supposed problem animals. This should apply also to areas adjacent the conservation area.

Elephants, in particular, live on the eastern boundary of the buffer zone and certainly move outside it. The possibility of building an electrified fence to protect Mpunga community from elephants has been discussed from the times of the first management plan. At Sussundenga workshop the question was raised again by Chief Mpunga. It is important to remember here that anti-elephant fences are very expensive (cost is approx. 10.000 US$/km) and, most importantly, they require meticulous and continuous maintenance to be effective. There should be a lot more information on real damages caused by elephants and possible benefits to justify these costs and commitments. Anyhow, the idea of fencing the entire Moribane forest to keep the elephants in is quite unrealistic. Moreover, electric fences, particularly if designed to protect fields from elephant, are often not an effective deterrent for baboons, small monkeys and rodents, which are indeed the species causing most economic damages to the agriculture. Indeed an electrified fence will be needed to protect the new Ndzou camp in Moribane. This is a 6-hectare area, and with a relatively low budget (around US$10.000) protection of visitors and facilities from elephants can be greatly increased. The shooting of elephants to reduce crop riding is demonstrated to be ineffective: the damages caused by crop riding elephants are often not correlated to elephant density. Removing of even few elephants from Chimanimani (i.e. in Moribane) is strongly not recommended as this might drive the small local population to the extinction and will anyway reduce the possibility of using them for tourism purposes.

The same apply for crocodiles and hippos. The crocodile and hippo populations of Chimanimani are probably quite small (even though even speculative figures are lacking; crocodile population in the Lucite River e.g. could potentially be a fairly large one). The removal of larger crocodiles, a frequent method of mitigating conflicts with this species, will also mean the removal of the breeding animals and eventually, in the long term, the eradication of the species from the area.
Barriers in the rivers are usually effective against crocodile attacks; but again before any of these to be built more detailed information are needed.

At present a reporting system of HWC exists at district level for all Mozambique. After a conflict occurs local people report it to the head of the administrative post and the data are then passed to the SDAE. All the district data on conflict are collated by the provincial office SPFFB who finally forward the data to DNTF for final treatment and analysis.

It has been recognized by DNTF that not all the conflicts are reported by local people (particularly by those living in remote areas) and by local administrations. Moreover the circumstances of the attack, a fundamental piece of information to understand the nature of the problem, are rarely reported. In general terms, this reporting system gives a good idea of the level and distribution of HWC at the country level but more detailed data are needed at the local level to identify specific solution to mitigate the existing conflict[13].

It is recommended that, in the short term, the Reserve starts a detailed data collection about incidents with wildlife in Chimanimani. The Reserve in collaboration with the wildlife provincial or district technical services and under the supervision of the Reserve ecologist, will train a person in each NRMCs to collect HWC data in each community using the standard DNTF datasheet on HWC and possibly expanding them *ad hoc*. This information, coupled with the data derived from the monitoring of wildlife trends and distribution, will help the Reserve in putting up a prevention and mitigation scheme and also in predicting the areas of possible HWC increase in the future.

The conflict data so collected will also be forwarded to the Sussundenga SDAE to be ultimately included in the national database on HWC.

Proposed Activities

- Guide and assist the communities in making communal land use plan that reduce the risk of human wildlife conflicts
- Start a programme for collecting detailed data on human-wildlife conflict in Chimanimani
- Coordinate urgent mitigation actions with local extension services of Fauna Bravia.
- To test and develop appropriate techniques to reduce human wildlife conflicts such as using beehive fences and chilly pepper cultivation against elephants.

[13] Dunham K, Ghiurghi A., Cumbi R. and Urbano F. (in press). Human-wildlife conflict in Mozambique: a national perspective, with emphasis on wildlife attacks on humans. *Oryx*.

3.2.10 Monitoring of wildlife populations

Monitoring of wildlife should aim at assessing changes in numbers, distribution, age and sex structure and level of mortality of population over time. The monitoring programme conceived by the proposed Reserve permanent ecologist will be designed to catch these trends. (See chapter "Priorities for research and environmental monitoring")

Proposed Activities

- Monitor wildlife populations distribution and trends in the Reserve and in the community protected forests of the buffer zone (see chapter "Priorities for research and environmental monitoring").

3.3 Gold mining in the Chimanimani conservation area

3.3.1 Current situation

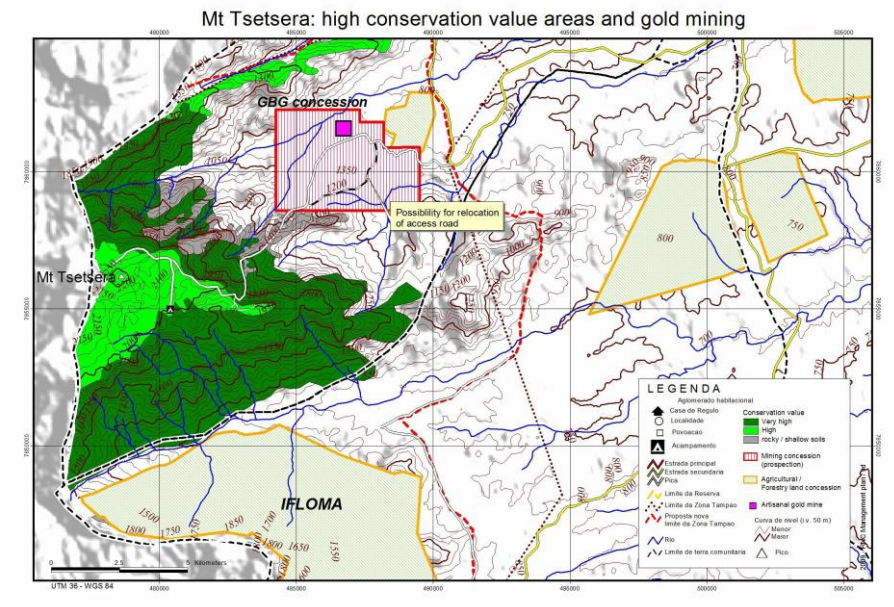
Gold is relatively common in central Mozambique and has been an export commodity at least for the last 1000 years. The Mineral Survey of 1912 publish by the *Companhia de Moçambique* indicates the presence of gold in the present Chimanimani Conservation Area but none of which on the highlands. At that time all known sites seem however to have been along some of the major streams, such as the Lucite, Mussapa and but also on Mt Tsestera. In this section the current situation is described and consideration for further actions given.

3.3.1.1 Artisanal mining in the Buffer Zone

At the foot slopes of Mt Tsetsera, still in miombo woodland vegetation, there is a legalised[14] and operation artisanal gold mine which is part of the Chimanimani conservation area. It is located at the foot of Mt Tsetsera, has about the size of 1 hectare and is exploited by a registered association of artisanal miners of about 300 members. There are working reef ore; digging out the quartzitic rock already to great depth and have exposed 300 m of gold rich quartz veins of 5 to 60 cm in width. The processing or the ore/rock is carried out at their camp a few kilometres away from the mine in the valley of the Rio Bonde. It is done in such a way that the water used in the processing does not reach the Bonde river, which remains one of the cleanest in the ChNR.

A first point of concern in relation to this mine is the safety for the miners; the quarry is getting incredibly deep, and adequate measures for securing the stability of the pit are not taken. The mining in this area is not affecting directly any of the areas of very high or high value to biodiversity conservation (see map). However, it is of concern to the development of the conservation area, and the potential for tourism development of Mt Tsetsera: a quarry of several hundreds meters long and several tens of meters deep is not doing much favour to the

[14] This is an old mine dating back to the pre-colonial periods. In the early days of the Companhia de Moçambique it was re-opened and known as 'Baboon's Kop'



aesthetic values of the landscape. An important practical concern is that the further development of the mine threatens the only existing road that lead to the Tsetsera plateau.

Alluvial gold has been recently found along the Nhaharamira river in Chimokono, Darue, in the south of Moribane forest along the new proposed limits of the buffer zone. The alluvial deposit is probably too small to think of managing the resource in a controlled and structured way, but at the same time mining activity is polluting the Nhaharamira river on which the entire Chimokono village depends for its water (see “Meeting notes of Darue” in annexe).

A small-scale alluvial mining activity, for which not many information are available, is also going on along the Lucite River, at the southern border of the buffer zone, to the west of the Sitatonga Gorge. The Lucite, until few years ago a clear water river, is now heavily polluted, its water being red, even though main pollution comes from Vimba and the Haroni River in Zimbabwe where gold mining and panning is done at very large scale.

3.3.1.2 Industrial mining in the Buffer Zone

The Canadian company Great Basin Gold Ltd[15], in a joint venture the Mozambican company "GS Minas Refinaria", has a prospecting licence of 17 km² for a concession area also at the foot slopes of Mt Tsetsera (see MAP). Great Basin Gold has committed to approximately $2.0 million USD for exploration expenditure over a three year period (2007-2010). The company reported to have mapped and sampled surface exposures along 17.5 km. The company reports that rock samples returned gold assay values between 0.22 26.8 g/tonne, and a chip sample across a 60 cm quartz vein returned 5.6 g/t Au. (As a rule of thumb about 10 g/t is generally seen as a economic viable ore). A shear zone hosting the surface quartz vein showing was mapped out over a strike length of 2.5 km. Abundant inactive local workings were identified during the mapping. At least 4 steeply dipping quartz veins were identified and mapped out over 800-1600 m strike length that varies in width from 20 cm to greater than 50 cm. However, the company's activities are for now put on a halt, or as the company itself puts in it most recent quarterly report[16] "T*he project is currently on care and maintenance. Management will evaluate the continuation of this project subject to the availability of funding for exploration activities*."

If for whatever reason, this company does not get into exploiting the area – which is not uncommon in central Mozambique[17] - the findings this company reported, gives some good insights into the extent the artisanal mining may develop into. The consequence this might have and further strategies which need to be followed will need more in-depth studies and discussion.

3.3.1.3 Illegal mining in the Chimanimani Reserve

The presence of thousands of illegal gold panners in the Chimanimani highlands, i.e. in the core of the actual reserve, poses the greatest challenges to nature conservation. Precise estimates of the actual numbers are obviously very difficult but the numbers ~~have~~ are probably ~~been~~ in the range of 2000 to 5000. Gold panners started working in the highlands of the

15 http://www.infomine.com/index/properties/TSETSERA.html & http://www.greatbasingold.com/index.html

16 Great Basin Gold Ltd. Management's discussion and analysis. Quarter ended June 30, 2009.

17 See for a discussion concerning this phenomena Dondeyne, S., Ndunguru, E., Rafael, P., Bannerman, J., 2009. Artisanal mining in central Mozambique: policy and environmental issues of concern, Resources Policy 34 (1-2), 45-50.

Chimanimani reserve in Nov 2004[18]. The mining is mostly done in streambeds, but at some sites it is also mined in galleries, such as in the site of Mussange in the southern part (see map below).

So far, all efforts to try to evict the miners have been ineffective and even counter productive. The law enforcement patrols tend, almost naturally, to focus on the areas where there are major concentrations of gold panners. This approach, however, leads miners to spread their activity to less accessible and more remote areas and resulting into damaging more areas, and particularly areas of high biodiversity value. Moreover, rangers (*fiscais*) often resort to violence, which on several occasions has backfired when miners get the opportunity to retaliate. Escalation of violence, and hence insecurity for tourists, would totally jeopardize the potential for ecotourism development.

During our last visit to the mining areas[19], which was from 18th to 22nd May 2009 we could observe:

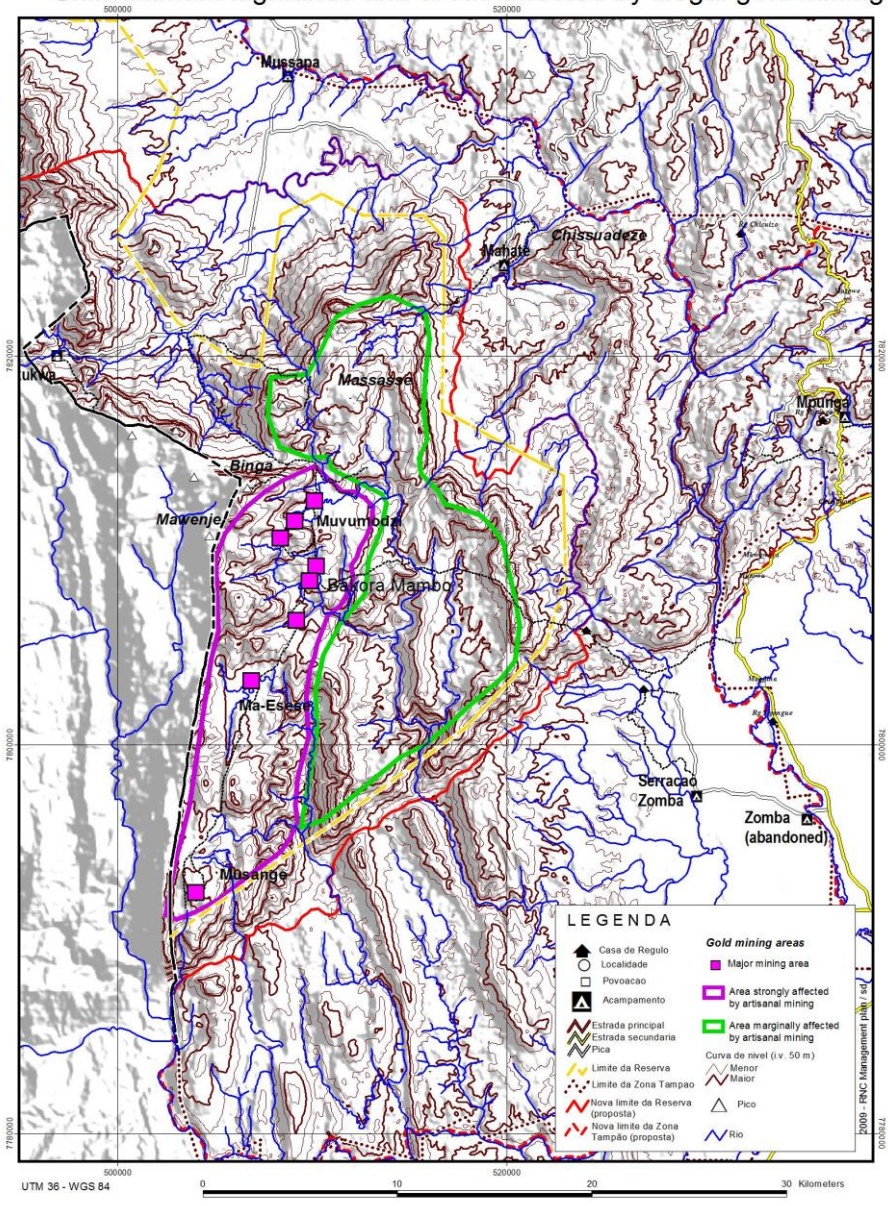
- That the mined areas had increased when compared with the situation in 2006 and 2008.
- That some of the miners had dogs, indicating that some of them are involved in poaching.
- Major entrance route for the Mozambican miners was along a trail along Zomba and Madzunzu, starting in Muwawa along the Dombe road.
- Though it was impossible to estimate the number of miners during this visit, they are obviously sufficiently numerous, for even small markets to function in the mountain. We came across various people bringing produces to the markets such as flour, biscuits, shoes, clothes, pans and even a goat. The agglomeration of Muwawa, along the Dombe road, is obvious economically thriving from the activity.
- Miners seem to mostly coppicing trees for their firewood; luckily their presence hasn't yet led to major deforestation.
- As the upper reaches of the Muvumodzi is heavily mined, and during our visit the

18 Ndunguru, E., Dondeyne, S., Mulaboa, J., 2006. Illegal Gold Mining in the Chimanimani National Reserve. Direcção Provincial dos Recursos Minerais de Manica, Reserva Nacionalde Chimanimani & CDS-RN, Ministry for the Coordination of Environmental Action, Chimoio. (available at: www.communitymining.org)

19 This visit was done by Andrea Ghiurghi together with E Ndungura and S. Dondeyne; the latter two had made several visits to the mining areas in the previous years.

middle reaches had the appearance of a dead river; sediment load is reasonable as the material is very sandy, but possibly because of the admixture of organic matter, oxygen levels may be depleted.

Chimanimani highlands and areas affected by illegal gold mining



3.3.2 Guiding principles

- Industrial mining should not be permitted in both the Reserve and the buffer zone, being incompatible with the Reserve objectives of "protecting the rich biodiversity, the endemic flora and fauna and the water sources of several rivers".

- Artisanal mining inside the Buffer Zone should be formalised and organized as much as possible with the double objective of:

    - reducing its environmental impact by controlling where it is practiced and by promoting mitigation techniques, and
    - collecting public taxes out of this resource.

- Artisanal mining inside the Reserve should be controlled by:
    - having permanent presence of rangers in the highlands.
    - provide in first place protection to the ecological fragile areas not yet touched by this activity.
    - exploring the possibility of some form of formalization of artisanal mining inside the Reserve, driving this to a limited, socially and environmentally responsible artisanal mining.

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3.3.3 Objectives

- To protect the aesthetic and ecological values of the entire Conservation Area from the uncontrolled and industrial mining activities

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- To reduce the threats to the ecosystem of the highlands caused by the current uncontrolled and illegal mining activity inside the Reserve.

3.3.4 Strategies for dealing with artisanal mining

3.3.4.1 Artisanal mining in the buffer zone

Well organised artisanal mining, with reasonably effective environmental control efforts, and in an area of limited value for biodiversity conservation as done in the Tsetsera mine pause few direct problems for nature conservation. Major concerns are the effect on the landscape

and hence making the area less attractive to tourism, and the impact the current mining could have on the access road.

These two concerns could somehow be alleviated by making a new access road, hence avoiding the mine.

Assuming that mining exploitation is allowed to go on in the area, the miners association needs to be made responsible for the consequences of their activity. In a somewhat similar situation in Manica district[20], where artisanal miners were about to destroy a road, they were given the authorisation to exploit the gold found under the road on the condition that they would repair the damages. They had to make a bank deposit of a sum sufficiently large, so that if they would not comply, it would have covered the repair costs. The miners however repaired the road, and they were given back the deposit. A similar arrangement could be thought of in the Tsetsera case. DIPREM, as the authority responsible of giving the licence, and the Sussundenga district authorities, involving also the Administration of the Conservation Area, should be responsible to work out such an agreement with the miners' association. As the gold bearing area is actually about 2 to 3 kilometres long (see below), it would probably be more sensible to relocate the access road (see MAP). This alternative should be explored and discussed by the parties.

This case is a good example of where the new proposed Management Committee of the Conservation Area (CGAC) would be most usefull in reaching an agreement that satisfies all parties.

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One could argue that the presence of miners so close to a sensitive conservation area is also problematic. Such a population concentration goes along with needs for food and fuel (firewood); increasing the temptation for poaching and encroachment on the forest land. As founded as these concerns may be, the reasoning can easily be turned upside down. The mining provides an income and direct livelihood to at least 300 families. Their increased purchasing power may help the development of agriculture of neighbouring farms, not necessarily within the conservation area, as e.g. the extended agriculture areas around Lake Chicamba. If these families would not have this income, one could argue that the pressure for

20 E. Ndunguru, Provincial Directorate for Mining and Energy, Manica, personal communication

agriculture land would even be greater. What needs to be urgently done is to work out a land-use plan with the community of Tsetsera.

The technical supervision of all mining works, in the Buffer Zone should be done by technicians of DPREM and the futher environmental monitoring should be carried out by the Reserve - as part of its ecological monitoring programme - and or even better with the involvement of an additional organisation as e.g. CDS-RN.

Experiences in Manica and Sofala provinces have however shown that the creation of such well structured artisanal miners' organisation only works where the ore is sufficiently big for guaranteeing a longer term exploitation. Places of alluvial gold deposits as e.g. found in the lower reaches of the Mussapa river (on the boundary between the community land of Mpunga and Mahate) and in Chimokono are so erratic that it is virtually impossible to create the same type of organisation[21].

Proposed Activities

- To develop "Community owned land use plans" that duly consider gold mining activity in those communities of the buffer zone affected by artisanal mining. A priority will be to work out a land-use plan with the community of Tsetsera.
- DIPREM and Sussundenga District authorities, involving the Reserve managers, should n~~N~~egotiate with the Tsetsera miners' association the cost and modalities to repair (if that will be the case) or deviate the road to access the Tsetsera plateau in proximity of the mine ~~(at present the mine is expanding under that road with the danger that it will eventually collapse)~~. The example of Manica district should be used as a good practice example.

3.3.4.2 Artisanal m~~M~~ining inside the Reserve

As argued before, attempts so far to evict the illegal gold panners have proven ineffective at best and counter productive at worst. Better strategies are needed for dealing with the artisanal

21 See in Annex field notes of visit to Chimokono, 19 June 2009.

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mining in the reserve. The mining is affecting about all streams in an area of about 125 km^2 [22]. The altitude in this area ranges mostly from 1800 to 2200 m; climate is cold, night frost occurs at 1600 m in the cold season, and the topography is rather rough. The harsh weather and the difficult topography make any controlling efforts rather difficult. Moreover, none of the rangers' posts is even nearby the highlands. During our visits, the camp at the "*Serração Zomba*" (see MAP) was used as the main base, which is actually two days walking from the first main mining site. If the mining is to be controlled there should be six permanent or semi-permanent rangers' posts spread over the core zone of the reserve, i.e. on the highlands (see chapter 2.1.3 "Infrastructure" for details on building standards). At each of these rangers' posts, there should be four to six rangers present. It is proposed that rangers would move one day that they would to make a patrol around that camp, and on the next day moving on to a next camp. A patrolling scheme should be worked out such that in about 6 days can be rotated by next teams. This strategy implies that the current number of rangers will have to be substantially increased.

To elaborate any detailed strategy, and considering the rapid dynamic of the gold panning activity in the area, it would be important to:

- get updated information on how many and where gold panners are at that moment of the plan implementation (see figure at page 142 for localization of gold panners at the moment of the plan preparation),
- a quantitative assessment should be made of the damage done at that moment;
- an inventory of the areas not, or hardly not affected at that moment should be carried out, in order to give priority protection to those areas.

This should be done ideally be some independent and external environmental and ecological experts.

Given the current number of rangers, a straight forward and total eviction of all miners is unrealistic. The first objective should be to make sure that mining activity does not expand into areas so far only marginally affected (see previous map); the part of the highlands so far only marginally affected is about 170 km² and its terrain presents the same logistic challenges. The Massasse plateau, the highest part of this area, is particularly reach in endemic and rare plant species and its protection should hence get the highest priority. Overall, targets should be set to which extent mining shall be reduced over a certain period; e.g. in the first year one could

[22] The effects of this can also be easily seen on satellite images available on Google Earth (GE, September 2009).

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maybe hope that mining would be reduced by 50%. This target could be assessed in terms of length of river, or number of rivers, affected by mining.

It should be realized that a localized ~~the~~ mining activity as such is not that great a threat to the conservation of the Chimanimani highlands. If the mining could be restricted to a few well determined sites – sites which have anyway already been affected by now – this activity should not be seen as a threat to conservation. The major problem is the activity is taking place in a much uncontrolled way; one is never sure whether areas harbouring endangered or endemic species will not be destroyed. The great number of miners active in the highlands, and the poaching activity which goes along this, is a major source of concern.

Article 12 of the Forest and Wildlife Law foresees that in National Reserves says:

> "Resources that are found at the national reserves may be used, subject to licensing, under terms to be regulated, provided that it does not infringe the specific objectives that dictated their creation and that it conforms to the management plan."

It should hence be considered whether it would not be preferable to legalize, and hence regulate and control the artisanal mining within the reserve. The licences should provide additional sources of revenues which should then be used to "police" the activity, and banking on the local communities cooperation, and ~~in line with the regulation~~ similar to the spirit of ~~of~~ regulation of the forest and wildlife law, 20% of these income should also be reverted to the local communities.

Preliminary condition to this are that:

- updated baseline data on the activity are collected by an external and independent environnemental expert;
- modes to work with these mineurs are worked out - which will require a better understanding of their current own internal organisation and also the creation of a new type of relathionship with them in order to make any future agreement possible;
- law enforcement in the Reserve is well functioning (thus including permanent presence of rangers inside the Reserve, see chapters 2.1.3.and 3.1.3.) and control over the entire Reserve territory is guarantee.

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If the idea is accepted this activity should be done according to the standard accepted for socially and environmentally responsible artisanal mining, e.g. as those set by the Alliance for Responsible Mining (ARM[23]).

The future technical supervision of these mining works should be done jointly by technicians of DPREM and the Reserve staff while the environmental monitoring should be carried out by the Reserve as part of its ecological monitoring programme.

Proposed Activities

- To have a permanent presence of rangers (*fiscais)* in the highlands of the Reserve. Objective is to reduce substantially the number of miners inside the area by protecting, in first place, the still untouched areas of the Reserve. This will mean the setting of *permanent* (but see "Infrastructure" chapter for construction standards of "permanent" buildings) and mobile ranger camps in the highlands.
- Work out a patrolling scheme to control illegal mining in the Reserve that will be based on a short cycle rotation system and will ensure almost permanent presence of rangers in the highlands and not only ~~ensure the presence of rangers not only~~ around base camps.
- To coordinated action for the control of illegal gold miners with authorities of the CNP in Zimbabwe, as about half of the miners come from across the border with Zimbabwe, or even further afield.
- To explore the possibility of legalizing and controlling gold panning activity in the Reserve. This will mean to start developing strategies for working with gold panners (*garimpeiros)* as it is doubtful that any permanent solution will be achieved by simply chasing them from the ChNR. ~~Industrial mining, on the other hand, should be strictly forbidden.~~

3.3.5 Industrial mining management

[23] See: http://arm.unixlandia.com/

3.3.5.1 Industrial mining in the buffer zone

Industrial mining in the Chimanimani buffer zone should be discouraged. Unlike artisanal miners, industrial mining groups have a far greater choice on where to deploy their activities. If a mining company goes from Canada, Europe or Asia to Mozambique, it should not be that much of an extra effort to make sure that it will not start investing in a nature conservation area. The Ministry of Mining should not issue licences to mine or prospect in Chimanimani as it is a protected area. If nevertheless, it was considered essential to grant industrial mining companies exploitation rights in the buffer zone, this would be only acceptable under the strictest environmental conditions.

~~Proposed Activities~~

- ~~Liaise with the Ministry of Mines to ensure that no industrial mining concession is given for any part of the Chimanimani conservation area (Reserve and Buffer zone).~~

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3.3.5.2 Industrial mining inside the Reserve

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Industrial mining inside the Reserve, on the other hand, being totally incompatible with the reserve objectives of "protecting the rich biodiversity, the endemic flora and fauna and the water sources of several rivers" shall be strictly prohibited.

Proposed Activities

- Liaise with the Ministry of Mines to ensure that no industrial mining concession is given for any part of the Chimanimani Conservation Area (Reserve and Buffer zone).

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3.4 Fires management

3.4.1 Background

Fire in Chimanimani is part of the Chimanimani ecosystem and a great part of the endemic flora is fire dependant[24] (see also chapter 4 on Monitoring). As in other afromontane regions of Africa, observation of post fire successions revealed that biodiversity is generally maintained except when fires are extremely hot and when they do not occur every few years[25].

Fire is also responsible for maintaining open grassland habitat. Without fires, shrubby vegetation would undoubtedly replace large areas of today's afromontane grasslands of Chimanimani[26]. Vast areas of impenetrable ericaceous forest and scrub are undesirable in terms of biodiversity and in relation to tourism in the afromontane environments of the Reserve.

Moreover, in absence of fire, biomass would accumulate with a danger of increasingly severe fires. As soon as fuel is abundantly available, a fire would not only be more extensive but also relatively hot, destroying larger areas and also potentially entering evergreen forests.

Fires in the Reserve are almost exclusively man-made rather than strictly natural; they are lit by local people, who utilize it for poaching, livestock grazing, and honey hunting.

During consultations and meeting with local stakeholders, wildfires did not emerge as a concern for the people of Chimanimani as it is in or around other protected areas of Mozambique (e.g. Gorongosa, Niassa) and at present there is no fire management programme implemented or planned by the Reserve.

24 Phipps J.B. & R. Goodier (1962). A Preliminary Account of the Plant Ecology of the Chimanimani Mountains. *The Journal of Ecology*,. 50,. (2): 291-319

25 Wesche Karsten, Georg Miehe and Meinhard Kaeppeli (2000). The Significance of Fire for Afroalpine Ericaceous Vegetation. Mountain Research and Development 20 (4): 340–347

26 The Journal of Ecology, Vol. 50, No. 2. (Jul., 1962), pp. 291-319

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Even so wildfires might be an issue for some conservation and management aspects. Small farmers also use fire to clear new *machambas* (fields) and these sometimes get out of control. In the vicinity of a natural forest, the resulting hot wildfires could be major factor in deforestation: they do not normally enter evergreen forest — except in exceedingly dry years — but slowly eat away trees at the forest margins. Some parts of the evergreen forest of Tsetsera have been destroyed in this way as well as large parts of the pine plantations in Tandara. Large parts of Moribane forest had also been affected by wildfires during the very dry years of 1993 and 2002 (picture below of part which had burned in 1993 and already recolonised by secondary forest vegetation).

3.4.2 Guiding principles for fire management

- Fire management in Chimanimani should principally aim at protecting the evergreen forests and other old forests by avoiding repetitive late season hot fires in the same location as these might be destructive and would eat away tress at the forest margins.
- Actions should also be taken to protect Reserve properties, tourist facilities and tourist areas/attractions, including historical sites.

- As wildfires in the (miombo) woodlands and afro-montane grassland are of little concern for the biodiversity conservation (except for extremely hot and frequent fires) it is not recommended to set up a specific fire control programme since trying to control these would be inefficient use of resources. Nevertheless, they may be an indication of poaching, which should get under (better) control within the core conservation area.
- Communities should develop fire management programme for the community forests of the buffer zone.
- Considering the type of fire adapted ecosystem, a zero-burning management scheme is not desirable in Chimanimani. In view of the future improvement of law enforcement and thus of the reduction of the presence of illegal poachers, gold miners and cattle owners in the Reserve - who are now responsible for lighting fires and maintaining the present fire adapted vegetation - a controlled burning programme will need to be planned and implemented.

3.4.3 Objectives

- To reduce the risk of loss of biodiversity and facilities by wildfires and to create the conditions for increasing numbers and improving visibility of wildlife in Chimanimani.

Proposed Activities

- Create firebreaks along boundaries of Reserve in order to prevent fires to enter evergreen forests (particularly in Maronga, Zomba, Mahate), to demarcate the Reserve and to prevent agriculture encroachment (see also chapter 1.1 on "Revision of boundaries").
- Create firebreaks along sensitive perimeters of Reserve infrastructures and tourist facilities.
- Include fire management strategies during the elaboration of the "Community owned land-use plans" (as already done by the Mpunga community for Moribane forest); whereby tasks of local coordination and control is attributed to the communities, in particular to each "*Comités de Gestão dos recursos naturais*".
- Start an awareness programme in communities and schools on the social and ecological consequences of uncontrolled fires (see also chapter 5.1 on "Awareness

programme").

- Set up a fire monitoring programme (see also chapter 4.1. on "Monitoring"). The permanent ecologist of the Reserve will start a fire monitoring programme based on the acquisition of wildfire data based on satellite images (available for free on the internet at http://maps.geog.umd.edu/firms/) and field monitoring. Objective of the programme is to understand the present fire patterns in Chimanimani, the possible long term consequences of the present fire regime and to collect data to know the type of long term fire management needed to achieve the objectives of:
    - provide long term protection to evergreen forests and other rare or sensitive plant formations;
    - increasing wildlife densities;
    - maintain open views for tourist purposes.

3.5 Community based management and sustainable use of natural resources

The general philosophy is that Chimanimani is a conservation area where multiple land-uses exist side by side. Chimanimani Conservation Area is recognised as an important asset to Mozambique, both nationally and internationally, in terms of its biodiversity, montane evergreen forests, cultural and historical values and magnificent landscapes, especially in the core zone. It is essential that any interventions should primarily benefit the local population. The development of their livelihoods, cultural and spiritual values should be paramount.

Overall the Chimanimani Conservation project aims at conserving the biodiversity of the area but by doing such so that the livelihoods of the inhabitants will be improved in a sustainable way. The sustainable livelihood analysis framework recognises that in for development people both draw on, and need, to invest and improve on five basic forms of "capital": human capital, natural resources, social capital, financial capital and physical capital.

There are several avenues through which the Chimanimani Transfrontier Conservation project aims at contributing at developing these themes. The most obvious ones are through *community based ecotourism* and thus creating new economic opportunities to local people. However, the Chimanimani conservation area will most likely, by its very nature, only attract relatively limited groups of specialised tourists. Therefore a rural development strategy should be more encompassing and so include additional strategies that will allow local people to exploit their natural resources, though in a sustainable, economic and profitable way.

3.5.1 Guiding principles

- Communities' leading roles in the management of the natural resources of the buffer zone are recognised and they need to be formalised and strengthened in such a way that the wider conservation and development objectives are achieved.
- The responsible management of natural resources can only be achieved when users see it as their own responsibility rather than that of the government.
- Communities can only be fully responsible of the sustainable management of their natural resources if they have their land rights secured.

- To ensure that communities adopt conservation measures, and/or come to a sustainable use and management of the natural resources, they require getting incentives and alternative sources of income. Indeed, the elaboration of "Community Action Plans" as foreseen will be essential to this effect~~It is unreasonable to expect communities to adopt conservation measures (i.e. the creation of "Community Reserves", and/or a more sustainable use of natural resources), which could, at least in the short term, reduce the opportunity to harvest and use some natural resources, without offering alternatives and provide concrete incentives.~~.

3.5.2 General objectives

Community based management and conservation of natural resources in Chimanimani needs to go through the following steps:

- Secure land rights of communities (all communities getting at least the *Certidão de Delimitação de terra*).
- Produce "Community owned land use plans" as a strategy to build possible partnerships with private investors or with the State in the context of the District Development Plans and to create a network of community protected areas in the buffer zone.
- Develop incentives for communities for protection of designated parts of communal land, for adopting non destructive land use practices and offer alternatives incentives to the unsustainable use of natural resources.

3.5.3 Secure land rights of communities: delimitation and registration of all communities

Sound partnership between potential investors in eco-tourism and rural communities requires that the identity of the community and the area it claims to be under its "jurisdiction" (in spatial sense) is clear. It is also important to have the land rights of the communities secured; not only for the development of eco-tourism and of other economic opportunities, but also for elaborating with the communities the natural resources management plans and conservation strategies. At the moment there are only six communities within the Chimanimani

conservation area which have their land rights secured through registration. These are: Tsetsera Mupandeia (basically Sembezia), Mussimwa Rotanda, Chikukwa, Mahate and Zomba[27].
In two communities which fall within the Chimanimani conservation area, the land registration process has been initiated. The community of **Mpunga** (covering the major part of the Moribane forest) has started the process of land delimitation and registration[28]. The community of **Chicuizo**, located at the northern fringe of Moribane forest, had started this process, with support from the *Centre for Sustainable Development of Natural Resources*[29]. However, this process has been bogged down due to administrative complications. The community land of Chicuizo does however cover about 1670 ha of Moribane forest. Involving this community in the management and protection this part of the forest is most desirable. Similarly, the communities of Chinda and Zinguena, would together have about 1200 ha of their land part of the Moribane forest.

None of the other communities have their land registered. Starting community based conservation initiatives, natural resources management planning or eco-tourism development without a clear sight on the extent of the community land, and its formal recognition by the state, is in such case rather difficult. This situation is the case for the communities of **Gudza**, **Zinguena**, **Chinda**, **Muoco-Machiri** (one or two communities), **Macoca, Munhahiwa** and **Maronga.**

According to the regulation of the Forest and Wildlife law, communities of the Chimanimani conservation area should get 20% of the income earned by the government. For this to happen, functional "natural resources management committee" (*Comité de Gestão dos recursos naturais*) must be officially registered and have a bank account. Though some communities have an operational committees (Nhabawa, Mpunga) none were yet officialised nor did any have a bank account.

Proposed Activities

- Complete the process of delimitation and registration of land for all communities inside the Chimanimani Ceonservation Aarea (both in the

27 This work was done by ORAM in 2002 during the first phase of the project
28 This has been facilitated by MICAIA in partnership with the NGO Pambery, and financed by the multi-donor funded project "*Iniciativas para Terras Comunutarias*" - lead donor DfID.
29 This centre is based in Chimoio and is part of the Ministry for the Coordination of Environmental Action (MICOA). The delimitation was done as a project initiative with financial support from the Ministry of Foreign Affairs of Finland

Buffer Zone and the Reserve). All communities should get the *Certidão de Delimitação de terra*.

3.5.4 Community owned land use plans

To come to good mutual understanding between the management of the Chimanimani Conservation Area and the resident communities, land-use and natural resources management plans need to be worked out, ideally in all the communities. Participatory inventories of natural resources, land use and management plans should be the strategy to build possible partnerships with private investors or with the State in the context of the District Development Plans (*Planos Distritais de Desenvolvimento*) and the District Strategic plans (*Planos Estratégicos Distritais*).

In the context of the Reserve objectives of "preserving the biodiversity and natural ecosystems", the community management plans should aim at creating a network of community protected areas in the buffer zone (this point has also been discussed in chapter 1.2 "Zonation"). Agreements have to be made on the areas which will be left aside for conservation, for residences, for possible expansion of agricultural land, for livestock, for development of tourism infrastructure. Sacred areas, some of which are out-of-bounds for tourists because of spiritual value, will also need to be mapped out or identified. Based on these land-use plans strategies will have to be worked out with the communities for possible alternatives or additional economic activities.

All community areas which will be set-aside for conservation will then need to be classified as **"Areas of historical and cultural value"** following the denomination of the Forest and Wildlife Act of 1999 (Lei 10/99) or **"Community Reserves"** conform to the eminent new "Policy for conservation areas"[30]. The objective should be to create a contiguous "**Chimanimani Community Reserve**" managed by a "**Federation of community associations**" to include the evergreen forest belt along the south east border of the Reserve. The idea is that the major part of the areas of high value for biodiversity conservation,

30 Ministério para a Coordenação da Acção Ambiental (2009) – Política de Conservação e Estratégia de sua Implementação (versão final, 18 de Agosto de 2009)

particularly the evergreen forests from Mpunga (Moribane forest) over Mashonga (Mahate), Zomba up to Maronga hence become a wider contiguous community based conservation area which is joined to the Chimanimani National Reserve as the core of the conservation area. Similarly the montane forest and highlands of Tsetsera Tsetsera escarpment and plateau should be registered as a Community Reserves.

Longer term objective is that the "Federation of community associations" will eventually include representative of all communities with the aim not only of managing the "Chimanimani Community Reserve" in the rain forest belt, but also of being the responsible body for the natural resources co-management and conservation (together with the Reserve) in the entire buffer zone (see chapter 1.3 "Coordination of management in the conservation area").

Communities where the development of such land-use plans, particularly the delimitation of the area for agricultural expansion, are most pressing are:

- The villages of **Ferreira** and **Nhabawa** both in Chikukwa. These villages should be given relative high priority as they fall within the Reserve; and would also remain inside if the adjustment of the boundaries is accepted.
- The community of **Tsetsera**. Population in Tsetsera seems to be rather dynamic and over the past years further opening up of agricultural land on the forested slopes of this mountain has been observed. Clear agreements on future land use need to be worked out.
- The communities of **Zomba**, and the sub-community of **Mashonga** (part of Mahate) as they harbour vast parts of the evergreen forest which is continuous with Moribane forest.
- Having a land-use plan is of course also crucial for the community of **Mpunga** (Moribane forest), but this process has already been initiated by Micaia Foundation. Ideally, this process should also be extended to **Chicuizo, Chinda** and possibly **Zinguena**.

Proposed Activities

- Produce the community-owned land use plans, particularly for the delimitation of the areas for agricultural expansion, for all communities

within the Chimanimani Ceonservation Aarea. The priority should be for the villages lying inside the Reserve, namely Nhabawa and Ferreira and for communities with areas of evergreen forest of high ecological value, namely Tsetsera, Zomba, Mashonga (part of Mahate) and Mpunga (largest part of Moribane forest).

- The land use planning process carried out with the communities should identify ecologically important areas that require protection in order that they can be classified as "Community Reserves" (in terms of the new policy for conservation areas) or "Areas of historical and cultural value" (following the "Forest and Wildlife Act" Lei 10/99).

-

- Assist the community of Sembezia in the land use plan preparation in order to create a "Tsetsera Community Reserve" that includes the montane forest and highlands of Tsetsera plateau and escarpment.
- Assist the community land use plan process in order to stimulate communities laying along the south east border of the Reserve in the creation of a contiguous conservation zone as "Community Reserves" (or "Areas of historical and cultural value"). This would include the evergreen forest belt along the south east border of the Reserve. The final objective is to create a "Chimanimani Community Reserve" in the evergreen forest belt.
- Create a Federation of community associations that will manage in a coordinated way the larger "Chimanimani Community Reserve". The Federation will also be, in the medium-long term, the responsible body for the natural resources co-management and conservation.

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3.5.5 Develop incentives and offer alternatives to communities

3.5.5.1 Potential for community based tourism[31]

The development of ecotourism has the highest potential in areas which are relatively easy in access, offer some special attraction to tourists and which either have already, or can fairly easily develop, at least basic infrastructure for receiving tourists.

The sites within the Chimanimani Conservation which currently meet these criteria are:

- **Mount Tsetsera**, the access road allows to get to the highest parts of the plateau by car (albeit by 4x4), and is hence the highest point of Mozambique where one can go on by car. It is of great interests to conservationists because of its montane rainforest, and partly for its montane grasslands. It also very popular with birdwatchers. Besides, bushbuck, common duiker, klipspringer, wild pigs and simango monkey are all fairly common on the mountain. Traces of clawless otters have also been recorded. The old mansion of "de Carvalho" offers already basic facilities for camping, and if one would be able investing in its restoration, the mansion would make a superb hotel or guest house. The local enterprise RDI, owned by Mr. Monthy Hunter, has now for several years shown interest to developing this idea. The cooperation and involvement of the local community in such a project needs probably strengthening and more support.
- **Moribane forest** is fairly accessible along the Sussundenga Dombe road. It is of high interest as it is one of the largest low to mid-altitude rainforest of Southern Africa. It is of interest to birdwatchers, but it also has the highest concentration of larger mammals of the Chimanimani conservation area. Most notably are the elephants, blue duiker, and wild pigs, besides several smaller species such as monkeys, galagos, mongooses and clawless otters. The Eco-Micaia has started a joint venture with an association representative of the Mpunga community, to start an eco-lodge in the forest. The principle is to train and employ as much as possible local people in the running of the lodge, but also to train local people as tourist guides. Trails in the forest will have to be marked out for hiking in the forest, and at strategic sites (e.g. wetlands) wildlife observation platforms should be installed such that tourists would have the chance to observe some of the animals, particularly elephants and birds, in all security.

[31] See also chapter 9.2 "Tourism development"

- **Nhabawa,** is a village, inside the Reserve, which is part of the Chikukwa community, and located at the base of Mount Binga and the Chimanimani mountain range. It is reasonable accessible through an 18 km track which branches off the Rotanda-Sussundenga road. Besides access to the highlands of the Chimanimani range, it would be a good base for doing hikes to the Mussapa gorge, visit some of the ancient rock paintings, even up to the village of Ferreira-Chikukwa. Micaia Foundation, through its private company Eco-Micaia Lda, also has started a process to establish, in joint-venture with the local community, a tented camp. Local people will also be trained as guides and porters.

Some more sites do offer potential for attracting tourist but are either more difficult in access, and/or lack or don't offer easy prospect for developing infrastructure:

- In **Mahate,** a village community at the north eastern edge of the Chimanimani reserve a basic tourist infrastructure was built in the first phase of the TFCA project. Access it is though difficult. The lack of a bridge over the Mussapa Grande river and the often poor condition of the 4x4 track makes it quite challenging getting there, and should really only be done by the more experienced drivers. The infrastructure which was built there offers huts made in local style, and is of a standard well acceptable to travellers who will accept basic but adequate facilities. The Mahate camp is however on a superb site overlooking a spectacular gorge and offer excellent hiking possibility either in the neighbouring woodlands or the eastern part of the Chimanimani Mountains. It could also serve as a base for mountain bikers or could be put on a hiking tour for people who would like walking say from Nhabawa to Moribane forest. At present the local community is not involved in the running of the camp. The first step would be to formally pass the ownership of it from the GOM to the community. It seems desirable to work out a programme to train local people to run the camp as a community based mountain refuge which would serve tourists hiking or biking to the area.

- **Ferreira-Chikukwa**, is a village of Chikukwa community inside the Reserve,, close to the border with Zimbabwe where, just as in Mahate, a basic camp was build during the first phase of the TFCA project. Getting there by car also is rather demanding, it is only 6 km from Nhabawa village but usually can take about an hour driving. The road has recently been upgraded but the Reserve administration should discourage tourists to go

there by car unless they have a good four-wheel drive car. Actually, once the camp in Nhabawa will be running, it would offer a nice destination to hike or to mountain bike to from Nhabawa. The standard of the tourists infrastructure are similar as the one of Mahate. Also similar as to Mahate, the camp could serve as a mountain refuge for hikers or bikers. The facilities are owned as at Mahate by the Government of Mozambique but it is recommended that the camp become property of the members of the local community who cold run it in partnership with a private investor.

- **Mt Tandara,** is a plateau in the buffer zone just north of the main Chimanimani range, and just south of Rotanda town. It could be of interest to birdwatchers (but yet unknown to them) and botanist. The grasslands on the plateau are breeding ground of the blue swallows and are botanically very rich. The cliffs of the plateau provide for spectacular views and are breeding sites for birds of prey. Access has been difficult in the recent past because one has to cross a pine plantation run by IFLOMA which has been destroyed by a wildfire, but once cleared is relatively easy. On old farmhouse, which used also to belong to de Carvalho (as on Mt Tsetsera) could be rehabilitated for providing lodging. The only potential investor who has shown interest so far in the area has been a South African farmer, but who had not interest in tourism development and limited interest in nature conservation.

As pointed out above, development of community based tourism in Chimanimani conservation area has some good potential, but still requires a lot of efforts and commitment in training and support to local communities in developing and running such business. In the short and medium term it is likely that community based tourism in Chimanimani will pass through joint-ventures of communities and private investors who have the technical and financial capacity of starting such a business and make it viable. Experiences from other parts in Africa have shown that purely community based tourist lodges are seldom a viable business and in any case to have chances of being successful this process might take several years, easily up to ten years.

The organisation which has so far interest and commitment for working this out is Eco-Micaia who has already started two joint ventures in Mpunga (Moribane forest) and Nhahedzi (Nhabawa) communities.

The TFCA project's community broker for Chimanimani (the Ambero-KSM consortium) is now identifying other communities to facilitate such activities: it is here recommended that

Tsetsera and Mahate, for their potential in developing tourism activities and for the ecological importance of the areas, would be given priority in such process.

Proposed Activities

For activities related to this topic see Chapter 2.2 on "Tourism Development"

3.5.5.2 Incentives to communities for sustainable natural resources use

It is unreasonable to expect communities to adopt conservation measures ~~(i.e. the creation of Community Reserves)~~ which will (at least in the short term) reduce the opportunity to harvest and use natural resources, without offering alternatives sources of income.

Villagers will only implement and/or comply with the plan if this will contribute to the improvements of their livelihood. As argued above, at present there are only a limited number of sites where one can hope for tourism development (say Moribane, Nhabawa and Tsetsera in first instances, possibly Mahate once the river crossings along the road leading to this community will be improved). Even so, revenues from tourism activities will still be relatively limited. Alternative sources of income and economic development need therefore also to be promoted.

Possible avenues which need to be further explored are:

- The sustainable basis of timber products through community forestry. An example has been set by EnviroTrade working in the community of Nhambita which is in the buffer zone of the Gorongosa National Park. EnviroTrade facilitated the creation of a first *community association* which owns a saw mill and has now a simple licence for exploitation of timber; initially the licence was for sawing dead trees but this has now been expanded to standing trees. A second *community association* is involved in the processing of the timber by having its own carpentry. It produces furniture in part to the lodge of the National park, but also to local takers. Improved beehives, flat topped Kenyan beehives, are also produced by these carpenters and are very popular among local bee-keepers.

- Commercialisation of non-timber forest products offer other possibilities; this can

range from dried mushroom (surely of high potential in miombo woodland such as in Mahate, parts of Chikukwa and Tsetsera), to the commercialisation of herbs be it for local medicinal use, extraction of essential oils and/or perfumes. There seems also to be a good market for the seeds of some forest tree species. The Fundação Micaia is investigating these aspects in Mpunga and Maronga areas.

- A special and potential very interesting non-timber forest product is the production of honey. In virtually all communities there are bee-keepers, and this activity had also received much support during the first phase of the project. Of this there is still a unity functioning in Sussundenga (run by Dona Tecla who has been processing honey there of the past 15 years) buying honey and selling this to the largest super market in Chimoio. There is however much scope for improving on the current system. First of all, the current organisation is not capable of reaching the more remote producers. The processing is also not sufficiently good quality for getting a product that would meet standards acceptable for export (hygiene and water content would be issues). This is most unfortunately as the demand for honey nationally and internationally seems to be important, (with also great demand in South Africa) with particularly a great international demand for 'organic' honey, which had to be from areas far away from where insecticides/pesticides are used, as is the case for most of the Chimaimani area.
  On the production side there is also much to be improved on. Beekeepers use currently tree bark for making their hives. This has several disadvantages: first, due to the shorter life of these hives more trees need to be killed over a certain number of years to maintain the honey production; secondly, the entire bee-wax is lost, which has on its own an economic value, if it can be commercialised. It can also be used to make for example candles, which in rural areas where there is no electricity could be well appreciated. Bee-wax, being a high energy product, is also rather demanding for bees to produce. So if the bee-wax is returned in the beehive, it saves lots of effort to the bees and in that way the honey production can substantially be increased.
  Improving the overall production and marketing of Chimanimani honey could also have tremendous social benefits. If a great number of producers from about across the whole conservation area can be associated to one popular, high quality organic product (ideally marketed with the "Chimanimani" brand) it may create a sense of pride and ownership of the community to the conservation area.

Next to these potential socio-economic, bee hives can also be effective in reducing conflicts with elephants. Experiences from Kenya have shown that judiciously placed beehives can function as a fence for keep elephants out of agricultural fields[32].

A possibility of expanding and boosting the honey market in Chimanimani in the near future is given by a Chimoio businessman, Mr Andre Vonk, of V.M. Grains Lda, who is involved in setting up a large honey collection operation in Central Mozambique. Mr Vonk has started up operations in the Sussundenga District by working with Dona Tecla. It is hoped that this project will expand into where, to date, there has been no opportunity for people to sell their honey, i.e. Zomba, Muoco, Mahate and Nhabawa, as well as those areas that have been selling honey to Dona Tecla in the past. The plan foreseen to have a high standard of collection and handling of the honey and 'Top Bar' hives will be instructed: only honey from this type of hive will be bought. Teams will visit the various honey producers themselves and assist in the gathering of the honey from the hives.

- The rural communities could (and should) also get economic benefits for conserving the carbon on their land in the "Areas of historical and cultural value" (or Community Reserves). In one part this could be under the current Kyoto clean development mechanism for afforestation of former agricultural land; in the course of land-use planning people could be given incentives to abandon land they are currently farming in forest land – e.g. in some parts of Moribane forest. Alternatively, or additionally, farmers could also get money from the voluntary carbon market for conserving forest (as done by EnviroTrade in Nhamatanda in the periphery of Gorongosa National Park). The practical and legal implication and base for such a scheme need however to be studied in more detail[33].

- Last, but not least, a programme should be worked for promoting better agricultural techniques, including conservation agriculture practises where applicable. If farmers can produce more on the land they are currently using there will obviously be less need for them to convert forest land into farmland:

32 Lucy E. King, Anna Lawrence, Iain Douglas-Hamilton and Fritz Vollrath (2009). Beehive fence deters crop-raiding elephants. Blackwell Publishing Ltd, *Afr. J. Ecol*., 47, 131–137.

33 See also the UN-REDD Programme - Reducing Emissions from Deforestation and Forest Degradation in Developing Countries.

Soil Conservation

Communities will need assistance here from the extension network, which operates in the northern part of the ChNR. However in the south there is little or no presence of extension workers and the assistance of NGOs should be solicited to promote agricultural and conservation awareness amongst the small holder farmers.

Both mechanical and biological conservation of soils are important. In the long to medium term the fertility of soils can often be improved by i) judicious use of inorganic /organic fertilizers, ii) mulching, iii) crop rotations, and iv) the use of lime to improve the ph of the soils as these are generally acid. With the improvement of soil fertility there would be less need for the continuation of shifting cultivation, at least on the better and heavier soils, and, hopefully, less deforestation.

Mechanical conservation is also important and should be linked wherever possible to biological conservation. For example, in the use of grass or vegetation strips where slopes are cultivated, vetiver hedges planted along the true contour, terracing and ridging. In the plains wind breaks are also important in stopping wind erosion and increasing humidity.

Use of Micro Climates

Micro climates can used to cultivate various crops and plants in an otherwise unfriendly environment. They can also be created by the use of shelter from wind, shade, humidly and are often important in the sighting of vegetable garden and even other agricultural crops. Micro climates can be found in such areas as riversides, in the middle of plantations crops, in woodland. They can be created by planting windbreaks, shade tree, and even inside erosion gulley.

In many cases, just the introduction of improved seeds can substantially increase yields.

Another interesting development in the area has been promoted by the DANIDA funded project ADIPSA which has promoted the production of sesame which has been particularly successful in the lowlands of Zomba and Dombe. Sesame is becoming a more profitable cash crop than banana, which is to the benefit of the conservation of the rainforest. All such possible synergies should be fostered.

Proposed Activities

- Promote sustainable extraction of timber products through development of community forestry.
- Promote the commercialisation of non-timber forest products (wild fruits, mushrooms etc.).
- Facilitate and create commercial linkages between communities and privates who are investing in the honey production. Explore the possibility of creating a "Chimanimani Honey" brand, ideally owned by a joint-venture of local communities and a private investor for local high quality organic honey.
- Sell carbon credits through afforestation and natural forest conservation programmes (e.g. Envirotrade, UN-REDD Programme).
- Perhaps the most urgent is to promote better agricultural techniques, including conservation agriculture practises.

4 Programme 4 - Research and monitoring

4.1 Research and environmental monitoring

4.1.1 Current ecological knowledge

Chimanimani Conservation Area is internationally recognised as a centre of high biodiversity and rich in endemic species. The Chimanimani mountain range is considered as a sub-centre of endemism of the wider centre formed by the mountain range along the Mozambican-Zimbabwean border[34]. We verified botanical records of central Mozambican and Eastern Zimbabwe and list at least 90 species whose range is restricted to the Chimanimani area, (the Chimanimani sub centre of endemism), while an 60 other species have to be added to this as typical of the wider Mozambique-Zimbabwean highlands centre of endemism (see list in Annex); other plants with either a rather restricted ranges (though not strict endemics to the Mozambican-Zimbabwe highlands) or which are reported to be endangered in Zimbabwe complete the list to a total of 266 species. Besides, its value for biodiversity from the botanical point of view, the Chimanimani conservation area is also renown – and therefore much appreciated by birdwatchers - for some rare (near) endemic and threatened bird species. The Chimanimani conservation area is situated at the intersection of three biomes - Afrotropical Highlands, East African Coast and Zambeziana - and as a result is probably the area of greatest avian diversity within Mozambique~~regarded to be the area of greatest avian diversity within Mozambique~~[35]. Four species are regarded to be threatened at global level: the Taita Falcon (*Falco fasciinucha*), Southern Banded Snake-Eagle (*Circlets faceplates)* and the Plain-backed Sunbird (*Athletes reichenowi*) residents of lowland forest; the blue swallow (*Hirundo atrocaerulea*) is a breeding migrant in montane grassland and the Swynnerton's Robin (*Swynnertonia swynnertoni*) a resident of montane forest[36].

34 Van Wyk, A.E. & Smith, G.F. (2001). Regions of Floristic Endemism in Southern Africa. A Review with Emphasis on Succulents. Umdaus Press, Pretoria.

35 BirdLife International (2009). Important Bird Area factsheet: Chimanimani Mountains, Mozambique (http://www.birdlife.org on 10/4/2010)

36 BirdLife International (2009) Important Bird Area fact sheet: Chimanimani Mountains, Mozambique (http://www.birdlife.org)

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Much of what is known on the ecology of the area draws on research done in the second half of the 20th century. For example the most comprehensive report on the vegetation ecology has been done by Phipps and Goodier in 1962[37]. These authors explain in qualitative terms the different vegetation types in relation to soils – whereby they emphasize the contrast of grasslands on soils derived from schist with those derived from the quartzitic sandstone; they also highlight the importance of the recurrent grass-fires for the vegetation. Their paper is however limited to the ecology of the Chimanimani highlands, hence important areas of the lowlands, such as the low and mid-altitude rainforests of Maronga, Zomba, Mahate and Moribane are not discussed; nor are the more northerly plateaux of Tandara and Tsetsera. Later surveys, such as the one by Dutton and Dutton (1973), looked at a wider area and added valuable insights, e.g. on the then distribution and occurrence of large mammals; most notably was the relatively common occurrence of buffaloes, elands and elephants.

More recent studies focussed on the forests of the conservation area. In 2004, Aristides Baptista Muhate, as a research student from the *Universidade Eduardo Mondlane* in Maputo, published a dissertation on the vegetation composition along an altitudinal transect of Moribane forest[38]. In 2005, Thomas Müller[39] of the botanical garden in Harare, together with Almeida Sitoe and Rito Mabunda, made an assessment of the status of the forest reserves of Mozambique[40], including the former forests reserves of Moribane, Zomba and Maronga. In 2006, José Monteiro, when working for the *Centro de Estudo Florestal* in Sussundenga, and as part of an MSc training in Denmark, conducted a study on the composition of the vegetation in natural gaps in Moribane forest[41].

The Chimanimani conservation area is facing several challenges; the most pressing ones are (i) uncontrolled artisanal mining in the core of the reserve; (ii) expansion of agricultural land, particularly in the low and mid altitude zones rich in evergreen forest (Moribane-Zomba-lower parts of Mahate), but also on the lower and mid slope reaches of Mt Tsetsera; (iii) illegal

37 Phipps J.B. & R. Goodier (1962) - A Preliminary Account of the Plant Ecology of the Chimanimani Mountains. *The Journal of Ecology*, Vol. 50, No. 2. (Jul., 1962), pp. 291-319.

38 Muhate , A. (2004). *Estudo da composição e estrutura arbórea ao longo de um gradiente altitudinal na reserva de Moribane*. Tese de Licenciatura. Faculdade de Agronomia e Engenharia Florestal. UEM, Mozambique.

39 Thom Muller also did a considerable amount of plant collection in the Makurupini area of Maronga as well as on Serra Macute.

40 Müller T., A. Sitoe and R. Mabunda (2005) - *Assessment of the Forest Reserve Network in Mozambique*. WWF, Maputo, 47 pp. (http://www.worldwildlife.org/what/wherewework/coastaleastafrica/WWFBinaryitem7720.pdf)

41 Monteiro (2007) - *Natural Regeneration in Natural Forest Gaps: a case of Moribane Forest Reserve, Sussundenga*. University of Copenhagen – Faculty of Life Science

hunting on large mammals; (iv) continuous demand for timber logging; (v) annual recurrent wildfires and on a longer term perspective (vi) one should add pressure on the vegetation due to global climatic changes. A research programme and environmental monitoring scheme is needed which would provide the managers of the conservation area the information necessary for focussing conservation efforts, and allowing for assessing the effectiveness of these efforts. An outline of priorities areas for such a research programme is presented below.

4.1.2 Guiding principles

- Chimanimani will be administrated on the base of informed management decisions provided by scientific researches and baseline data are thus essential for Chimanimani managers to take informed decisions.
- Research will lead, in the long run, to better scientific insights and add to the international standing of the area.
- Monitoring is the process through which the success of the management actions undertaken in Chimanimani will be evaluated and future management actions will then be adjusted based on what has been observed (feedback between the monitoring processes and the decisions making).
- **Before investing resources in any unsystematic data collection a comprehensive, well planned and specific monitoring programme should be designed by the proposed appointed senior ecologist of the Chimanimani Reserve. Any data collection should only be part of this programme and functional to achieve the desired objectives. A specific Decision Support System (DSS) will guide the process of planning the research and monitoring programme and will help storing the collected data in a systematic and functional manner.**
- A suggested approach is that in the short term, monitoring should focus on the immediate threats, giving indication on the effectiveness of the management by measuring the reduction of those threats.
- All data collected within this framework (ecological, socio-economic, spatial…) need to be properly maintained by the Reserve administration.

- Chimanimani mangers should facilitate researches of national and international researchers and institutions in ChNR, particularly those targeted by the DSS and necessary for the management of the Reserve. Besides, it is acknowledged that the presence of researchers often contributes to the protection of the environment (discouraging illegal activities such ad poaching, illegal logging etc.).
- Access to all the data available as well as data collected in the future is essential for the adaptive management of the Reserve.

4.1.3 Strategies for ecological research and environmental monitoring

4.1.3.1 Building the monitoring programme

Before investing resources in unsystematic and haphazard data collections a well planned and site-specific monitoring programme should be designed by the proposed appointed senior ecologist of the Chimanimani Reserve (see below). The objective is that any data collection should only be part of this programme and functional to achieve the desired objectives.

A Decision Support System (DSS) specifically built for Chimanimani will guide the process of planning the research and monitoring programme and will help storing the collected data in a systematic and functional manner[42]. The DSS will be based on a series of indicators, targeted in the preparation phase of its creation, and use these through the system diagram built for Chimanimani. Lacking baseline data for almost any component, the DSS will work at the beginning at the qualitative level; once the data will start feeding into the DSS, the indicators will allow for decision based on quantitave aspect of each component.

All data collected need to be properly stored, organized in a systematic manner and maintained by the Reserve administration. The DSS will define the data (ecological, climatic, socio-economic, cultural resources and spatial data-GIS) that need to be collected, their format and the required update frequency.

[42] A holistic DSS approach is being introduced in the Great Limpopo Tranboundary Area to manage interventions in the communal land outside the protected areas of the three Countries. The same approach is also going to be used by the DNTF of the Minag of Mozambique to monitor the land use planning implementation in some districts of the Tete province. For further information on this approach see for example: http://www.progesconsulting.it/

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~~All data collected need to be properly stored, organized in a systematic manner and maintained by the Reserve administration. It is than recommended the creation of a comprehensive database of ChNR including the ecological (vegetation and wildlife), climatic (rainfall and temperature), socio-economic, cultural resources and spatial data (GIS).~~

~~DSS…..~~

4.1.3.2 Reserve ecologist

Though overall staff of the Chimanimani conservation area is extremely dedicated to their work, the current staff has not the capacity for conducting research and capacity for environmental monitoring is rather weak. They will surely need additional technical assistance for elaborating a comprehensive environmental monitoring scheme which, as suggested below, should be elaborated in partnership with some national and local educational and research institutions/organisations.

It is firstly recommended for the Reserve to hire a full time ecologist, or if that is not possible a part time ecologist (say up to 50% of his working time), for designing ~~the details of~~ the specific DSS system, the details of the research and monitoring programme and supervising its implementation and guarantee the quality of the data collection and analysis. The ecologist should be chosen on an honourably basis, and consist of a reputed national or international senior researcher familiar with the area. The ecologist should not be responsible for carrying out the field work and the data collections – although he will certainly perform some of it – but should rather maintain a role of planning, supervision and coordination of the institutions and researchers working in Chimanimani.

~~4.1.3.2~~4.1.3.3 Research programmes and local partners

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At national level, the best reputed institution for conducting ecological research is undoubtedly the University of Eduardo Mondlane, in Maputo. This institution should therefore keep taking a leading role in ecological research. The Chimanimani Conservation Area, being a biodiversity hotspot at world level, should also attract international research initiatives. International calls for research proposals should be launched, inviting researchers to set-up research projects within the conservation area. In as much as possible such research projects should be set-up in collaboration with national research institutions.

As in general environmental monitoring, will require more readily and rapid access to the conservation area, a wider and more active involvement of local institutions would be highly desirable than just the University Eduardo Mondlane. There are several educational and research institutions based in Chimoio, besides one in Sussundenga, which should all be considered for contributing in research and monitoring in the Chimanimani Conservation Area.

The *Instituto Agrario de Chimoio* (IAC), which is an institution of vocational training, and training forestry and wildlife technicians could take up such a role. Staff and students of this institution could for example contribute in forestry inventories and wildlife surveys. IAC has recently also been gaining experience in community based natural resources management, and could hence contribute to setting up community based monitoring systems.

The *Instituto Superior Politécnico de Manica* is an institution of higher education (at degrees bachelor level) training students in agriculture, agro-business and natural resources management. This institute could be involved in both academic research and environmental monitoring. Its geographical information unit could for example be involved in monitoring of land-use changes and/or studying the wildfires as described above.

The *Centre for Sustainable Development of Natural Resources* (CDS-RN) is a research institution of the Ministry for the Coordination of Environmental Action (MICOA) based in Chimoio. It has been involved in studies on artisanal gold mining. It also has a GIS unit and could be involved in monitoring the evolution of gold mining in the conservation area, and possibly also in monitoring land-use changes and wildfires. CDS-RN also has experience in community based natural resources management in communities adjacent to the Chimanimani conservation area.

The ARA-Centro unit (Authority for Water Management in Central Mozambique), based in Beira, could provide technical assistance for setting up a pluviometric recording system and for the monitoring of the water quality in relation to gold mining activities. At present ARA-Centro is doing basic water quality monitoring in the Pungue basin using field kits (turbidity, pH, EC, ...); there are no operational laboratory facility around needed for monitoring e.g. fertilizers (N, P, K), heavy metals (Hg, Pb, Cd, As and others) or pesticides residues, but ARA Zambezi has some laboratory facilities and so in the future samples may be sent to them for analysis, until ARA Centro will get its own laboratory. Directors of this structure already

expressed their interest in collaborating with Chimanimani Reserve on these aspects, as they do with the Gorongosa National Park. Their collaboration, and possibly their participation in the *Conselho de Gestão* of the Reserve, will also guarantee that any plan for creating dams or other water related infrastructures[43] in the Chimanimani area will be initially discussed with the Reserve authorities.

The *Centro de Estudo Florestal* (CEF), based in Sussundenga, is part of the *Instituto de Investigação Agrária de Moçambique* falling under the Ministry of Agriculture. The CEF has a long history with research and community based natural resources management in the forest of Moribane. The continuous involvement of this research centre in ecological monitoring of the evergreen forest is most desirable.

4.1.4 Outline of some potential rResearch and monitoring priorities

In this chapter are outlined some possible researches activities. These should be taken as examples and suggestions since, as mentioned in chapter 4.1.3, before any research is undertaken in the Reserve a specific and comprehensive monitoring programme incorporating a DSS should be prepared. This programme will guide the Reserve managers in deciding what the data collection priorities are. Only the targeted activities will then be actually carried out.

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4.1.4.1 Basic inventories

For conservation efforts to be effective, ones needs to know what there is in the conservation area. During our field visits in the Chimanimani Conservation area, we recorded several plant species which were not known to occur in the area.
For example:

- We noticed that *Zamioculcas zamiifolia*[44] (Lodd.) Engl. (Araceae) to be really common and widespread in the Chimanimani Conservation area. We found it in the undergrowth of forest patches in Zomba, but also in Moribane forest, as well as in miombo woodland around the Mussapa Pequena River. These observations are noteworthy as

[43] As with regard to potential dam sites in the Chimanimani Conservation Area, ARA-Centro directors affirmed there are no current plans for making any; but one of the activities of the Buzi Watershed Project planned to start in the near future will be to assess the potential for such also in the Chimanimani area.
44 See http://www.zimbabweflora.co.zw/speciesdata/species.php?species_id=111980

the species is regarded to be "vulnerable" for extinction in Zimbabwe[45].

- We identified *Vernonia polyanthes* Less (Asteraceae) a South American species introduced in Sussundenga district in the 1990s as it is regarded as an excellent honey plant; it is now becoming really widespread in Moribane forest, where it could possibly be regarded as an invasive species.
- We found *Raphidiocystis chrysocoma* (Schumach.) C. Jeffrey (Cucurbitaceae) in Moribane forest, which is, to the best of our knowledge, a new record for Mozambique[46].
- Also in Moribane forest, we found *Aloe swynnertonii* Rendle, an endemic to the Mozambican-Zimbabwean highlands, which we believe was not known to occur in Moribane forest.
- We also believe to have found, the bamboo species which could be *Oreobambos buchwaldii* K. Schum. (Poaceae) which, if confirmed, would also be a new record for Mozambique.

These examples just serve to illustrate the very limited knowledge there is on the general ecology of the Chimanimani Conservation area. Comprehensive inventories of all biota just hence are one of the first research priorities.

As for the flora, botanical surveys should be carried out to get a complete inventory of the plant species occurring in the Chimanimani conservation area and mapping their distribution. Ideally, specimens of all plant species would be kept in a local herbarium and with reference copies at the National Herbarium in Maputo. We started establishing a photographic database of recorded species – see the "Photographic check list of plants of ChNR" in the Annexes – which can further be used as a reference and should be expended.

4.1.4.2 Wildlife ecology

As for the wildlife, the actual remaining number of large mammals and their distribution is not well known. During our field visits we found markings and droppings of elephants in Moribane forest, of sable antelope on the Chimanimani highlands. Rangers report that there still are eland antelopes in some parts of the reserve. During our visit in Zimbabwe, however,

45 *Southern African Plant Red Data Lists* (SABONET Report No. 14, 2002) – see also
46 http://mozambiqueflora.com/speciesdata/species.php?species_id=157440

we learned that numbers of elands had dramatically collapsed there, so prospects may not be good. Buffaloes were considered to be potentially present in Chimanimani only in the south near the Sitautonga Mountains in Maronga (though this still has to be confirmed) but a recent observation by rangers of about 10 individuals indicates that little numbers of this species might still occur in the Mapombere area. Wildlife surveys are needed to find out what the actual number and distribution is of all the larger mammals. Sable and eland antelopes have high potential for tourism but also seem to be particularly popular with poachers and therefore deserve special attention.

Elephants still have a prominent presence in Moribane forest but are also frequent crop raiders. Studying their actual numbers and foraging habits should also be given priority. There is a need to assess if the current population (possibly an isolated one) is viable in the long run and if the population increases if the available foraging area is large enough to support them and what the consequences will be for local farmers. Strategies and testing of techniques for minimising conflicts with elephant is needed (see also chapter 3.2.9 on "Wildlife management – Human-wildlife conflicts"). Such strategies and techniques will in part be a judiciously land use planning – agreeing with local population the areas which will remain untouched as to give enough space to the elephants. This work has been started by MICAIA in the Mpunga community of Moribane forest, but needs to be expended to part of Chicuizo, and possibly to parts of Mahate.

The blue swallow (Hirundo atrocaerulea) is an endangered species believed to breed in the Chimanimani mountain range. As on various occasion we have observed several birds of this species foraging on the Tandara plateau, and given that it is their typical habitat, it must be assumed that they are breeding here[47]. Their presence on the Chimanimani highlands, in the Binga range, needs to be confirmed and a survey specifically on their actual distribution is of high priority.

A complete updated check list and distribution of birds of Chimanimani would also be important as a baseline study to plan management actions to protect them. Ideally an ornithological study should be planned to produce along with a scientific report also a guide to the birds of Chimanimani, for bird-watchers and tourists use.

[47] Mozambique Seeds Company - *Sementes de Moçambique* (SEMOC) has very recently, when this plan was about to be completed, started planting seed potatoes on Tandara plateau. It is likely that no limitation has been passed to SEMOC to reduce the impact on blue swallows. The impact on the breeding blue swallow population should be studied and monitored.

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Finally, a research should be done on fish species presence and distribution in the main rivers of Chimanimani; the research should also asses the presence of introduced alien species (e.g. trout) and the impact of gold panning activity on the river ecosystem.

4.1.4.3 Vegetation ecology

Vegetation composition differs according to environmental variables, such as grazing pressure, soils, climate and fire regime. So far, no quantitative studies have been undertaken to characterise the vegetation composition – the vegetation of natural gaps in Moribane forest by Monteiro (2007), and the study of Muhate (2004) being the noteworthy exceptions. Knowing the vegetation units of the Chimanimani conservation area which harbours the rare and endemic species and the environmental factors determining their formation and dynamics is of prime importance for developing effective conservation strategies. Ideally such research would be twofold: there is need to characterise the major vegetation units in relation to environmental variables (slope, slope, climate, altitude, fire regimes) but also in such a way that a base line data would be collected enabling monitoring of the vegetation in the future. A particular case is the pine plantation on Mt Tsetsera which is being cut down with support of the project. For example, we observed the widespread growth of *Chironia gratissima* S. Moore[48], on part of the land where *Pinus* had been cleared; monitoring the evolution of this vegetation should give better insights into the results of the conservation efforts made. *Chironia gratissima*, though strictly spoken not an endemic, is still regarded to be special as its range is restricted to the Chimanimani highlands and, apart from that, also seems to occur in the DR Congo.

The widespread artisanal mining in the reserve is affecting large part of the river ecosystems; particularly by the direct working of the miners in the river beds, but also for the habit of removing grass suds for making dams (photograph). As there is no information on vegetation composition, it is impossible to estimate to which extent the mining activity is affecting endangered and endemic plant species.

4.1.4.4 Environmental monitoring

As outlined in the previous section, research should provide basic information for enabling informed conservation management decision. However, the time span for research to yield

48 http://mozambiqueflora.com/speciesdata/species.php?species_id=144770

practical insights is usually too long for guiding initial conservation actions. At this stage, conservation strategies should therefore focus on the major threats to the Chimanimani conservation area and the environmental monitoring system put in place will assess whether these efforts are effective. Environmental monitoring should hence focus on the threats posed by:

- mining, particular the artisanal mining in the highlands
- deforestation for agriculture (which may have to be distinguished from plain slash-and-burn agriculture)
- illegal hunting
- demand and pressure for logging of timber
- wildfires, and
- global climatic change

4.1.4.5 Monitoring of artisanal mining

As explained in the section on mining, artisanal gold panners have been active in the highlands of the Chimanimani reserve since Nov 2004 and efforts so far to evict the miners have been ineffective. Major concern is the destruction they directly cause on the river systems, and secondly the poaching some of them may be involved in. Deforestation caused by increasing numbers of gold panners is likely to be a problem in the near future, even if it is not so at present. Conservation strategy should first of all be focussed at the preservation of areas not yet much affected by the mining, and in the areas already affected by mining, attempting to contain the effects by overall reducing the number of exploited sites.

To assess the effectiveness of any strategy to deal with the mining on the highlands, it is proposed that do a detailed survey of the highlands which would map all the sites which have been affected by the mining; and reciprocally areas which have not yet been affected. This data should provide a baseline for later objectively assessing to which extend control measures would have been effective.

4.1.4.6 Deforestation

Monitoring deforestation and land-use changes in general, is most easily done by comparing remote sensing data over time. Acquiring such data is rather expensive and processing and analysing them requires staff with specialist training. Software, luckily, is widely available as open source and/or freeware programmes such as quantumGIS-GRASS and SPRING.

Remote Sensing techniques, however, still require ground truthing. The vegetation map prepared as part of the national forest inventory[49] as well as the classified image of the conservation area as prepared by Peace Park Foundation[50] can serve as a base for deriving some baseline data. A scheme need to be elaborated, ideally in collaboration with the resident communities, for monitoring land-use changes in the field and which can be compared with this remote sensing based information layers.

4.1.4.7 Illegal hunting

The low density of large wildlife in Chimanimani directly reflects the past and present high hunting pressure. Nevertheless, in the absence of large predators, wildlife in Chimanimani will recover relatively quickly if proper protection is given and illegal hunting reduced to a minimum.

Monitoring of wildlife will be done with the objectives to catch trends in the numbers and changes in the distribution of wildlife so to assess if anti-poaching activity is being effective or not. It has to be noted that, due to the low densities, obtaining precise estimates of wildlife numbers in Chimanimani will be difficult at the beginning. Yet baseline surveys are necessary even if it is likely that statistically significant trends will only be detectable after several years of monitoring.

4.1.4.8 Timber exploitation

It is being proposed that timber exploitation should not be allowed with the Chimanimani conservation area, expect for, under the strict condition that this would be on a sustainable and

49 Marzoli A (2007) – *Inventário florestal nacional. Avaliação integrada das florestas de Moçambique. Ministerio de Agricultura*, Maputo & Agriconsulting, Roma.
50 GeoterraImage (2008) - *Land-Cover Classification for Peace Parks Foundation: Chimanimani dataset*. Final Data Report and Meta Data. Peace Parks Foundation, Stellenbosch, South Africa.

community based forest exploitation scheme. Such exploitation should hence fit within detailed land-use and natural resources management plans which have to be elaborated at community level. To get to such a scheme there is still a long distance to be covered for formalising all the communities their land-use rights and organising and training them to be able to lead such forest exploitation. Hence, in collaboration with the Provincial and District agricultural and forestry services, a formal agreement has to be made that no forestry licences will be issued in the conservation area (with the exceptions mentioned above). In the field, a simple monitoring scheme should be set-up to verify that indeed, no commercial logging is taken place.

4.1.4.9 Wildfires

Wildfires are an annual recurrent phenomena in Mozambique to which most of the vegetation units, particularly the grasslands and the woodlands are highly adapted. Already in 1915, Thiele and R. C. Wilson[51] reported that they were very common, indicating that it is for sure not a recent phenomena. Phipps and Goodier[52] argue that fire is part of the Chimanimani ecosystem and that a great part of the endemic flora found there is fire dependant. A total ban of wildfires in the reserve, besides not be achievable, would also not be desirable. Wildfires are however detrimental to some specific vegetation units, particularly the evergreen forests and making sure that they do not occur in these areas should be the principal preoccupation. In normal years, the evergreen forest are however not prone to fire; it is hence in particular dry years that extreme care should be taken to protect these from fire.

Still, taking into account that wildfires are an important part of the ecosystem, it should be very important to get to know per vegetation unit, their frequency of occurrence the extent of the area annually affected. Remote sensing data on wildfires, as registered by the MODIS satellite, can freely be downloaded from the website of the University of Maryland, USA[53]. These data are however only point data indicating a probability that a fire was active when the satellites where passing; there are actual two each passing once per day. This data does not directly allow for estimating the extent of the burned area. Parallel to the processing of this

51 Thiele, E.O. & R. C. Wilson (1915) - Portuguese East Africa between the Zambezi River and the Sabi River: A Consideration of the Relation of Its Tectonic and Physiographic Features. *The Geographical Journal*, 45: 16-40.
52 Ibidem
53 http://maps.geog.umd.edu/firms/

remote sensing data, a field monitoring procedure needs to be worked out which can then be correlated to the remote sensed data.

This set of information on fires will also help in setting up a fire management programme (see chapter 3.4).

4.1.4.10 Global climate change

Global climate change will most likely affect mountain ecosystems more markedly than lowland areas. Species particular adapted to certain temperature ranges may disappear as their habits changes with increasing temperature, and is hence of direct relevance for conservation.

Monitoring changes in the ecosystems of mountainous world wide should provide scientific insights into how climate change is taking place at a global. With that objective, the Global Observation Research Initiative in Alpine Environments (GLORIA) has been established as an international network to make long-term observation in alpine environments[54]. A detailed monitoring protocol has been elaborated for collecting vegetation and temperature data. It would be most worthwhile if the Chimanimani mountain range would also be included in that network.

The procedure entails describing and monitoring the vegetation and temperature of at least four inter-comparable mountain summits in a given mountain range. Summit habitats are chosen as a reference units as:

- Summits are well-defined topographic units which can provide comparable conditions; they comprise habitats in all exposures (north, east, south, west) within a small area.
- On summits selected, shading effects from neighbouring land features can be avoided and therefore, the climatic conditions are largely defined by the altitude. Any other topographical feature is likely to be much affected by diurnal and seasonal variation in insolation as a result of shading by neighbouring features.
- The species composition in summit areas is typical for the respective elevation because the flora is not enriched by elements from higher altitudes.
- Topographic diversity at summits can result in a high variety of niches, causing high species richness. The presence of narrow transition zones between habitats or

54 http://www.gloria.ac.at/

vegetation types may enable a rapid recognition of climate-induced shifts of boundaries.

- Conversely, summits may function as traps for upward-migrating cryophilic species with weak competitive abilities. This is particularly critical on isolated mountains with a high percentage of endemic species occurring only at the uppermost elevation levels. Summit areas are not prone to severe disturbance such as debris falls or avalanches. This enhances their value for long-term observations.
- Summits are prominent landmarks which can be easily relocated.

For these reasons, mountain summits are considered as the most appropriate sites for comparing ecosystems along climatic gradients. For the selection of monitoring sites, however, certain criteria have to be considered to avoid possible disadvantages (for details see the GLORIA Field Manual).

4.1.5 Historical monuments and other cultural sites

Chimanimani is not only a unique place for its biological richness and uniqueness but also for its heritage of culture and history. Indeed major tourist attractions are the historical monuments of the Great Zimbabwe culture and the ancient bushman rock paintings.

- It is recommended to contract a senior researcher to make a detailed and comprehensive inventory and description of all historical monuments and other cultural sites of Chimanimani conservation area and of its surroundings. Objective of this work is to assess the present state of the cultural heritage of the area, to give recommendation for the protection and sustainable exploitation for tourism and to set a programme for the **long term monitoring of the historical and cultural sites**.

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4.1.6 Monitoring of the Reserve infrastructures

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Infrastructure of the Reserve should be regularly monitored in order to assess their status and to plan for their maintenance. Infrastructures to be monitored are:

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- Roads and tracks: status of main tracks and roads is done by the Reserve staff during their normal duties and movements in the Reserve. Attention should be given to infrequently used tracks to assess for erosion particularly after each rainy season. This

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monitoring also includes all river crossings structures (drifts, culverts and bridges)[55].

- Reserve headquarters and ranger posts: details on the maintenance of permanent buildings are also expected to be included in the "Infrastructures plan for Chimanimani".

Proposed Activities

- Appoint a full time senior ecologist
- Develop a specific Chimanimani DSS.
- Set up a database of the Reserve to store all data (ecological, climatic, socio-economic, cultural resources and spatial) already available and collected in the future. These data will be used to feed the DSS.
- Design an immediate monitoring system. As outlined above, research should provide information for enabling informed conservation management decision through the DSS. However, some time will pass before quantitative data can guide initial conservation actions. At this stage, before the DSS will guide actions on a quantitative basis, an "emergency approach" can be followed and conservation strategies should therefore focus on the major threats to the Chimanimani conservation area. The DSS system put in place will assess whether these efforts are effective. Environmental monitoring should hence focus on the immediate threats posed by:
    - Mining, particular the artisanal mining in the highlands
    - Deforestation for agriculture (which may have to be distinguished from plain slash-and-burn agriculture)
    - Illegal hunting
    - Demand and pressure for logging of timber
    - Wildfires
    - Global climatic change
- Establish MOUs of collaboration with national and local institutions – UEM, IAC, ISPM, CDS-RN, CEF – to carry out baseline surveys and implement the

[55] Details on the monitoring of these infrastructures are expected to be included in the specific "Plano de infra-estruturas de Chimanimani" prepared by Norconsulting but not yet available at the moment of the finalization of this plan.

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monitoring system.

- Make an inventory and monitoring of historical monuments and other cultural sites in collaboration with ARPAC. To date many of these, of high value for tourism and for the national heritage, have not been recorded yet and risk in the short term to be damaged if not well preserved.
- Regularly monitor the Reserve infrastructures.

5 Programme 5 - Awareness programme and divulgation of plan

5.1 Awareness programme

5.1.1 Guiding principles

- The main task for the Reserve administrators remains to convince the communities that they and the government have equal responsibility in managing the environment of the conservation area.
- In dealing with local people, prime need in Chimanimani is not for education but for motivation and support.
- This motivation largely depends on the availability of economically viable alternatives to the present unsustainable and sometimes destructive use of natural resources and on incentives for conservation, as outlined in Programme 3 of this plan ("Community based management"). Nevertheless, part of the support and motivation will also depend on the communication between the Reserve and the communities and on an effective and long term awareness campaign.

5.1.2 Objective

- To increase local support to, and motivate communities in conserving the Chimanimani Conservation Area.

The present Reserve's staff is probably not sufficient to implement this activities, it would require additional human resources to prepare and especially carry out such a programme. These activities should preferably be entrusted to the community broker (KSM) or to other NGOs and local association who will be responsible to implement this component under the supervision of the Reserve's technician in charge for the community programme. ~~- and motivate .~~

Proposed Activities

- Involve local communities' *Comités de Gestão* in the organization of awareness campaigns in each community.
- Publish and distribute awareness material in the villages (brochures, posters, note books, calendars).
- Launch an awareness programme in the schools of the District and Province:
  - Organize school level education on the importance of the conservation of natural ecosystems (including consequences of wildfires – see chapter 3.4 on "Fires management").
  - Organize school visits to the Reserve.
  - Organize different school based activities such as drawing, quiz contests and essay writing.

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5.2 Divulgation of the plan

This plan is the result of a participatory process which involved informing all stakeholders at different stages of the plan preparation process, by means of public workshops and more restricted meetings (the minutes of all meetings held during the preparation of the plan are in the annexes). It is therefore important that all persons involved in this process should be informed on the outcome of this process and will have access to the final version of the management plan.

The plan, being produced in both English and Portuguese versions, will be accessible by all stakeholders of the area, some of whom are English-speaking, and also by CNP authorities in Zimbabwe.

5.2.1 Guiding principles

- Prerequisite for a full involvement in the management of the conservation area of all stakeholders and, particularly, local government and local communities is that they will have access to the official management plan. A good understanding by

stakeholders of the long term objectives and the strategy to achieve them is the essential first step to gain their support to the Reserve.

- Coordination of actions with CNP authorities in Zimbabwe will be better achieved once they are familiar with the Mozambique Chimanimani Reserve management plan.

5.2.2 Objective

- To continue the participatory process put in place with stakeholders during the preparation of the plan

Proposed Activities

- Meet with local governments to present the plan. It will be very important at a very early stage to present and debate the management plan with the administration of Sussundenga district as they are in the process of elaborating (with the technical support of GTZ, German international cooperation enterprise for sustainable development) their district development plan, which should as much as possible integrate actions and strategies of this plan.
- Organize meetings to officially distribute copies to and debate its contents with communities and local leaders. For the communities, several local meetings are preferred to a single large meeting. Ideally a presentation and the official delivery of the plan should be organized as soon as the plan is formally ratified in each of the following communities: Tsetsera (Sembezia), Mussimwa, Gudza, Nhahedzi, Mahate, Mpunga, Zomba, Maronga and Muoco.
- Deliver copy and discuss the contents of the plan with the CNP authorities in Zimbabwe.

6 Cross border actions

Since the beginning of the TFCA-TD project the Chimanimani Conservation Area (CCA) in Mozambique and the Chimanimani National Park (CNP) in Zimbabwe have discussed the coordination of management of their respective protected areas. These two areas share a 42 km common boundary with no great natural barriers. In the past, tourists coming from the Zimbabwe side used to visit the highlands Mozambican Chimanimani, particularly the upper Muvumozi river valley up to the Muvumodzi falls (known in Zimbabwe as "Martin's Falls). The usual crossing points were "Skeleton pass" in the centre, "Corner camp" in the north and "The Saddle" in the South. Today with the collapse of the tourism industry in Zimbabwe the same passes are used by illegal miners who enter the ChNR in search of gold.

At present there is no coordinated management and law enforcement between the two protected areas, but it is clear to both parties that it is necessary to coordinate certain activities, with the following objectives:

- Improve the control of illegal activities;
- Create new opportunities for tourism;
- Promote the exchange of experiences between the staff of the two parks;
- Communicate a consistent message to local populations through a shared awareness program.

6.1 Cross border patrolling for gold miners and poachers

During our consultancy for the preparation of the MP two meetings were held with the authorities of the CNP~~PNC~~ to discuss the strategy to be adopted to solve the problem of illegal crossing of the international border, primarily by gold miners.
Recommendations for the implementation of an effective strategy to control illegal activities in the reserve are given in chapter 3.1 "Law enforcement" and 3.3 "Gold mining"

6.2 Trans-boundary Tourism

The Chimanimani Massif extends to both sides of the Mozambique-Zimbabwe border, with some easy crossing passes. Until the end of 1990 'the CNP~~PNC~~ has received about 12,000 visitors a year, many of whom visited the Mozambican part of the massif with no benefit going from it to the country, to the protected area or just to local people. Facilitate and institutionalize cross-border tourism between the two protected areas will give the opportunity to increase the offer of tourist attractions of each area and benefit from the presence of visitors coming from the opposite side of the border.

To achieve this it necessary to produce a memorandum of understanding between the two parties to facilitate the tourists crossing the international border and ensuring equitable distribution of tourism revenues to the two protected areas.

Some recommendations on this aspect are given in Chapter 2.2 ("Tourism development").

6.3 Experience exchange

Mozambique and Zimbabwe have quite different approaches in the management of protected areas in Chimanimani. In this way the CCA in Mozambique and the Chimanimani National Park in Zimbabwe have the opportunity to observe two approaches to conservation being carried out next to each other and in the same natural environment and within related community. Rather than causing mutual criticism this should be an opportunity for mutual learning.

The CCA and CNP authorities should put on together a programme of exchange of experienced for the staff from the two protected areas. For example, some aspects of the tourism management, well developed in Zimbabwe could be adapted and imported in Mozambique while some aspects of the proposed co-management of natural resources in CCA~~hNR~~ could be adopted in Zimbabwe.

The exchange of experience for the Reserve~~ChNR~~'s staff ideally should not be limited to CNP but possibly also with other parks in Zimbabwe, South Africa and Malawi. The objective, in all cases, is not to exactly duplicate models of management used elsewhere (which is an increasing attitude in Mozambican protected areas and natural resources management) but to adapt to the Mozambican and local reality new ideas and experiences.

6.4 Cross border awareness programme

Most of the people living in the CCA have close relationships with the people living on the other side of the international border around the CNP in Zimbabwe. They not only share the same language and culture but also are often closed relatives. Chikukwa, Mahate and Matsia community lands lay across the two countries: in fact, the *mambo* of Chikukwa community lives in Zimbabwe.

This came out quite clearly during interviews conducted with the communities and traditional authorities; they were afraid that the Zimbabwe approach to conservation would be adopted on the Mozambican side and that this would result in their eviction from their tradition land.

The general lack of understanding by local people of the conservation project in Chimanimani also corresponds to some confusion of Mozambicans on what is going on in the Zimbabwean side.

One government might have less stringent regulations thereby facilitating greater access to natural resources and benefits to its border communities than its neighbour. The end result can be a flourishing community on the one side and an impoverished one on the other. This can generate tensions between communities. Further, where a community perceives that a government is retarding its potential for development in comparison to a community of the same tradition and culture in a neighbouring country, it might have fewer incentives to engage in sustainable methods of natural resource management. This is probably truer for Zimbabwe than for Mozambique where in the latter the long term strategy is to increasingly delegate to local communities the co-management of tourist activities and of natural resources in the buffer zone. The conservation approach in the two countries will probably continue to be different also in the future; nevertheless, correct information will help producing a feeling of trust between people and the reserve.

The proposed awareness programme (see chapter 5.1) recommends developing a long term communication programme involving local teachers and the locals *Comité de Gestão* of the different communities. It is here proposed to include in this programme a “trans-boundary component” to correctly inform communities in the CCA on the strategy implemented and the

activities carried out in CNP so to give clear and correct information to communities on both sides of Chimanimani.

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