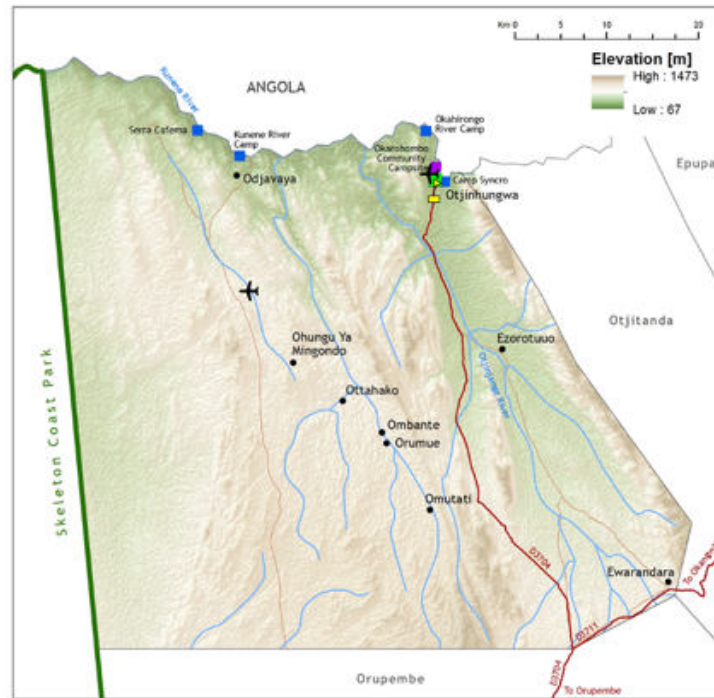


APP: 230926002151

Environmental Management Plan For The Proposed Water Abstraction from Kunene River for Marienfluss Community at Marienfluss Conservancy, Kunene Region



Legend

- Settlement
- ▲ Place of Interest
- Border post
- Conservancy office
- ▭ School
- ⊕ Health facility
- Joint Venture Lodge
- Lodge/Campsite
- ✈ Air field



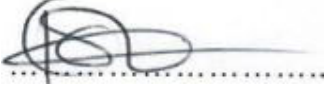
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PROJECT TITLE	Environmental Management Plan For The Proposed Water Abstraction From Kunene River for Marienfluss Community in Marienfluss Conservancy, Kunene Region
CLIENT	Marienfluss Conservancy
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ACRONYMS

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 Marienfluss 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	10
2.5 Support from Community Conservation Fund of Namibia (CCFN)	10
2.6 Statutory Requirements	10
3 Terms of Reference for the EMP	11
4 Project Description	12
4.1 Water abstraction	12
4.1.1 Water quality	13
4.2 Project Alternatives	15
5 Description of the Environment	17
5.1 Population Demography	17
5.2 Climate	17
5.2.1 The Kunene River	18
5.3 Biodiversity	18
5.3.1 Flora	18
5.3.2 Fauna	19
6 The need and desirability of the Project	19
7 Policy, Legal and Administrative Framework	21
8 Public Participation Process	26
8.1 Marienfluss Community meeting	26
9 Impact Assessment	28

10	The Environmental Management Plan.....	30
10.1	Purpose of the EMP	30
10.2	Compliance to the EMP	30
10.3	Roles and Responsibility.....	30
10.4	Disciplinary Action.....	31
11	The EMP table	32
11.1	Construction Phase.....	32
11.1.1	Socio-Economic Consideration	32
11.1.2	Health and Safety of employees	34
11.1.3	Bio-physical consideration.....	35
11.1.4	Heritage Resources	36
11.2	Operation Phase	37
11.2.1	Water quality.....	37
11.2.2	Equipment maintenance.....	38
1	Grievance Procedure.....	39
12	Decommissioning and Rehabilitation Plan.....	41
13	Conclusion and Recommendations.....	41
13.1	Conclusions.....	41
13.2	Recommendations.....	41
14	Annex 1: Attendance Register	42

List of Figures

Figure 1.	Map of Marienfluss Conservancy.....	5
Figure 2.	Marienfluss valley	6
Figure 3.	Generator used for water abstraction at Marienfluss Conservancy	8
Figure 4.	Water storage tank and solar panels for the conservancy office	9
Figure 5.	Community garden at Marienfluss	9
Figure 6.	Project site	12
Figure 7.	Existing Solar panel installations at project site.....	13
Figure 8.	Community water treatment by Chlorination (Photo: for illustration purpose only) ...	14
Figure 9.	Riverine vegetation at Marienfluss.....	18
Figure 10.	Community consultation at Marienfluss Conservancy.....	27
Figure 11.	GRM flow chart (Source: ESMF_ Poverty Oriented Support to Community Conservation in Namibia).....	40

List of Tables

Table 1. Project Alternatives.....	15
Table 2. Regulatory framework applicable to the project.....	21
Table 3. Criteria for Impact Evaluation	28

EXECUTIVE SUMMARY

Marienfluss Conservancy lies in the furthest reaches of an area formerly known as Kaokoveld, located between the mountain ranges of the escarpment in the east and the Skeleton Coast Park in the west, it stretches north to the Kunene River, at the border between Namibia and Angola.

Overall Marienfluss conservancy has a dry harsh climatic desert condition. The establishment of the conservancy office, clinic, school and lodges created a relative permanent localities of Ovahimba people along the Kunene river in Marienfluss. This community and their livestock consume water directly from the river.

The collection / use of water from Kunene River presented one of the biggest challenge of HWC that the conservancy is facing “*the human-crocodile conflict*”. 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 Marienfluss Conservancy to establish a solar powered direct abstraction of river water for Marienfluss community to establish safe access point for water. 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 bio-diversity, bio-physical environment on land and, it has positive impact on socio-economic in addressing *the human-crocodile conflict* and poverty eradication by supporting community 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 exacerbate 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 MARIENFLUSS CONSERVANCY

2.1 Location

Marienfluss Conservancy lies in the furthest reaches of an area formerly known as Kaokoveld, located between the mountain ranges of the escarpment in the east and the Skeleton Coast Park in the west, it stretches north to the Kunene River, at the border between Namibia and Angola (-17.262253°, 12.439074°) (Fig 1). It is located in a valley formed by Otjihipa and Hartmann Mountains on the eastern and western side of the conservancy respectively (Fig 2).

It was registered as a conservancy in January 2001⁷ and covers an area of 3,034 km² of Kunene region representing about 3% of the regional land area.



Figure 1. Map of Marienfluss Conservancy

⁷ <https://www.nacso.org.na/sites/default/files/Brochure%20Marienfluss.pdf>

2.2 Population Demography

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.

It is sparsely populated, with a population of 400 people, about 0.13 people per square kilometres. In context, Opuwo the regional capital city is 10.8 km², has a population of 20,000 people. Like many part of the Kunene region, large part of the conservancy is uninhabitable, as it is mountainous and desert like Valley's of sand (Fig 2). Therefore, nominal population density cannot necessarily be applied, as the area is to a larger extend uninhabitable.



Figure 2. Marienfluss valley

2.3 Challenges faced by the Conservancy Community

2.3.1 Water Resource

Generally, Namibia is one of the hottest and driest country in Sub-Saharan Africa. The country has high climatic variability in the form of persistent droughts, unpredictable, low, and variable

rainfall patterns leading to scarcity of water⁸. 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 region 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.

Overall Marienfluss conservancy has a dry harsh climatic desert condition. The establishment of the conservancy office, clinic, school and lodges created a relative permanent localities of Ovahimba people along the Kunene river in Marienfluss. This community and their livestock consume water directly from the river.

2.3.2 Human Wild Life Conflict (HWC)

The collection / use of water from Kunene River presents one of the biggest challenge of HWC that the conservancy is facing “*the human-crocodile conflict*”. The river supports a large population of crocodiles. It is reported that crocodile attack human and livestock.

The conservancy has raised the challenge of *human and livestock-crocodile conflict* to CCFN and through a proposal⁹, and requested assistance to develop / establish safer water access point to mitigate the *human, livestock-crocodile conflict*. Besides the of *human and livestock-crocodile conflict*, drowning especially during rainfall season is a high risk to the community.

Previously, the community had used a petrol fuelled generator to extract water from the river (fig 3). However, the conservancy have expressed grave concern on the upkeep of the generator since the community lack financial capacity to buy fuel. For example, when there is no fuel, the communities and livestock access water directly from the river, which makes them vulnerable to

⁸ Namibia Fourth National Communication to the United Nations Framework Convention on Climate Change. Windhoek: Ministry of Environment Forestry and Tourism, March 2020.

⁹ Human Wildlife Mitigation emergency funding request. Extraction of water from the Kunene River in Marienfluss Conservancy to mitigate Human Wildlife Incidents involving crocodiles 2022

crocodile attacks. Additionally, the remoteness of the area to Opuwo town makes it challenging to rely on fuel powered generator to extract water. In context, it takes 8-9 hours for a normal pick-up vehicle to travel from Opuwo to Marienfluss and the only vehicle that frequents the Opuwo is the conservancy cars.



Figure 3. Generator used for water abstraction at Marienfluss Conservancy

Box 2

Currently, the community make use of the **conservancy office's** solar powered water pumps (Fig 4), but due to its small capacity, it is unable to meet the community water demand, for own consumption, gardening (Fig 5) and their livestock.



Figure 4. Water storage tank and solar panels for the conservancy office



Figure 5. Community garden at Marienfluss

The conservancy, through its proposal, requested CCFN to assist with the provision of solar powered pumps and installation of supporting infrastructures for the abstraction of water from the river to mitigate *human-crocodile conflict*.

Box 3.

The challenges faced by Marienfluss are similar to that of Epupa Conservancy, however their **geographical location** are determinant of feasible interventions to mitigate HWC. The option of drilling a borehole at Marienfluss is impossible due to lack of access load for heavy vehicle. It is impossible (or perhaps uneconomical) for a drill rig to access Marienfluss. Hence, the only practical intervention is direct abstraction of water from the river. The location of Marienfluss, is

isolated and above permanent human habitation, thus in terms of pollution and to ensure supply of clean water particularly for human consumption, the water may require terminal disinfection. Various disinfection methods exists, this study focuses on chlorination of water.

2.4 HWC Mitigation Options

Mitigation options of “*human-crocodile conflict*” in the conservancy aims to supply sufficient and uninterrupted water to Marienfluss 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 supply of fuel which the community was not able to maintain. Hence the intervention, which is solar powered, should require minimal maintenance that the conservancy office, or identified community member will be able to undertake to ensure sustainable water supply to the community.

2.5 Support from Community Conservation Fund of Namibia (CCFN)

Marienfluss conservancies raised the challenge of *human and livestock-crocodile conflict* to CCFN through a proposal¹⁰ 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 Marienfluss Conservancy to establish a solar powered direct abstraction of river water for Marienfluss community. 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”.

2.6 Statutory Requirements

The protection of the environment is enshrined under Article 95l of the Namibia Constitution and

¹⁰ Human Wildlife Mitigation emergency funding request. Replacement of solar pump and erection of crocodile proof fence to mitigate Human Crocodile conflict 2022

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	Kunene River where the water will be abstracted is a transboundary river.

To fulfil the above statutory requirements, Red-Dune Consulting CC (RDC) was appointed to develop an Environmental Management Plan (EMP) for direct abstraction of river water for Marienfluss Community.

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

4.1 Water abstraction

The water abstraction site is located at Marienfluss on the bank of the Kunene River (Fig 6) (-17.261994°, 12.439216°). The site has existing solar panel infrastructure used by the conservancy office and the school to abstract river water (6).



Figure 6. Project site



Figure 7. Existing Solar panel installations at project site

4.1.1 Water quality

Surface water has long been the source of water for human and livestock Namibia. Generally, run off from catchment areas and human settlement pollutes rivers stream through various pollutants such as faeces and other waste which poses a threat to human health through water-borne diseases.

Subsequently, the supply of surface water for human consumption requires treatment to ensure safe drinking water. The level of treatment, especially for the permanently flowing water is dependent on the proximity of human activities to the area of abstraction. Marienfluss is an isolated desert area and above permanent human habitation. Additionally, Kunene River is a permanently flowing river, henceforth, the level of pollution is expected to be minimal. Consequently, minimal treatment of water at terminal consumption will be sufficient to ensure water quality that is fit for human consumption.

Terminal water disinfection is widely practised at household and community level mainly through chlorination. Chlorination is the process of adding chlorine to drinking water to kill parasites, bacteria, and viruses which will be a cost-effective means to treat water for the community of Marienfluss. In this regard, Chlorine doses will be added in the water storage tanks, through an automated dosing system (Fig 8). However, it will not be necessary to add Chlorine in water for livestock.



Figure 8. Community water treatment by Chlorination (*Photo: for illustration purpose only¹¹*)

¹¹ <https://www.dosatron.com/en-bd/water-treatment/chlorine-dosing-pumps-for-drinking-water-treatment>

4.2 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
No project	Do not implement the project	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Continued Human-Crocodile Conflict • Loss of Human lives to Crocodiles 	No
Implement the project	Implement the project	<ul style="list-style-type: none"> • Reduced Human-Crocodile Conflict (Injuries and loss of human 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. • Cost of diesel too high and not sustainable. Nearest supplier is \pm 300 km away. 	No
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 	Yes

Project Alternative	Description	Advantages	Disadvantages	Alternative adoption
Automated Chlorine Dosage	The use of automated non-electric chlorine dosage pumps	<ul style="list-style-type: none"> • Ensure constant disinfection 	<ul style="list-style-type: none"> • Not determined 	Yes

5 DESCRIPTION OF THE ENVIRONMENT

5.1 Population Demography

The Ovahimba people 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 is supplemented by small scale gardening including maize, pumpkins, sweet peppers and tobacco which they grow along the Kunene river. At Marienfluss, the conservancy has supported them to establish small community gardens.

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 persistent droughts, unpredictable, low, and variable rainfall patterns and high temperature leading to scarcity of water¹².

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 worst affected region 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 general climatic condition of Marienfluss area is influence by the Namib Desert and the cold Benguela Current of the Atlantic ocean which are associated with harsh arid condition. The area receives an average annual rainfall of 100 to 150mm which is highly variable and experience frequent and prolonged periods of drought.

¹² Namibia Fourth National Communication to the United Nations Framework Convention on Climate Change. Windhoek: Ministry of Environment Forestry and Tourism, March 2020.

5.2.1 The Kunene River

Kunene River is Perennial river which has permanent flowing and is the main source of water for communities of Marienfluss. The river has an annual flow of 5,500Mm³¹³. 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/day¹⁴ including industries, businesses and tourism which translate to 86.2Mm³.

Box 3

With a population of less than 400¹⁵ and no industries and businesses, the proposed water abstraction will be minimal and insignificant to affect river's biodiversity and its flow.

5.3 Biodiversity

5.3.1 Flora

Makalani palms, huge ana trees and mustard tree thickets line parts of the Kunene, while mopane trees are dominant throughout the eastern parts of the conservancy (fig 9).



Figure 9. Riverine vegetation at Marienfluss

¹³ Integrated Water Resources Management Plan for Namibia, 2010

¹⁴ 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

¹⁵ NASCO

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.

5.3.2.2 Wildlife

The conservancy is rich in wild animals but recent droughts has significantly reduced their numbers. The common wildlife include, springbok, gemsbok and ostrich. Other wildlife life includes, giraffe, mountain zebra, kudu, klipspringer, duiker, steenbok and the diminutive dik-dik. The common predator includes cheetah, leopard, spotted and brown hyaena, and jackals. Occasional nomadic lions do frequent the areas well¹⁶.

Marienfluss Conservancy provides habitats to numerous endemic scorpions and reptiles as well as 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 rockrunner. While the riverine habitat of the Kunene attracts a variety of birds, including goliath heron, darter, African fish eagle and osprey. Well over 100 bird species have been recorded in the conservancy. Furthermore, the Kunene river supports a large crocodile population, Cape clawless otter and around 65 species of fish in the river.

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 contribute 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

¹⁶ <https://www.nacso.org.na/sites/default/files/Brochure%20Marienfluss.pdf>

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
Environmental Assessment Policy (1995)	MEFT	<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>
Water Supply And Sanitation Policy 2008	MAWLR	<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 gazettelement, 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 PROCESS

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 Marienfluss Community meeting

On 18 August 2023, RDC undertook a site assessment at Marienfluss and held a meeting with the community led by the conservancy manager (fig 10). Those in attendance were communities living around the conservancy office. RDC was informed that, it requires extensive logistics to invite all members of the conservancy. However, with those in attendance, RDC informed them about the proposed support based on their request. Many have expressed gratitude, but requested more assistance in gardening in terms of training and infrastructures. Furthermore, the community has expressed lack of privacy and sanitation, particularly bathrooms, as men shower in an open area next to the conservancy water storage tank.

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 the water quality to human health and suggested the project to seek ways to ensure the health and safety of the water. At Marienfluss, chlorination is recommended to ensure good water quality that is fit for human consumption.



Figure 10. Community consultation at Marienfluss Conservancy

9 IMPACT ASSESSMENT

The environmental impact assessment was done in accordance to 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). Marienfluss with support with from CCFN and contractors should adhere to the framework of this document.

10.3 Roles and Responsibility

10.3.1.1 Proponent

The proponent, Marienfluss 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.

10.3.1.2 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

10.3.1.3 Employees

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

10.3.1.4 Environmental Compliance Officer

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

10.3.1.5 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 to 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.

11.1 Construction Phase

Activities to be undertaken during construction includes; digging holes to install poles for the solar panel platforms, steel platform for water storage tanks which will be supported by concrete base, concrete base for livestock trough and laying of distribution pipes. Technological installation such as electric box for solar and chlorine dosage pumps are done based on standards and specification of which no adverse impact is expected.

11.1.1 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"> 1. All employees must go through an induction course for the provision of the EMP. 2. 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 advancement for local	To ensure that general work created during the project is reserved for local people	<ol style="list-style-type: none"> 1. Ensure that all general work is reserved for local people 2. Fair compensation and labour practise as per Namibian Labour Laws must be followed 	<ul style="list-style-type: none"> • Employee register • Wages for employee • Complains about payment 	Contractor

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
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	• Training report	Contractor
General waste	To manage solid waste To prevent littering, pollution, contamination of water and general environmental health hazards	1. Provide well labelled waste drums 2. No onsite burying / dumping or burning of waste material is permitted. 3. Ensure appropriate waste collection and removal from the site and effective disposal	Physical verification of waste drums Report of waste disposal	Contractor

11.1.2 Health and Safety of employees

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
HIV and AIDS, Alcohol and Drug abuse	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 Practise (Organization?) (ILO) 2. Ensure adequate first aid kit 3. Supply clean drinking water to the site 	<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 3. Ensure that every employee goes through an induction course about safety 	<ul style="list-style-type: none"> • Safety plan / pamphlets • Training minutes and attendance register • Physical verification of crocodile proof fence 	Contractor

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		<ol style="list-style-type: none"> 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 PPE • Physical verification of life jackets 	

11.1.3 Bio-physical consideration

Environmental / Social Impact	Objective	Proposed Mitigation Measure	Monitoring Indicator	Responsibility
Biodiversity	To protect plant and animals	<ol style="list-style-type: none"> 1. Do not cut down makalani trees 2. Do not kill animal unless it possess danger to human safety 3. Poaching strictly forbidden 	<ul style="list-style-type: none"> • Physical verification • Report of poaching 	Contractor
Land degradation	To prevent soil disturbance / erosion	<ol style="list-style-type: none"> 1. Movement of vehicles must be well coordinated to ensure minimal soil disturbance 	<ul style="list-style-type: none"> • Physical observation of tracks outside designated areas 	Contractor
Water pollution	To prevent surface and groundwater pollution	<ol style="list-style-type: none"> 1. Stationary vehicles must be provided with drip tray to capture oil and lubricants 2. All vehicle and machinery must be well service to avoid leakages 3. Soils contaminated with grease, oils and hydrocarbons must be collected and disposed of appropriately; 	<ul style="list-style-type: none"> • Physical observation of drip trays, oil marks etc • Vehicles service report / service books • Training report on emergency response 	Contractor

Environmental / Social Impact	Objective	Proposed Mitigation Measure	Monitoring Indicator	Responsibility
			<ul style="list-style-type: none"> • Reports of disposal of contaminated soils 	
General waste	To manage solid waste To prevent littering, pollution, contamination of water and general environmental health hazards	<ol style="list-style-type: none"> 1. Provide waste drums 2. No onsite burying / dumping or burning of waste material is permitted. 3. 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

11.1.4 Heritage Resources

Heritage Resource	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Responsibility
Heritage and Archaeology	The proposed area does not have known Heritage site or archaeological material. Regardless and as standard practise, a chance find is developed to ensure protection of artefacts, heritage and archaeological materials.	<ol style="list-style-type: none"> 1. Employee must be trained on the possible find of heritage and archaeological material in the area; 2. Implement a chance find and steps to be taken for heritage and archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed by; <ol style="list-style-type: none"> i. Stopping the activity immediately ii. Informing the operational manager or 	Training records and attendance registers	Contractor

Heritage Resource	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Responsibility
		<p>supervisor</p> <p>iii. Cordoned of the area with a danger tape and manager to take appropriated pictures.</p> <p>1. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).</p>		

11.2 Operation Phase

11.2.1 Water quality

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Human and Animal Health (Quality of Water fit for human consumption)	To ensure the water is fit for human consumption	1. Undertake intermittent water quality assessment to ensure that it is fit human consumption	• Water quality monitoring reports	Conservancy Management
Safety risk of hooved animals on concrete drinking platform	To ensure safety of hooved animal at water point on concrete platforms surrounding the water trough	1. Ensure that concrete surface of the water trough is kept rugged and rough to avoid slippery that could injure animals	• Physical site inspection for the trough	Conservancy Management

11.2.2 Equipment maintenance

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Maintenance of water and chlorine dosing pumps	To prevent water pump from clogging and ensure efficient operation of the chlorine dosing pump	1. Identify and train a community member (s) to be responsible for maintenance of the water and chlorine pumps	<ul style="list-style-type: none"> • Training report and attendance register 	Conservancy Management

1 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, iiv) 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.

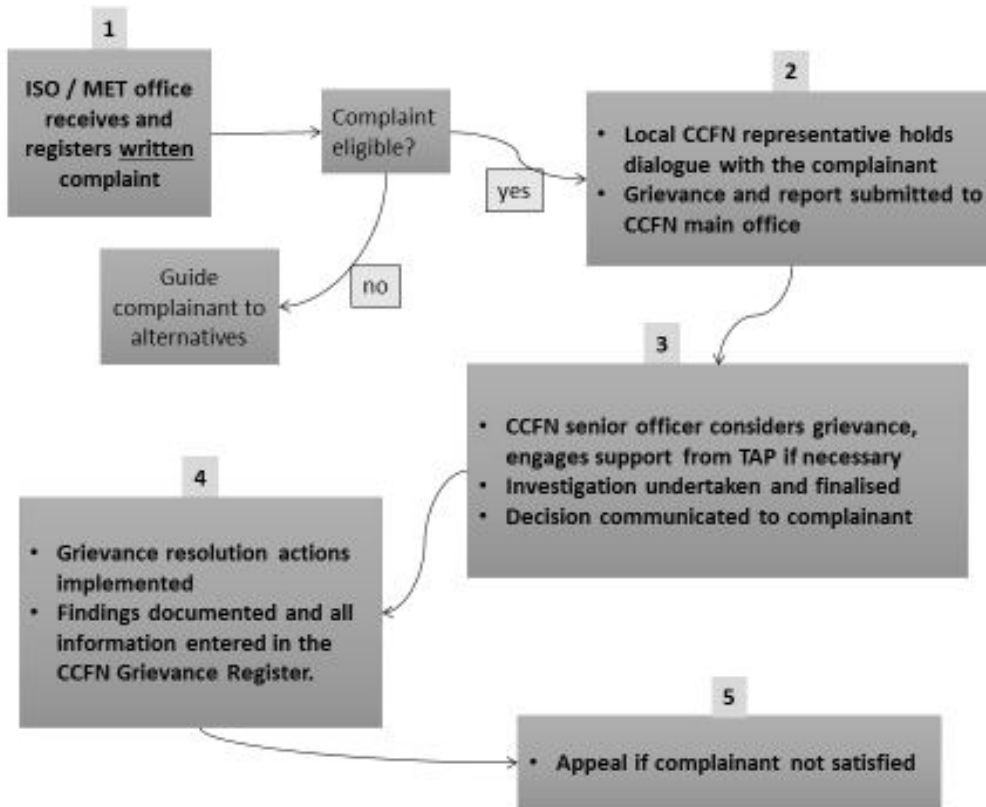


Figure 11. GRM flow chart (Source: ESMF_ Poverty Oriented Support to Community Conservation in Namibia)

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.

12 DECOMMISSIONING AND REHABILITATION PLAN

Decommissioning is normally the reverse of construction where all installed equipment / structure must be removed. Supply of water to the community is aimed to be a life-long intervention unless of a pressing issue that would necessitate decommissioning. Aging equipment that requires replacement should be done by qualified Namibians to ensure smooth operation and constant water supply.

13 CONCLUSION AND RECOMMENDATIONS

13.1 Conclusions

This Social Environmental Management Plan is developed for the supply of water to the community to mitigate the National pressing issue of HWC and eradicate poverty. The study has three conclusions


- i) on general bio-physical environment, all potential impacts were negligible
- ii) on river flow and its aquatic biodiversity, the impact of abstraction of water is negligible,
- iii) on social environment, the project will deliver sustainable solution to Human-Crocodile conflict and make safe water available to the community.

13.2 Recommendations

The study recommends the following;

- i) the approving authority to issue the project with the ECC.
- ii) Training of community member on basic maintenance of water and chlorine pumps




14 ANNEX 1: ATTENDANCE REGISTER



RED CLANS CONSULTING CC

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

DATE: 18 August 2023
 TIME: 10:00
 VENUE: Conservancy office

No	Name	Organisation	Contact detail (tel or email)	Signature
1	Herry GANUSEA	CONSERVANCY M	0818360950	
2	MUNA RUTAYI	MARIENFLUSS.C	0812926983	
3	UMENISOPO TUMBIRU	MARIENFLUSS.C	081	
4	TUMBAMBI TUMBIRU	MARIENFLUSS.C	0813500087	
5	MAPAZAPI TUMBIRU	MARIENFLUSS.C		
6	RAEPHORA MATHENJE	MARIENFLUSS.C		
7	MAMNIRVIRE TUMBIRU	MARIENFLUSS.C		
8	TATHONI TUMBIRU	MARIENFLUSS.C		
9	MUKATJIBE TUMBIRU	MARIENFLUSS.C		
10	MABETIREMO NGUMBI	MARIENFLUSS.C		

