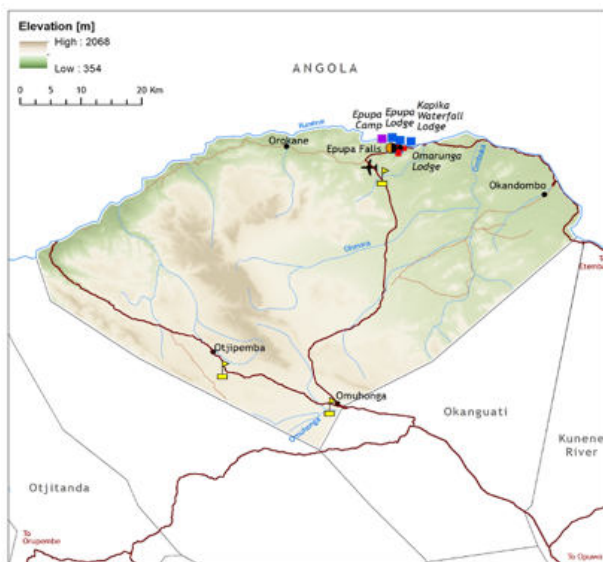


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Environmental Management Plan for The Proposed Water Supply at Epupa Waterfall Settlement in Epupa Conservancy, Kunene Region



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DOCUMENT INFORMATION

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ACRONYMS

CBNRM	Community-Based Natural Resource Management
CCFN	Community Conservation Fund of Namibia
DEA	Department of Environmental Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act 2017 (Act No. 7 of 2007)
EMP	Environmental Management Plan
HWC	Human-Wildlife Conflict
HWC-WC	Human-Wildlife Conflict- Wildlife Crime
m³	Cubic
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
Mm³	Million Cubic
MOHSS	Ministry of Health and Social Services
PPE	Personal Protective Equipment
RDC	Red-Dune Consulting
SM	Site Manager
WC	Wildlife Crime

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1 Introduction and Background	2
1.1 Poverty Oriented Support to Community Conservation in Namibia.....	2
1.2 Community Based Natural Resource Management.....	3
1.3 Challenges faced by Conservancies.....	4
2 Epupa Conservancy	5
2.1 Location	5
2.2 Population Demography	6
2.3 Challenges faced by the Conservancy Community	6
2.3.1 Water Resource.....	6
2.3.2 Human Wild Life Conflict (HWC	7
2.4 HWC Mitigation Options.....	8
2.5 Support from Community Conservation Fund of Namibia (CCFN).....	8
2.6 Statutory Requirements.....	9
3 Terms of Reference for the EMP.....	9
4 Project Description.....	10
4.1 Water abstraction	10
4.2 Drilling of Borehole.....	12
4.3 Project Alternatives.....	13
5 Description of the Environment.....	15
5.1 Population Demography	15
5.2 Climate.....	15
5.2.1 The Kunene River	16
5.3 Biodiversity.....	16
5.3.1 Flora	16
5.3.2 Fauna.....	18
5.3.2.1 Domestic	18
5.3.2.2 Wildlife	18
6 The need and desirability of the Project	19
7 Policy, Legal and Administrative Framework	20
8 Public Participation.....	25

8.1	Meeting with Epupa settlement community	25
9	Impact Assessment.....	27
10	The Environmental Management Plan.....	29
10.1	Purpose of the EMP	29
10.2	Compliance to the EMP	29
10.3	Roles and Responsibility.....	29
10.3.1	Proponent	29
10.3.2	Site Manager	29
10.3.3	Employees.....	30
10.3.4	Environmental Compliance Officer.....	30
10.3.5	Ministry of Agriculture Water and Land Reform	30
10.4	Disciplinary Action.....	30
11	The EMP table	31
11.1	Part I. Direct River Water Abstraction.....	31
11.1.1	Construction Phase.....	31
11.1.1.1	Socio-economic consideration	31
11.1.1.2	Employees health and safety.....	33
11.1.2	Operational Phase	34
11.1.2.1	Water quality.....	34
11.1.2.2	Maintenance of equipment.....	35
11.2	Part II: Drilling of a borehole.....	36
11.2.1	Construction Phase.....	36
11.2.1.1	Social-economic consideration Impacts	36
11.2.1.2	Health and Safety of employees	37
11.2.1.3	Bio-Physical Consideration	38
11.2.1.4	Heritage Resources	38
11.2.2	Operation Phase	39
11.2.2.1	Aquifer Conservation.....	39
11.2.3	Bio-physical and socio-environmental concerns	40
12	Grievance Procedure.....	41
13	Decommissioning and Rehabilitation Plan.....	43
14	Conclusion and Recommendations.....	43
14.1	Conclusions.....	43

1.1.	Recommendations.....	43
15	Annex 1. Groundwater monitoring plan	44
15.1	Groundwater Quality	44
15.2	Groundwater Level Measurements.....	44
15.3	Aquifer Properties.....	44
16	Annex 2. Attendance Register	45

List of Figures

Figure 1.	Map of Epupa Conservancy (Source: NASCO).....	5
Figure 2.	Diesel powered water pump and water storage tanks.....	7
Figure 3.	Broken water pipe aimed to supply water to the storage tanks.	7
Figure 4.	Trends in Human Wildlife Conflict (Source: NASCO)	8
Figure 5.	Location of Epupa Falls and i) direct water abstraction site and ii) proposed borehole site	10
Figure 6.	Illustration of solar panel installation	11
Figure 7.	The livestock trough and the broken part.	11
Figure 8.	Rainfall pattern of Epupa Conservancy (Source: NASCO)	16
Figure 9.	Vegetation at water abstraction site project site.	17
Figure 10.	Borehole site area	17
Figure 11.	Goats, Cattle and Donkeys randomly found in the Conservancy.....	18
Figure 12.	Meeting at Epupa.....	26
Figure 13.	GRM flow chart (Source: ESMF_ Poverty Oriented Support to Community Conservation in Namibia).....	42

List of Tables

Table 1.	Project Alternatives.....	13
Table 2.	Regulatory framework applicable to the project.....	20
Table 3.	Criteria for Impact Evaluation	27

EXECUTIVE SUMMARY

Epupa conservancy (Otjiherero language a for "foam", referring to the foam created by the *falling water*) is located in Epupa Constituency (-17.003278°, 13.246157°) north of the Kunene region at Angola and Namibia borders in a valley surrounded by rugged mountains towards the Kunene River.

The tourism establishment at Epupa waterfall has created a permanent settlement of Ovahimba people at Epupa Falls who, with their livestock consume water directly from the river. The use of water directly from the river presented one of the biggest challenges of HWC that the conservancy is facing "*the human-crocodile conflict*". Statistics indicates that, crocodile are responsible for the highest number of attacks on livestock in the conservancy and sometimes fatal attack on humans.

The conservancy raised the challenge of *human-crocodile conflict* to CCFN and through a proposal requested assistance to develop / establish safer water access point to mitigate this challenge.

The CCFN, through the project "*Poverty Oriented Support to Community Conservation in Namibia*" is supporting the Conservancy with a solar powered water supply infrastructures to establish safe access water point for human and livestock. This intervention is in line with the project's objective of "providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia".

Section 27 of EMA has listed the "*Abstraction of water from a river that forms an international boundary*" as an activity that may not be undertaken without Environmental Clearance Certificate. To fulfil this statutory requirements, Red-Dune Consulting CC (RDC) was appointed to develop an Environmental Management Plan (EMP) for the project.

The project's magnitude is small, and its potential negative impacts are negligible to; the river flow, aquatic biodiversity, bio-physical environment on land and, it has positive impact on socio-economic in addressing *the human-crocodile conflict* and poverty eradication by supporting livestock of the community and potential gardens.

1 INTRODUCTION AND BACKGROUND

1.1 Poverty Oriented Support to Community Conservation in Namibia

The Community Conservation Fund of Namibia (CCFN) is a non-profit Association incorporated under Section 21 of Namibia's Companies Act of 2004. Using a foundation model, the CCFN is mandated to raise funds and manage various financial mechanisms such as endowments, sinking or revolving funds, to ensure the long-term sustainability of Community-Based National Resource Management (CBNRM) activities that are carried out by communal conservancies and other entities with a similar legal mandate.

Box 1. A Conservancy is...

- a legally registered area with clearly defined borders and a constituted management body run by the community for the development of residents and the sustainable use of wildlife and tourism.
- managed by a group elected to serve the interests of all its members.
- a place where residents can add income from wildlife and tourism to traditional farming activities.
- a place where wildlife populations increase as they are managed for productive gain.
- a place where the value of the natural resources increases, enhancing the value of the land.
- a forum through which services and developments can be channelled and integrated.
- zoned for multiple uses to minimize conflict and maximize the interests of all stakeholders.

With financial support from the German Government through the KfW Development Bank, CCFN is implementing a project, "*Poverty Oriented Support to Community Conservation in Namibia*". The project's main objective is to contribute to biodiversity conservation and rural development through the establishment of sustainable Human-Wildlife-Conflict (HWC) management systems in Namibia's communal conservancies.

The project is (i) working together with CBNRM partners to develop and institutionalize long-term mechanisms and structures that make management of HWC part of the sustainability strategy of CBNRM (ii) providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia.

1.2 Community Based Natural Resource Management

Before Namibia gained its independence in 1990, residents in the communal areas had few rights to use wildlife. Predators and foraging wild animals were regarded as threats due to their destruction of crop fields, human attacks, killing of livestock as well as damaging of infrastructures, especially water infrastructure. In turn, community retaliate by killing wild animals, which gave birth to a concept commonly known as Human Wildlife Conflict and Wildlife Crime (HWC-WC).

After independence, and in line with Article 95¹ of the Namibian Constitution, Namibia has adopted policies, legal instruments, and strategies for addressing HWC-WC. One such strategies is enabling communities and private businesses to benefit from wildlife-based tourism and sustainable natural resource management commonly known as Community-Based Natural Resource Management (CBNRM) which is guided by the National Policy on Community Based Natural Resource Management.

The CBNRM concept is based on the understanding that if natural resources have sufficient value to rural communities, and allow for rights to use, benefit and manage, then appropriate incentives for people to use natural resources in a sustainable way will be created through the establishment of a Conservancy. The CBNRM programme links conservation to poverty eradication through developing the conservation, hunting and tourism industries which in turn contribute to the Gross Domestic Product, employment creation and the improvement of the well-being and social upliftment of rural communities.

¹ The State to actively promote and maintain the welfare of the people by adopting policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future.”

1.3 Challenges faced by Conservancies

The CBNRM has yielded into remarkable recovery and increase of wildlife populations, including key predator species and internationally threatened or endangered species such as elephant and black rhinoceros². However, this increased wildlife population resulted into their expanded foraging ranges into communal and freehold farming areas resulting in an increased frequency and severity of Human Wildlife Conflict (HWC) especially involving elephants, feline predators, crocodiles and hippopotamus³⁴.

The conflicts include damage to crops, gardens and infrastructure (water points, fences, kraals, boreholes, etc.), loss of life or injuries to people and livestock mortalities. Climate change is known to contribute to shift of wildlife population to areas that are not heavily affected by drought, which further exacerbates HWC & WC.

Wildlife trafficking became a million-dollar criminal enterprise that has expanded to more than just a conservation concern. The increasing involvement of organized crime in poaching and wildlife trafficking threatens peace, strengthens illicit trade routes, and destabilizes economies and communities that depend on wildlife for their livelihoods.

Namibia is not spared from Wild Crime⁵ (WC). Although the country has made remarkable effort in preventing WC, the country is still facing this challenge and requires significant financial resources to address the challenge. Statistics indicates that 27 elephant and 61 rhinos were poached in 2018 while in 2019, 39 live and 65 dead pangolins were seized in 2019. Furthermore, conservancy residents experiencing HWC sometimes engage in retaliatory killing to remove problem animals⁶. Other WC reported includes poaching wildlife such as Gemsbok, Springbok, Kudu, Giraffe etc., to sell meat and for own consumption.

² Republic of Namibia: Revised National Policy on Human Wildlife Conflict Management 2018-2027

³ Brian T. B. J and Jonathan I. Barnes 2006., Human Wildlife Conflict Study Namibian Case Study

⁴ Ailla-Tessa Nangula Iiyambula 2021., Identifying the Spatio-Temporal Distribution and Drivers of Human-Carnivore Conflict in Epupa and Okanguati Conservancies, Kunene Region Namibia.

⁵ Republic of Namibia: Revised National Strategy on Wildlife Protection and Law Enforcement 2021 - 2025

⁶ Project Document: Integrated approach to proactive management of human-wildlife conflict and wildlife crime in hotspot landscapes in Namibia

The drivers of HWC and WC are complex and interlinked and to address these twin challenges, a concerted integrated approach to HWC and WC is required.

2 EPUPA CONSERVANCY

2.1 Location

Epupa conservancy (Otjiherero language a for "foam", referring to the foam created by the *falling water*) is located in Epupa Constituency (-17.003278°, 13.246157°) north of the Kunene region at Angola and Namibia borders in a valley surrounded by rugged mountains towards the Kunene River (fig 1). It was gazetted in October 2012 and covers an area of about 2912.34 km² representing about 3% of the 115615.7 km² Kunene regional land area.

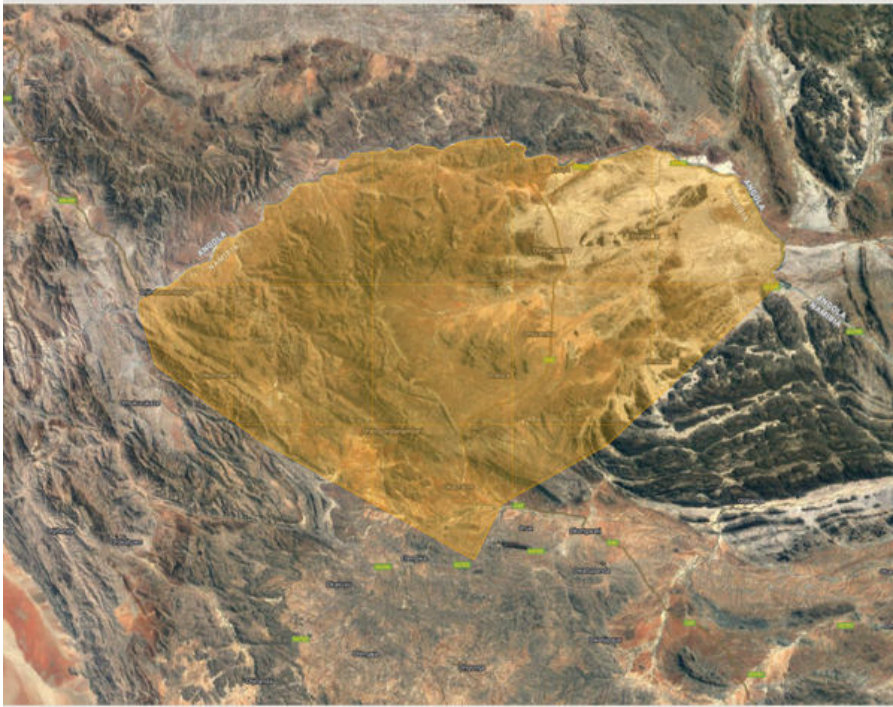


Figure 1. Map of Epupa Conservancy (Source: NASCO)

2.2 Population Demography

In the context of population density, the conservancy is relatively densely populated, with a population of 2970⁷ people and a population density 1.29 people/ km² when compared to the regional population density of 0.8 people/ km²⁸. However, the nominal population density may not necessarily be applied, as the area, to a larger extent is made up of uninhabitable mountains.

The conservancy is home to Ovahimba people who are part of the larger Herero language group. They are well known for being pastoralist and semi-nomadic cattle headers. Civilization, however, has altered their nomadic way of living in various forms. The development of tourism industries at Epupa waterfall has attracted Ovahimba to form a “settlement”.

2.3 Challenges faced by the Conservancy Community

2.3.1 Water Resource

Although Namibia is one of the hottest and driest country in Sub-Saharan Africa. It is almost unthinkable that, Epupa conservancy, especially “Epupa settlement” lacks water since its next to the permanent flowing Kunene River. It is perhaps the use of words that would bring the sense of understanding to the reader, by rather stating that, Epupa conservancy lacks resources to abstract water from the river or to drill a borehole to supply Epupa settlement and their animals in effort to avoid crocodile attacks.

The Epupa settlement community was initially supported with the abstraction of water using a diesel-powered generator which pumped water into storage tanks (fig 2). The water supply network to the settlement and to the livestock trough already exists. However, due to limited financial resources, the community was unable to keep constant supply of fuel as well as maintenance of broken pipes (fig 3) and pumps. This resulted in the community resorting to fetching water from the river as well their livestock drinking from the river.

⁷ Epupa Audit report 2021 using the 2011 population census.

⁸ Population and Housing Census Regional Profile, Kunene Region



Figure 2. Diesel powered water pump and water storage tanks.



Figure 3. Broken water pipe aimed to supply water to the storage tanks.

2.3.2 Human Wild Life Conflict (HWC)

The collection / use of water directly from Kunene River resulted in one of the biggest challenge of HWC for the conservancy *“the human-crocodile conflict”*. The river supports a large population of crocodile. Statistics indicates that, crocodile are responsible for the highest number of attacks on livestock (Fig 4) in the conservancy. *“One day, a woman was washing her clothes with her child, all of the sudden, she was attacked by the crocodile and got rescued by surrounding people”* narrated Mr. Tungee Raphael the Secretary of Kapika Traditional Authority.

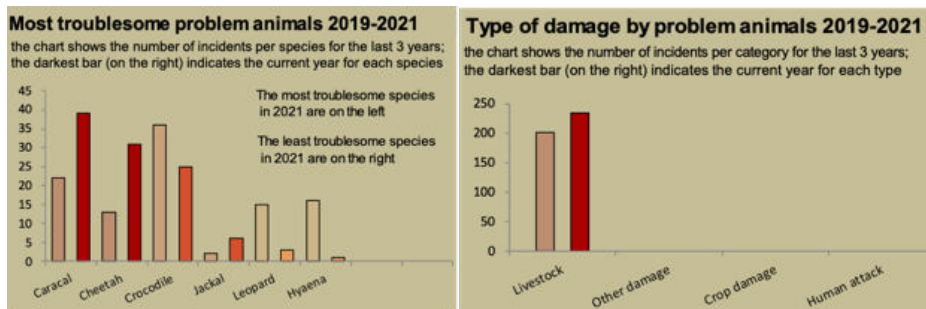


Figure 4. Trends in Human Wildlife Conflict (Source: NASCO)

2.4 HWC Mitigation Options

Mitigation options of “*human-crocodile conflict*” in the conservancy aims to restore the supply of water to Epupa community and their livestock through safe access point. The implementation of this option will prevent community members and their livestock to access water directly from the river thereby preventing “*the human-crocodile conflict*”. Lesson learned from initial efforts to supply water indicates that, direct water abstraction required maintenance which the community may not be able to upkeep. A long-term option is thus drilling of a borehole. The pros and cons of these options are described in section 4 below.

2.5 Support from Community Conservation Fund of Namibia (CCFN)

Epupa conservancies raised the challenge of *human and livestock-crocodile conflict* to CCFN through a proposal⁹ and requested assistance to develop / establish safer water access point to mitigate the *human and livestock-crocodile conflict*.

It is against this background that CCFN, through the project “*Poverty Oriented Support to Community Conservation in Namibia*” is supporting Epupa Conservancy to establish a solar powered water supply infrastructure for Epupa community. This intervention is in line with the

⁹ Human Wildlife Mitigation emergency funding request. Replacement of solar pump and erection of crocodile proof fence to mitigate Human Crocodile conflict 2022.

project’s objective of “providing targeted conservancies with the means to address the HWC challenges they face in line with the National Policies of Namibia”.

2.6 Statutory Requirements

The protection of the environment is enshrined under Article 95I of the Namibia Constitution and the Environmental Management Act 2007 (Act No 7 of 2007) (EMA). Section 27 of EMA has listed activities that may not be undertaken without Environmental Clearance Certificate (ECC) Table 1.

Table 1. Identified listed activities concerning the proposed project.

Activity	Applicability
Water Resource Developments 8.1 Abstraction of water from a river that forms an international boundary. 8.2 The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources.	Kunene River where the water will be abstracted is a transboundary river. The option of drilling of borehole.

To fulfil the above statutory requirements, CCFN appointed Red-Dune Consulting CC (RDC) to develop an Environmental Management Plan (EMP) for water supply to Epupa settlement.

3 TERMS OF REFERENCE FOR THE EMP

The scope to develop this EMP is guided by the Terms of References as provided in the EIA Regulation 2012, Section 9 (a-b) but, not limited to the following;

- Provide a comprehensive description of the proposed Project;
- Identify relevant legislation and guidelines for the project;
- Identify potential environmental (physical, biological and social) conditions of the project location and conduct risk assessment;
- Inform Interested and Affected Parties (I&APs) and relevant authorities about the

proposed project to enable their participation and contribution;

- Develop an Environmental Management (EMP) that would be a legal guideline for the environmental protection by the project

4 PROJECT DESCRIPTION

The water abstraction is located at the area with existing pipeline (-17.001675°, 13.247645°) while the drilling of borehole has two proposed site i) next to the water abstraction site ii) outskirts of the settlement (-17.007711°, 13.251492°) (fig 5).



Figure 5. Location of Epupa Falls and i) direct water abstraction site and ii) proposed borehole site

4.1 Water abstraction

The water infrastructure for abstraction already exists, which includes the supply network of pipes to the storage tanks and to households as well to the livestock trough (Fig 7). Under this option, it

is only the solar panel platforms (fig 6) that will be constructed and the installation of the submersible solar water pump in the river.



Figure 6. Illustration of solar panel installation

In addition, the cattle trough is broken and need to be replaced with the new one. This activity will only involve installation of the trough since the concrete base already exists (Fig 7).



Figure 7. The livestock trough and the broken part.

During consultations, the lodges indicated that, initially, their water supply was through abstracting of water from the river, but they frequently faced challenges of pump failure due to siltation, especially during rainfall when the runoff is high. This resulted into tourism establishment switching to boreholes, which they said is cost-effective and yield quality water safe for human consumption. Abstracting of water from the river is then regarded a short term (about 2 years) intervention to prevent HWC. Additionally, if a major pollution happens in the upstream, the option of water abstracting could subject people to poor water quality and may compromise their health.

Owing to the challenge of clogging water pumps and water quality, the conservancy recommended the drilling of a borehole as long-term solution.

4.2 Drilling of Borehole

The long term to supply of water to the settlement of Epupa is via drilling of solar powered borehole. The average depth for boreholes at Epupa water fall area is less than 10m which indicated healthy aquifers that are constantly recharged by the Kunene River. Furthermore, borehole water will be safer for human consumption and minimal maintenance is required.

4.3 Project Alternatives

The EMA requires impact assessment to explore various project alternatives which aims to ensure that a chosen project component does not have significant impact to the environment. Project alternatives ranges from not implementing the project (no go alternative), when the environmental impacts are severe, or there is high degree of uncertainty. Other alternative considers the project site, technology, and equipment to be used. The description of alternatives is given in table 1 below.

Table 1. Project Alternatives

Project Alternative	Description	Advantages	Disadvantages	Alternative adoption
PROJECT: DIRECT ABSTRACTION OF WATER FROM KUNENE RIVER				
No project	Do not implement the project	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Continued Human-Crocodile Conflict • Injuries and Loss of Human lives to Crocodiles 	No
Implement the project	Implement the project	<ul style="list-style-type: none"> • Alternative source of water • Reduced Human-Crocodile Conflict (Injuries, loss of lives and livestock) • Improved water supply 	<ul style="list-style-type: none"> • Poor water quality during high run-offs 	Yes
Diesel Power Pump	Use of diesel-powered water pump	<ul style="list-style-type: none"> • Cost effective and quick to implement 	<ul style="list-style-type: none"> • Difficult to upkeep with fuel supply. • Water pump may clog during high flow from siltation • Diesel too costly for the community and Epupa is too far from the 	No

Project Alternative	Description	Advantages	Disadvantages	Alternative adoption
			nearest fuel station is ±200 km away.	
Solar Powered Pump	Use of solar powered water pump	<ul style="list-style-type: none"> • Environmentally friendly • Does not require fuel to operate 	<ul style="list-style-type: none"> • Water pump may clog during high flow from siltation. • Risk of theft of solar panels or pumps 	Yes

Project Alternative	Description	Advantages	Disadvantages	Alternative adoption
PROJECT: DRILLING OF A BOREHOLE				
Diesel powered borehole	Use diesel powered borehole	<ul style="list-style-type: none"> • Delivers clean water to the community. • Not environmentally friendly 	<ul style="list-style-type: none"> • Diesel cost makes it unsustainable to the community 	No
Solar powered boreholes	Use diesel power borehole	<ul style="list-style-type: none"> • Long term solution for water supply • No operational cost • Environmentally friendly • Delivers clean water to the community 	<ul style="list-style-type: none"> • Relatively expensive to install in comparison to diesel 	Yes

5 DESCRIPTION OF THE ENVIRONMENT

5.1 Population Demography

The Ovahimba living in Kaoko make up less than one percent of Namibia's national population. Their culture has always been centred around herds of cattle and goats, and as pastoralists they lead migratory lifestyles following the sparse grazing of north-western Namibia. Their pastoral livelihoods are supplemented by small scale gardening including maize, pumpkins, sweet peppers and tobacco which they grow along the Kunene River. At Epupa falls settlement, they are mainly supported by the conservancy through income from tourism establishments.

5.2 Climate

Namibia is one of the hottest and driest country in Sub-Saharan Africa, with a large part of country having a climatic condition characterized by. The country has high climatic variability in the form of persistent droughts, unpredictable, low, and variable rainfall patterns and high temperature leading to scarcity of water¹⁰.

Persistent extreme drought conditions caused government to declare national emergencies in 1992/1993, 1995/1996, 2012/2013, 2013/2014, 2015/2016, and 2018/2019. The 2019 drought was recorded to be worst in 90 years, agriculture production was at its lowest and affected the livelihood of many people.

Kunene Region is one of the most affected regions by drought in the country. The region's rainfall is highly sporadic ranging from 50mm – 400mm per year which increases from the western part of the region to the eastern part. Lack of water in conservancy is the biggest challenge to agriculture, livestock and wildlife.

The study area, Epupa, has a dry climatic condition with frequent drought spells. The area receives an average annual rainfall 100 to over 200mm which is highly variable (Fig 8). However, rainfall

¹⁰ Namibia Fourth National Communication to the United Nations Framework Convention on Climate Change. Windhoek: Ministry of Environment Forestry and Tourism, March 2020.

trends over the years have been on the decline. During consultation, communities indicated that, it has been almost 7 years since Epupa Waterfall area received an above average rainfall.

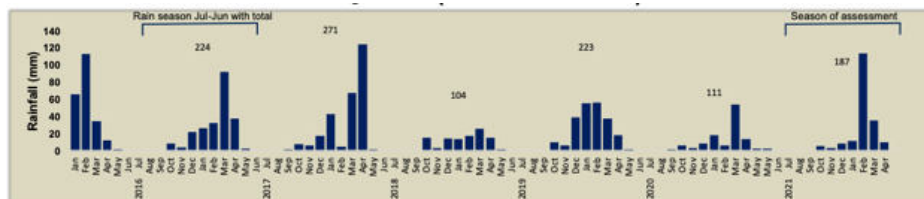


Figure 8. Rainfall pattern of Epupa Conservancy (Source: NASCO)

5.2.1 The Kunene River

The Kunene River, a Perennial Rivers which has permanent flowing is the main source of water for communities of Epupa settlement those nearby. The river has an annual flow of 5,500Mm³¹¹. In context, Namibia total water demand equals to 334.1Mm³/year including irrigation and mining. As of 2020, the population of Windhoek was estimated to be around 431,000 and had per capita water demand of 0.2m³/day¹² including industries, businesses and tourism which translate to 86.2Mm³.

With a population of less than 300¹³ at the water fall settlement and no industries and business, the proposed water abstraction will be minimal and insignificant to affect river’s biodiversity and its flow or ground water recharge. It is important to note that, each tourism establishment at Epupa waterfall has its own borehole. Thus, the proposed water supply is solely for the community.

5.3 Biodiversity

5.3.1 Flora

Mopane trees, commonly known as Omusati tree dominates the entire Kunene regions. However, the riverine vegetation is dominated by Makalani palms (fig 9) and mustard tree thickets.

¹¹ Integrated Water Resources Management Plan for Namibia, 2010

¹² Michael Boucher et al 2007., Public Perception of Windhoek’s Drinking Water and Its Sustainable Future; A Detailed Analysis of The Public Perception of Water Reclamation In Windhoek, Namibia by Michael Boucher et al

¹³ Personal observation during site assessment on 16th August 2023



Figure 9. Vegetation at water abstraction site project site.

The proposed water supply project will use existing pipeline networks for the abstraction of water from the river, while the proposed area for the borehole consists of shrubs of Makalani tree and grasses (Fig 10). Hence, the project impact on biodiversity will be negligible.



Figure 10. Borehole site area

5.3.2 Fauna

5.3.2.1 Domestic

The Ovahimba people are known pastoralist who graze livestock mainly cattle, goats and sheep which are present in the conservancy. The project will bring about positive impact to the livestock, as it will prevent livestock from drinking directly in the river, thereby avoiding crocodile attacks.



Figure 11. Goats, Cattle and Donkeys randomly found in the Conservancy.

5.3.2.2 Wildlife

The riverine habitat of the Kunene has a variety of birds, including goliath heron, darter, African fish eagle and osprey. The Kunene River supports a large crocodile population, Cape clawless otter and around 65 species of fish in the river.

Inland, the conservancy is rich in wild animals. It is reported that since its establishment, wildlife animals has significantly increased. The common wildlife include springbok, gemsbok and ostrich. Other wildlife life includes, giraffe, mountain zebra (rare), kudu, klipspringer, duiker, steenbok and the diminutive dik-dik. The common predator includes caracal, cheetah, leopard, spotted and brown hyaena, and jackals.

Epupa Conservancy provides habitats to many of the country's near endemic birds. These birds include Benguela long-billed lark, Gray's lark, Carp's tit, rosy-faced lovebird, Rüppell's korhaan, Monteiro's hornbill, white-tailed shrike, Herero chat and rock runner.

6 THE NEED AND DESIRABILITY OF THE PROJECT

The project is in line with the CBNRM programme toward reducing HWC-WC and contributing to conservation incentives and poverty reduction. In addition, the project contributes to the aim and objective of the Integrated Water Resource Management (IWRM) for Namibia which aims to achieve a sustainable water resources management regime, contributing to social equity, economic efficiency, and environmental sustainability. Lastly, the aridity of the area coupled with effect of climate change requires investments in water resource development to ensure sustainable water supply for the livelihood of the local people.

7 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

Table 2. Regulatory framework applicable to the project

Legislation	Relevant authority	Applicability
The Namibia Constitution	Government Republic of Namibia	The Namibian constitution is the supreme law of the country and makes provision for environmental protection and sustainable development. Article 95(1) of the Constitution of Namibia states that:- “The State shall actively promote and maintain the welfare of the people by adopting policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.
Environmental Management Act No. 7 of 2007	MEFT	The environmental management act No.7 of 2007 aims to promote the sustainable use of natural resources and provides the framework for the environmental and social impact assessment, demands precaution and mitigation of activities that may have negative impacts on the environment and provision for incidental matters. Furthermore, the act provides a list of activities that may not be undertaken without an environmental clearance certificate.

Legislation	Relevant authority	Applicability
<p>Environmental Assessment Policy (1995)</p>	<p>MEFT</p>	<p>The Environmental Assessment Policy for Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards implementing integrated environmental management. Sets an obligation to Namibians to prioritize the protection of ecosystems and related ecological processes.</p> <p>The policy subjects all developments to environmental assessment and provides guideline for the Environmental Assessment. The policy advocates that Environmental Assessment take due consideration of all potential impacts and mitigations measures should be incorporated in the project design and planning stages (as early as possible).</p>
<p>Water Supply And Sanitation Policy 2008</p>	<p>MAWLR</p>	<p>2.3.1 Water supply</p> <p>To improve the provision of water supply in order to:</p> <ul style="list-style-type: none"> • Contribute to improved public health; • Reduce the burden of collecting water; • Promote community based social development taking the role of women into special account; • Support basic water needs; • Stimulate economic development; and • Promote water conservation.

Legislation	Relevant authority	Applicability
Revised Policy on Human Wildlife Conflict Management 2018-2027	MEFT	The policy was developed to manage human wildlife conflict in a way that recognizes the rights and development needs of local communities while at the same time recognizing the need to promote biodiversity conservation.
Revised National Strategy on Wildlife Protection and Law Enforcement	MEFT	The strategy provides policy directives, a framework and common approaches to the protection and conservation of wildlife and ensures the effective enforcement of laws governing wildlife resources in the country.
National Policy on Community Based Natural Resource Management	MEFT	This policy provide a framework that promotes the wise and sustainable use of natural resources on State land outside protected areas as well as the promotion of integrated natural resource planning and management.
Pollution Control and Waste Management Bill (in preparation)	MEFT, MOHSS	The Pollution Control and Waste Management Bill, intents to regulate and prevent the discharge of pollutants into the air and water as well as providing for general waste management. Upon gazettment, the Bill will repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976).

Legislation	Relevant authority	Applicability
<p>Public Health Act (Act No. 36 of 1919)</p>	<p>MOHSS</p>	<p>The Public Health Act aims to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.</p> <p>The proponent should ensure that the workers are provided with protective gear to safeguard their wellbeing. The activities should also be conducted in a manner that does not pose any danger to the general public.</p>
<p>Water Resources Management Act (Act No. 11 of 2013)</p>	<p>MAWLR</p>	<p>This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources. Furthermore, any watercourse on/or in close proximity to the site and associated ecosystems should be protected in alignment with the listed principles.</p> <p>Water is one of the most important resources, and determinant factor for any development. Therefore, water abstraction should satisfy the provisions of the water act (water abstraction / borehole permit should be applied from the respective ministry).</p>
<p>Water Act No, 54 of 1956</p>	<p>MAWLR</p>	<p>This act states that, all water resources belongs to the State. It prevents pollution and promotes the sustainable utilization of the resource. To protect this resources, this act requires that permits are obtained when activities involve the following:</p> <ul style="list-style-type: none"> (a) Discharge of contaminated into water sources such as pipe, sewer, canal, sea outfall and (b) Disposal of water in a manner that may cause detrimental impact on the water resources

Legislation	Relevant authority	Applicability
The Occupational Safety and Health Act No. 11 of 2007	MOL	A safety risk is a statistical concept representing the potential of an accident occurring, owing to unsafe operation and/or environment. In the working context “SAFETY” is regarded as “free from danger” to the health injury and to properties.
Soil Conservation Act No. 76 of 1969	MAWLR	This act promotes the conservation of soil, prevention of soil erosion. Prevent soil salinification.
National Heritage Act No. 27 of 2004	MEAC	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits.
Regional Councils Act, 1992 (Act No. 22 of 1992)	MURD	The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage and evaluate regional development. The Regional Council is considered to be an interested and affected party (I&AP) and reserve the right to comment on the project and EMP.
Polluters Pays Principle	MEFT and International Conventions	This principle ensures that proponent takes responsibility of their actions. Hence in cases of pollution, the proponent bears the full responsibility and cost to clean up the environment

8 PUBLIC PARTICIPATION

Section 21 of the EIA Regulation requires the undertaking of an Environmental Impact Assessment (EIA) to follow a robust and comprehensive public consultation. This is an important process, because it gives members of the public, especially the Interested and Affected Parties to comment or raise concerns that may affect their socio-economic or general environment because of the project. Further, it solicits crucial local knowledge that the Environmental Assessment Practitioner may not have.

8.1 Meeting with Epupa settlement community

On 16 August 2023, RDC held a meeting with a few members of Epupa settlement led by the conservancy Chairperson (fig 12 and annex 1). The meeting was informed about the proposed support by CCFN to restore water supply in effort to mitigate human crocodile conflict (including loss of livestock). The community narrated how risky it has become to fetch water from the river especially women who are mostly accompanied by young children.

RDC inquired if the initial direct river water abstraction was treated before consumption and if there has been health risks in consuming untreated water. The community indicated that, generation after generation, they had consumed water directly from the river and it had never been a health risk because the river is constantly flowing. *“Perhaps our body is used to the river water”* remarked one member.

RDC however explained that, with increased industrialization, risk of pollution is relatively higher which poses health risk. The meeting, on what they term as a long-term solution, suggested the drilling of a borehole. Overall, the meeting expressed gratefulness for the proposed support, and requested for the speedy implementation.

The competent and or regulatory authority such as Ministry of Environment Forestry and Tourism (MEFT), Ministry of Health and Social Service (MOHSS), Ministry of Agriculture Water and Land Reform (MAWLR), were consulted during the project development phase. MOHSS expressed concern of providing untreated portable water to human health and suggested the project

Commented [SN1]: Provide more details on the meeting, when did it take place, how many people, segregated by gender and position in community. What was discussed and the outcomes.

Provide list of participants as an Annex

to seek ways to ensure water quality.



Figure 12. Meeting at Epupa

9 IMPACT ASSESSMENT

Commented [SN2]: Insert a section on potential social positive/negative impacts . And how it will be addressed.

The environmental impact assessment was done in accordance with the criteria for impact evaluation outlined in Table 3 below. This approach conforms with the Environmental Impact Assessment Regulations (Government Gazette No. 4878) of EMA. The approach adopts two phases: (i) identification and (ii) Assessment of impacts.

- **Impact identification:** Potential project impacts during construction and operation were be identified.
- **Impact Assessment:** The criterial outline in table 3 was be used to determine impact significance, which was determined under two mitigation scenarios; **without mitigation** and **with mitigation**. The confidence of impact mitigation depends on the level of certainty based on available information to assess the impact.

Table 3. Criteria for Impact Evaluation

Risk Event	Rating	Description of the risk that may lead to an Impact
Impact type	0	No Impact
	+VE	Positive
	-VE	Negative
Probability	The probability that an impact may occur under the following analysis	
	1	Improbable (Low likelihood)
	2	Low probability
	3	Probable (Likely to occur)
	4	Highly Probable (Most likely)
	5	Definite (Impact will occur irrespective of the applied mitigation measure)
Confidence level	The confidence level of occurrence in the prediction, based on available knowledge	
	L	Low
	M	Medium
	H	High
	0	None (Based on the available information, the potential impact is found to not have a significant impact)

Significance (Without Mitigation)	L	Low (The presence of the impact's magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects are altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Mitigation	The applied measure / alternative to reduce / avoid an impact	
Significance (With Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localised, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects are altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Duration	Time duration of the impacts	
	1	Immediate
	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent
Scale	The geographical scale of the impact	
	1	Site specific
	2	Local
	3	Regional
	4	National
	5	International

10 THE ENVIRONMENTAL MANAGEMENT PLAN

10.1 Purpose of the EMP

This Environmental Management Plan (EMP) is a risk strategy that contains logical framework, monitoring programme, mitigation measures, and management control strategies to minimize environmental impacts. It further stipulates the roles and responsibility of persons involved in the project. These strategies are developed to reduce the levels of impacts for the projects. Lastly, the EMP further aims to develop mitigation measure of social and environmental risk that the project may cause as identified in the Environmental Social Management Framework (ESMF) of the project.

10.2 Compliance to the EMP

This EMP is a legally binding document as given under the provisions of the Environmental Management Act, 2007 (Act No. 7 of 2007). Epupa with support with from CCFN and contractors should adhere to the framework of this document.

10.3 Roles and Responsibility

10.3.1 Proponent

The proponent, Epupa Conservancy with support from CCFN shall take overall responsibility for proper implementation of the EMP. It remains the responsibility of the proponent to appoint key personnel for the implementation of the EMP such as Site Manager and ensure that all employees and contractors are conversant with the EMP.

10.3.2 Site Manager

The Site Manager (SM) represents the proponent on site. He/she shall be responsible for daily activities in ensuring environmental protection. All communication with regard to the implementation of EMP must be channelled through the SM.

Commented [T13]: MAWLR plays a role in borehole monitoring (beyond support period), water abstraction permits etc and should be included here too

10.3.3 Employees

It shall be responsibility of employees to always adhere to the provision of EMP.

10.3.4 Environmental Compliance Officer

Compliance to EMP is enforced by the environmental inspector as provided for under Environmental Management Act (No. 7 of 2007) (EMA).

10.3.5 Ministry of Agriculture Water and Land Reform

This ministry as mandated through the Water Resources Management Act 11 of 2013 to ensure adequate management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters. MAWLR will be responsible to ensure to that the allocated abstraction by the water permit is not exceeded.

10.4 Disciplinary Action

This EMP is a legally binding document, non-compliance to the EMP is punishable in accordance with the provision of EMA.

11 THE EMP TABLE

This EMPs is structured to address potential impacts during the construction and operational phase of the project. The EMP is divided into two parts (i) water abstraction from the river (ii) drilling of a borehole.

11.1 Part 1. Direct River Water Abstraction

11.1.1 Construction Phase

Under this activity, only three activities are envisioned: i) Digging holes to install poles for the solar panel platforms, a maximum of 4 holes, ii) submerging the solar powered submersible water pump into the river and iii) replacement of the cattle trough.

11.1.1.1 Socio-economic consideration

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Staff induction	To ensure that all staff / employees are familiar with the requirements of the EMP	<ol style="list-style-type: none"> All employees must go through an induction course for the provision of the EMP. Ensure that a copy of the EMP is kept on site 	<ul style="list-style-type: none"> Induction Minutes and Attendance Register, Physical verification of the EMP on site. 	Contractor
Employment Socio-Economic	To ensure that general work created during the project is reserved for local people	<ol style="list-style-type: none"> Ensure that all general work is reserved for local people 	<ul style="list-style-type: none"> Employee register Wages for employee 	Contractor

Commented [T14]: EMP should also include potential HWC risks and appropriate/applicable mitigation measures associated with water abstraction scenario, to ensure safety of those on site during installation/decommissioning

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
advancement for local		2. Fair compensation and labour practise as per Namibian Labour Laws must be followed	<ul style="list-style-type: none"> Complains about payment 	
Skill and Knowledge transfer	To build local capacity	1. Identify and train competent people (Preferable youth) to do basic maintenance of water pump and its supporting infrastructure	<ul style="list-style-type: none"> Training report 	Contractor
General waste	To manage solid waste To prevent littering, pollution, contamination of water and general environmental health hazards	<ol style="list-style-type: none"> Provide well labelled waste drums. No onsite burying / dumping or burning of waste material is permitted. Ensure appropriate waste collection and removal from the site and dispose at appropriate waste disposal site. 	<ul style="list-style-type: none"> Physical verification of waste drums Report of waste disposal at approved sites 	Contractor

11.1.1.2 Employees health and safety

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
HIV and AIDS, Alcohol and Drug abuse	Prevent alcohol and drug use at work place. Provide awareness of dangers on HIV/AIDS	<ol style="list-style-type: none"> 1. Ban the employees against the use of alcohol during working hours 2. Provide awareness on the dangers and health impacts of alcohol and drug use 3. All employees must be screen with the breathalyser to avoid intoxicated personnel on site 4. Adopt a disciplinary system to discipline staff for non-compliance 5. Provide Condoms to employees 	<ul style="list-style-type: none"> • Monitor presence of alcohol at harvesting site • Awareness meeting attendance registers • Breathalyser report • Disciplinary reports • Physical assessment and logs of condom procurement 	Contractor
Health	To ensure employees and community health	<ol style="list-style-type: none"> 1. Abide to the Occupational Health and Safety and Labour Act of Namibia and other statutory requirements such as International Labour Organization (ILO) practise. 2. Provide adequate first aid kit 3. Supply clean drinking water to the employees 	<ul style="list-style-type: none"> • Complaints of health issues by employees • First aid kit available 	Contractor
Safety	To ensure employees and community safety	<ol style="list-style-type: none"> 1. Develop a safety plan 2. Install a crocodile proof fence at the construction site 	<ul style="list-style-type: none"> • Safety plan / pamphlets • Training minutes and attendance register 	Contractor

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		3. Ensure that every employee goes through an induction course about safety 4. Provide appropriate Personal Protective Equipment (PPE) which includes helmets, overalls, safety shoes, safety glasses, gloves, etc. 5. Provide life jackets to employees walking close the river	<ul style="list-style-type: none"> Physical verification of the crocodile proof fence Physical verification of PPE Physical verification of life jackets 	

11.1.2 Operational Phase

The operation phase entails maintenance of equipment; i) water pump ii) solar system including replacement of panels when they reach their lifetime, pipelines and water tank. The tragedy of the commons teaches us that, no one takes responsibility of the “commons”. Hence it is important for the conservancy to take ownership and responsibility of the infrastructure to ensure adequate maintenance and smooth operation. Furthermore, water quality is critical, hence it is important to ensure that the water is safe for human consumption.

11.1.2.1 Water quality

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Human and Animal Health (Quality of Water)	To ensure the water is fit for human consumption	1. Undertake intermittent water quality assessment to ensure that it is fit human consumption	<ul style="list-style-type: none"> Water quality monitoring reports 	Conservancy Management

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
fit for human consumption)				

11.1.2.2 Maintenance of equipment

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Maintenance of water abstraction infrastructure	To ensure adequate upkeep and smooth running of infrastructures	<ol style="list-style-type: none"> 1. Appoint contractor / individual to ensure the maintenance of water abstracting and associate infrastructures 2. Periodic reporting on maintenance 	<ul style="list-style-type: none"> • Appointed maintenance contractor / individual • Maintenance reports 	Conservancy Management

11.2 Part II: Drilling of a borehole

11.2.1 Construction Phase

Activities to be undertaken during construction includes; drilling of the borehole and digging of trenches to lay the water pipelines from the borehole to the existing storage tanks. The pipeline network from the storage tank to the communities however exist. Supporting infrastructures such as elevated solar panels platforms will also be constructed.

11.2.1.1 Social-economic consideration Impacts

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Staff induction	Same as above	1. Same as above	<ul style="list-style-type: none"> Same as above 	Contractor
Employment Socio-Economic advancement for local	Same as above	1. Same as above	<ul style="list-style-type: none"> Same as above 	Contractor
Skill and Knowledge transfer	To build local capacity	1. Identify and train competent people (Preferable youth) to do basic maintenance of the borehole and its supporting infrastructure	<ul style="list-style-type: none"> Training report 	Contractor
General waste	Same as above	2. Same as above	<ul style="list-style-type: none"> Same as above 	Contractor

11.2.1.2 Health and Safety of employees

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
HIV and AIDS, Alcohol and Drug abuse	Same as above	Same as above	<ul style="list-style-type: none"> • Same as above 	Contractor
Health	Same as above	Same as above	<ul style="list-style-type: none"> • Same as above 	Contractor
Safety	Same as above	Same as above	<ul style="list-style-type: none"> • Same as above 	Contractor
Noise Pollution	Same as above	Same as above	<ul style="list-style-type: none"> • Same as above 	Contractor

11.2.1.3 Bio-Physical Consideration

Environmental / Social Impact	Objective	Proposed Mitigation Measure	Monitoring Indicator	Responsibility
Biodiversity	Same as above	1. Same as above	• Same as above	Contractor
Land degradation	Same as above	1. Same as above	• Same as above	Contractor
Water pollution.	Same as above	1. Same as above	• Same as above	Contractor
General waste	Same as above	1. Same as above	• Same as above	Contractor

11.2.1.4 Heritage Resources

Heritage Resource	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Responsibility
Heritage and Archaeology	Same as above	1. Same as above	Same as above	Contractor

11.2.2 Operation Phase

11.2.2.1 Aquifer Conservation

Although Kunene region is known to have low yield aquifer, this aspect may not necessarily be applicable at Epupa due to constant recharge of aquifer by the permanent flowing river. This assumption is derived from existing boreholes for the tourism establishment whose total depth average 10m deep. The shallow intersection of water gives an indication of a healthy aquifers. In absence of data to sufficiently back this argument, it is necessary to monitor to the performance of the aquifer from time to time.

Environmental / Social Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Water abstraction	To conserve the aquifer	<ol style="list-style-type: none"> 1. Do not abstract more than what is allocated by the permit. 2. Develop and implement a ground water monitoring plan. 3. Install automatic measuring gauge to monitor abstraction. 4. Carry out periodic pumping yield to assess aquifer sustainability. 5. Undertake systematic water quality assessment. 	<ul style="list-style-type: none"> • Abstraction reports • Ground water monitoring plan • Report of test pumping • Physical verification of vegetation • Water quality 	Proponent

11.2.3 Bio-physical and socio-environmental concerns

Environmental / Social Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Ecology	Rangeland Management	<ol style="list-style-type: none"> 1. Monitor the vegetation health condition during abstraction and vice versa. 2. Monitor local vegetation and report their unusual health status 	<ul style="list-style-type: none"> • Vegetation monitoring reports 	Proponent
Skill and Knowledge transfer	To build local capacity	<ol style="list-style-type: none"> 1. Identify and train competent people (Preferable youth) to do basic maintenance of the borehole and its supporting infrastructure. 	<ul style="list-style-type: none"> • Training report 	Proponent
Conflict of water use by the communities	To prevent conflict among communities of the borehole	<ol style="list-style-type: none"> 1. Raise awareness of the indented purpose of the borehole. 2. Ensure no one is made to be entitled to owning or have controlling power on who should use the borehole 	<ul style="list-style-type: none"> • Community consultation and awareness raising report 	Proponent
Corrosion of borehole metal casing	To ensure the casing are not corroded that could affect pump yields and water quality	<ol style="list-style-type: none"> 1. Use non-corrosive casing. 	<ul style="list-style-type: none"> • Corrosion monitoring reports 	Proponent

12 GRIEVANCE PROCEDURE

The Grievance Procedures will be a process to facilitate for an easy and smooth process in which stakeholders are able to submit their complaints about the project activities or its consequences i) free of charge ii) without fear of retribution iii) anonymously and iv) user friendly channels.

It is important to emphasise that the Grievance Procedure will not address HWC incidents per se, because those are not caused by the Project. Grievances that are eligible are, for instance, cases where a party is disadvantaged as a result of a Project activity, or as a result of negligence on the part of the Project to follow its procedures thoroughly or fairly. Complainants may be by actual or potential beneficiaries of the Project, or any members of the public.

In generally, the grievances process will follow six (6) Grievance Redress Mechanism (GRM) value chain, namely; i) Receive and log grievance, ii) Acknowledge grievance, iii) Assess and Investigate iv) Grievance Resolution, iv) Sign-off on grievance and iiiv) Monitor and continuously evaluate the effectiveness of the GRM.

Grievances will be addressed through the channels in the institutional structure presented below, in an efficient, effective and consistent manner.

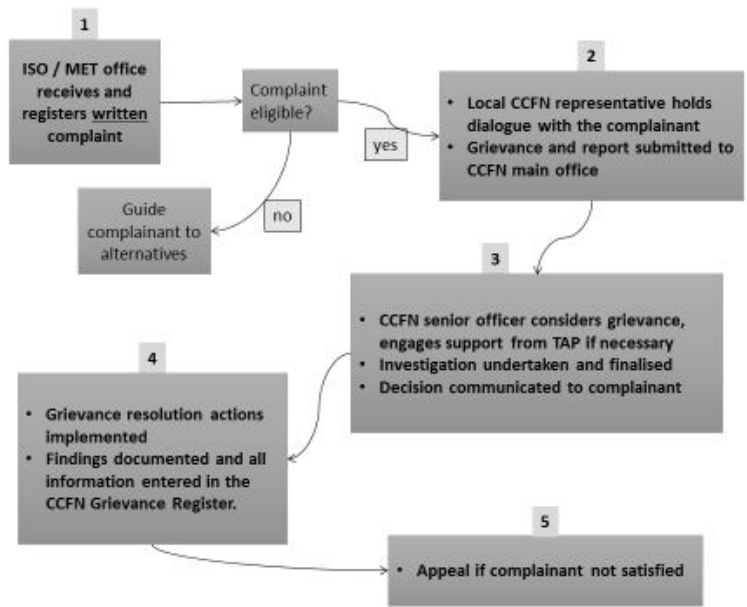


Figure 13. GRM flow chart (Source: ESMF_ Poverty Oriented Support to Community Conservation in Namibia)

The eligibility of the grievance will be assessed at the level where it is first received, at a local MEFT / ISO office (Step 1) and the following actions / steps will be undertaken. The grievance will be discussed with the complainant, with the objective of understanding the problem and giving the complainant a fair hearing (Step 2). The local CCFN representative will submit the grievance, and any notes of their own, to the CCFN head office for higher-level input to the issue (Step 2). The CCFN senior officer will investigate the substance of the grievance (Step 3). If necessary, assistance may be sought from the TAP. Further dialogue with the complainant and others affected by the grievance might also be necessary. The CCFN senior officer will compile a written report on the grievance and communicate the outcome to the complainant. Any actions necessary to resolve the grievance will be implemented by the relevant parties, under the direction of the CCFN (Step 4). Resolution of the grievance will be documented and entered into the Grievance Register. Under normal conditions, a grievance will be resolved, and redress actions commenced within 30 days of receiving a complaint. A complainant is permitted to appeal against the decision by the CCFN, to the CCFN CEO (Step 5). In such a case the CEO must present the grievance and the CCFN decision to the Board, for reconsideration.

13 DECOMMISSIONING AND REHABILITATION PLAN

Decommissioning is normally the reverse of construction where all installed equipment / structure must be removed. Supply of water has an infinite timeframe. Unless otherwise of a pressing national issue, such as degraded water quality, that would necessitate decommissioning. Aging equipment that required replacement should be done by qualified Namibians to ensure smooth operation and constant water supply.

14 CONCLUSION AND RECOMMENDATIONS

14.1 Conclusions

This Social Environmental Management Plan is developed for the supply of water to the community to mitigate one of the National pressing issue of HWC and to enhance conservation and eradicate poverty. The study has two conclusions i) on general bio-physical environment, all potential impacts were negligible ii) on social environment, the project will deliver sustainable solution to Human-Crocodile conflict and make safe water available to the community.

However, straight water abstraction from the river for human consumption is not necessarily a long-term solution and has compromised water quality. Although the community argued that they have been drinking straight from the river since time immemorial. However, with increased global industrialization, there is increased chance of water contamination that could pose a health risk to human and their livestock. This option could then be considered as a short-term intervention while borehole should be considered as a long-term solution for mitigation Human-Crocodile conflict and safe water supply to the community.

1.1. Recommendations

The study recommends the following;

- a) the approving authority to issue project with the ECC.
- b) Water abstraction from the river to be considered as short term (2 year) intervention.
- c) Drilling of a Borehole to be considered as a long-term solution.

15 ANNEX 1. GROUNDWATER MONITORING PLAN

The purpose of the groundwater monitoring plan is to make sure that suitable procedures are in place to monitor and evaluate the response of the aquifer and the surrounding environment to the abstraction process. Furthermore, the plan is aimed to control the impacts of groundwater abstraction and contaminant loads, and monitoring aquifer response and quality. The proposed procedures shall also serve as an early warning system for over-abstraction.

15.1 Groundwater Quality

It is essential that the quality of groundwater abstracted is monitored on a realistically regular basis, to serve as an early warning of quality changes that may occur due to the abstraction; natural causes; or pollution. A plan must be given of groundwater quality monitoring procedures to be followed. This includes the frequency of sampling and chemical constituents to be analysed for. A baseline of water quality is therefore required to monitor the water quality overtime.

15.2 Groundwater Level Measurements

The level of groundwater in the aquifer will serve to inform the water quantity vs the rate of abstraction. This provision is provided for in the monitoring sheet for water meter readings provided by the MAWLR to the borehole operator. It is therefore important that hydrological baseline information of water level is recorded to ensure time-variant collection of data. This type of monitoring becomes effective and proof of errors when MAWLR also carries out periodic inspections.

15.3 Aquifer Properties

Aquifer properties such as aquifer pumping tests may vary overtime, especially in areas with poor recharge.

16 ANNEX 2. ATTANDANCE REGISTER



PUBLIC MEETING ATTENDANCE REGISTER: ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED WATER ABSTRACTION FROM KUNENE RIVER TO EPUPA CONSERVANCY, KUNENE REGION

DATE: 16 AUGUST 2023

TIME: 08:00

VENUE: OPEN AREA EPUPA FALLS

No	Name	Organisation	Contact detail (tel or email)	Signature
1	Tungee Raphael	Secretary Kapitea	0813371521	
2	Kaogina Tleauru	Chairperson Epupa cons	0816736862	
3	Kambury Jilano	Manager: water	0814298077	
4	Phang Mungulu	ROC	0811977889	
5				
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