

APP-00383

**IRRIGATION AND RELATED ACTIVITIES OF DDESERT FRUIT
ENVIRONMENTAL MANAGEMENT PLAN**



Assessed by:



Assessed for:



September 2022

Project:	IRRIGATION AND RELATED ACTIVITIES OF DESERT FRUIT //KARAS REGION, ENVIRONMENTAL MANAGEMENT PLAN
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1 OBJECTIVES OF THE EMP

Geo Pollution Technologies (Pty) Ltd prepared an environmental management plan (EMP) for Desert Fruit located in the //Karas region. The EMP is based on the environmental impact assessment conducted on farms Stolzenfels No. 74 (portion 3 & 4) and Eagles Rest No. 475 along the Orange River in 2022 (Bosman et al., 2022). The EMP provides management options to ensure impacts of construction and operational activities on the farm are minimised. An EMP is a tool used to take proactive action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The EMP acts as a stand-alone document, which can be used during the various phases (planning, construction, operational and decommissioning) of any proposed activity or development.

All contractors and sub-contractors taking part in construction and operational activities related to Desert Fruit, should be made aware of the relevant sections of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of the various activities;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the both construction and operational activities;
- ◆ to monitor and audit the performance of the construction and operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible personnel and contractors.

2 IMPLEMENTATION OF THE EMP

The sections below outline the management of the environmental elements that may be affected by the activities associated with the various phases of the facility. These phases are as follows:

- ◆ Planning Phase
- ◆ Care and Maintenance Phase
- ◆ Operational Phase
- ◆ Decommissioning Phase

The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on where appropriate. Delegation of mitigation measures and reporting activities should be determined by the Proponent and included in the EMP.

All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the environmental clearance certificate (ECC) and must be submitted to the Ministry of Environment, Forestry and Tourism. Renewal of ECC will require bi-annual reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the operations, care and maintenance, and decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts as well as prevention and mitigation measures are listed below.

2.1 PLANNING

During the phases of planning for the operations, maintenance / construction and decommissioning phases of the facility, it is the responsibility of Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to, and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- ◆ Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction (maintenance) activities and operations of the project remains valid.
- ◆ Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- ◆ Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- ◆ Have the following emergency plans, equipment and personnel on site, where reasonable, to deal with all potential emergencies:
 - EMP / risk management / mitigation / emergency response plan and health safety and environment (HSE) manuals
 - Adequate protection and indemnity insurance cover for incidents;
 - Comply with the provisions of all relevant labour and safety standards;
 - Procedures, equipment and materials required for emergencies.
- ◆ If one has not already been established, establish and maintain a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.
- ◆ Establish and / or maintain a reporting system to report on aspects of operations, maintenance / construction, and decommissioning as outlined in the EMP.
- ◆ Submit bi-annual reports to the MEFT to allow for ECC renewal after three years. This is a requirement by MEFT.
- ◆ Appoint a specialist environmental consultant to update the EMP and apply for renewal of the ECC prior to expiry.

2.2 IMPACTS AND RELATED MANAGEMENT MEASURES

The following section provide management measures for both the operational phase as well as care and maintenance activities related to the project.

2.2.1 Revenue Generation in the Professional Sector

Consulting and professional services are engaged with for assistance in applications for new permits and renewal for existing permits such as the water permits, fuel storage and environmental clearance certificates. During the application process, information is generated which informs and facilitates planning of the Proponent as well as affected parties and governmental agencies. The professional service sector is further engaged with in terms of administrative processes. Such services mainly relate to the planning and operational services.

Desired Outcome: Contribution to national treasury and increased economic resilience in the local professional sector.

Actions

Enhancement:

- ◆ Contract local Namibians where possible.
- ◆ Adhering to permit conditions on reporting.
- ◆ Deviations from this practice must be justified.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Service providers' contracts or agreements or records be kept.

All reporting, monitoring and information sharing records kept on file

2.2.2 National Development Goals: Water, Agriculture and Land use Planning

The agricultural project pins down key development goals and challenges which were identified as part of the Namibian development goals. It may be considered as an agricultural / irrigation project which aims at generating income from foreign sectors by providing the most value per resource (water, soil & labour). In addition, the project is located in line with the regional planning initiatives which identified the location as an area for irrigation development. The project is unique in being one of only a handful of date growing projects in Namibia. The project is considered a long term project.

Developing of the agricultural sector was identified as one of the core plans within the 3rd and 4th National Development Plans for Namibia. The focus on agricultural development has further been carried forward in the 5th National Development Plan which was released during the final quarter of 2017. The agricultural project therefore is considered to be a positive contributor to achieving national development goals.

Desired Outcome: Continued contribution to the development of the //Karas Region as well as implementation of project activities in line with NDP 4 & 5 and Vision 2030.

Actions

Enhancement:

- ◆ Liaison with regional and national governmental agencies through appropriate financial and social responsibility reporting.
- ◆ Infrastructure maintenance and development such as, road servitude, water- and sanitation system developments (provision to employees) and node development. Where possible, public and private partnership regarding projects should be considered.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ All project contributions towards regional development, inclusive of communications held with relevant authorities, to be kept on file.

2.2.3 Scientific Knowledge

During the environmental assessment, the social, economic and biophysical information of the area was either updated or augmented by new information. During the assessment biophysical attributes were documented. Similarly information related to water use and fuel has been updated and shared with the relevant authorities. The scientific contribution is of national and international importance.

Desired Outcome: Sharing of all scientific knowledge or finds with relevant NGO's, authorities and scientific fraternity.

Actions:

Enhancement:

- ◆ Monitoring of environmental features of concern, such as riverine vegetation, to be conducted and information included in monitoring reports.
- ◆ Any heritage, archaeological or paleontological finds to follow chance find procedures which includes the notification of the National Heritage Council.
- ◆ Water and soil quality records to be kept on file.
- ◆ Weather data records to be kept on file.
- ◆ Liaison with regional and national governmental and international agencies regarding matters such as water quality and quantity concerns.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Keeping of all scientific records and finds.
- ◆ Proof of data sharing records kept, including proof of water abstraction quantities submitted, proof of environmental monitoring reports submitted.

2.2.4 Ideals and Aspirations for the Future

During the environmental assessment, public consultation was conducted with neighbours and interested and or affected parties. Information shared with the parties did not result in a change in aspirations for the future. The Proponent and surrounding neighbour are in the process of re-assigning the property border. This information was used during the environmental assessment and contributions from the neighbour incorporated into the mapping of the project borders. The agricultural project is considered to have an overall positive impact on ideals and aspirations of the local community at large.

Desired Outcome: Continued sharing of activity plans with IAPs and governing agencies. Maintaining an open door policy with neighbours and employees.

Actions

Enhancement:

- ◆ Information sharing about major changes in operations, proposed expansions and or decommissioning activities should be made available to governmental agencies, interested and affected parties. The Proponent and affected parties should use the information generated during the environmental assessment to realistically plan for future growth and optimisation of irrigation systems with related operations. Open communication regarding future development and employment opportunities to employees, through employees' management structures.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Records kept of all information shared with authorities, neighbours and employees.

2.2.5 Contribution to the National Economy (Revenue & Investment Confidence)

During the operational phase, dates will be exported to world markets generating revenue for Namibia. The successful implementation of the project and related return on investment for shareholders, will boost investors' confidence in Namibia. The successful implementation of the project will contribute to Namibia's sustainable development of Vision 2030 and the related development goals of the //Karas Land Use Plan (Koch et al., 2011). The project will contribute to stimulate growth in the region and stimulate localised expenditure.

Desired Outcome: Contribution to national treasury and increased economic resilience in the local sector.

Actions

Enhancement:

- ◆ Maximise contribution to the Namibian economy by contribution to industry development and using Namibian suppliers where possible. Adhere to Namibian Labour Act requirements.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Service providers' contracts or agreement or records be kept.

2.2.6 Economic, Resilience and Employment

Establishment of additional agricultural areas will require additional skilled and unskilled labour. People considered for employment will be sourced from the local population while skilled labour may be sourced from other regions. The project has a combined labour force of approximately 450 people. This number is expected to slightly increase with the realisation of proposed expansion. Successful implementation of the project is hinged on continued employment of labourers. Continued employment of individuals increases their economic stability which in turn increases their economic resilience.

Desired Outcome: Continued remuneration of temporary and permanent employees as per the Labour Act. Continued contributions to social security.

Actions:

Enhancement:

- ◆ Predominately Namibian workforce to be employed, ideally from the region and informal settlement itself where relevant to the position.
- ◆ Investigation and possible collaboration with banking sector or social security in providing voluntary financial literacy.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Financial records of contributions to social security and employees' salaries.

2.2.7 Change of Land Use

Changes will be initiated in the way revenue is generated and contributed to the local, regional and national economy. The change in the use of the land will change the revenue produced and paid to the national treasury as the projected profitability of the farm increases in line with the maturing of the plantations. A major change of revenue has already been established since the Proponent acquired the property and expanded operations. Increased revenue will be generated through employment, purchasing of goods and use of services.

Desired Outcome: Continued revenue generating activities through the successful implementation and management of the project.

Actions

Enhancement:

- ◆ The Proponent is encouraged to develop an anti-corruption policy which could be made public.
- ◆ Implementation of measures to ensure the successful management of the project.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Service providers contracts or agreement or records be kept

2.2.8 Training and Skills Development

During the development phase, training will be provided to a portion of the workforce to be able to install and maintain the extensive irrigation system and related operations. Skills will further be transferred to the unskilled workforce in the operational phase during pollination and harvesting, nursery management, and plantation and infrastructure maintenance.

During normal operations, employees will enhance their working expertise while some individuals may be identified for promotion and additional skills development and training.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technological advancements in the agricultural industry.

Actions

Enhancement:

- ◆ Predominately Namibian workforce to be employed, ideally from the region and within the area itself where relevant to the position.
- ◆ Ensure that all training is certified or managerial referenced and proof provided to the employees.
- ◆ Skills development and improvement programs to be made available as identified during performance assessments. Ensure that all training is certified or managerial references provided (proof provided to the employees) inclusive of training attendance, completion and implementation. Employees to be informed about parameters and requirements for references upon employment.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Service providers contracts or agreement or records be kept

2.2.9 Agricultural Produce

The project is in line with the objectives of Namibia's NDP5 and related implementation plans and strategies. Production of crops for export to international markets strengthens the Namibian economy.

Desired Outcome: Provide a positive contribution to the trade balance of Namibia by reducing the amount of imported produce and increasing exported products.

Actions

Enhancement:

- ◆ Diversification and continuous improvement to maximise sustainability of the farm.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Records kept of goods produced and exported.

2.2.10 Demographic Profile and Community Health

The proposed expansion will require additional labour during both the harvesting and pollination seasons. Change in the demographic profile of the local community may result in an influx of job seekers over time and densification of the informal settlement, especially when considering the potential growth of surrounding agricultural units. Community structures may change with an increase in population while the economic profile will be adjusted as the employment structure of the area is changed. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse. An increase in people in the area may potentially increase the risk of criminal and socially deviant behaviour such as theft of agricultural produce, poaching of game, and the illegal harvesting of fish. More people in the area will exert additional pressure on governmental services, particularly essential services such as health care. Currently mobile clinic units visit operations on a monthly basis. Medical assistance, emergency services and the policing of the community are strained especially during harvesting season. The impact is compounded by the fact that the informal settlement is established on private property, hence no governmental services are expected to be provided. This impact is strongly cumulative as many of the seasonal workforce are employed by neighbouring properties during off-season periods.

Desired Outcome: To prevent the occurrence of social ills and prevent the spread of diseases such as HIV/AIDS.

Actions.

Prevention:

- ◆ Employ local people from the area, deviations from this practice should be justified appropriately.
- ◆ Adhere to all local authority by-laws relating to environmental health which include, but are not limited to, sanitation requirements.
- ◆ Appointment of reputable contractors where applicable.
- ◆ Provide educational, awareness information for employees on various topics of social behaviour and HIV/AIDs.
- ◆ Disciplinary steps, within the legal parameters of Namibia, to be taken for socially deviant behaviour at the employee-housing compound or during working hours should be clearly stipulated in employment contracts.

Mitigation:

- ◆ Take disciplinary action against employees not adhering to contractual agreements with regard to socially deviant behaviour (e.g. alcohol or drug abuse during working hours).

Responsible Body:

- ◆ Contractor

Data Sources and Monitoring:

- ◆ Summary report based on educational programmes and training conducted.
- ◆ Employee contracts on file.

2.2.11 Health and Safety of the Workforce

Every activity associated with the development phase is reliant on human labour and labourers are thus exposed to health and safety risks. Some activities, especially associated with the operation of machines and heavy motor vehicles and or hazardous chemicals, pose the main risks to employees. In addition to these expected risks, severe climatic characteristics of the area (e.g. extreme heat) may contribute to conditions such as sunstroke, fatigue, dehydration and related symptoms. Risks to human health and safety have been identified as a priority concern by the Proponent who has endeavoured to reduce the risk of incidents by implementing improved operating systems (such as worker transportation) and warnings (for dangerous substances). It is therefore foreseen that the improved operating procedures (in terms of health and safety) will be carried forward to the proposed new expansion areas and implemented during the development phase of these areas.

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- ◆ Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool.
- ◆ Comply with health and safety standards as specified in the Labour Act and related legislation.
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- ◆ Lock away or store all equipment and goods on site in a manner suitable to discourage criminal activities (e.g. theft).
- ◆ Provide all employees with required and adequate personal protective equipment (PPE) where required.
- ◆ Ensure that all personnel receive adequate training on the operational procedures of equipment and machinery and the handling of hazardous substances.
- ◆ Train selected personnel in first aid and ensure first aid kits are available on site.
- ◆ The contact details of all emergency services must be readily available.
- ◆ Implement a maintenance register for all equipment whose malfunction can lead to injury or exposure to hazardous substances.
- ◆ Apply and adhere to all industry specific health and safety procedures and regulations applicable to the handling of food produce for markets.

Mitigation:

- ◆ Treat all minor work related injuries immediately and obtain professional medical treatment if required.
- ◆ Assess any safety problems and implement corrective action to prevent future occurrences.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Record any incidents with the actions taken to prevent future occurrences.
- ◆ Record all training which was conducted and when safety equipment and structures were inspected and maintained

2.2.12 Fire

Fires may be ignited in a number of ways. Lightning can be a natural ignition source for veld fires, which in turn can spread and damage infrastructure and plantations or pose health impacts. Failing electrical infrastructure and fires outside of designated areas may increase the risk of the occurrence of uncontrolled fires which may spread into the nearby fields and surrounding farms. Similarly machinery can ignite dry vegetation if sufficient heat (e.g. exhaust pipes) or sparks are produced. Chemicals and fuel stored and used for general activities may be flammable. Improper waste burning or discarding of cigarette buds further increases fire risks.

Desired Outcome: To prevent property damage, veld fires, possible injury and impacts caused by uncontrolled fires.

Actions

Prevention:

- ◆ Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- ◆ Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).
- ◆ Ensure all flammable chemicals are stored according to material safety data sheet (MSDS) and SANS instructions and all spills or leaks are cleaned up immediately.
- ◆ Maintain regular site, mechanical and electrical inspections and maintenance.
- ◆ Maintain firefighting equipment and promote good housekeeping.
- ◆ Allow fires used for purposes such as cooking (by staff) in designated areas only.

Mitigation:

- ◆ Implement the fire protection and firefighting plan in the event of a fire.
- ◆ Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Maintain a register of all relevant incidents. Include measures taken to ensure that such incidents do not repeat themselves.
- ◆ Record when fire drills were conducted and when firefighting equipment were tested and training given.

2.2.13 Waste Production

Various waste streams result from the operational and possible construction and maintenance activities. Waste may include hazardous waste associated with hydrocarbon products, pesticides and chemicals, as well as soil and water contaminated with such products. Construction/maintenance waste may include building rubble and discarded material and equipment. Domestic waste will be generated by the residents and employees on the farm. Waste presents a contamination risk and when not removed regularly may become a health and/or fire hazard and attract wild animals and scavengers. Sewage is a form of liquid biological waste that needs disposal.

Desired Outcome: To reduce the amount of waste produced and prevent pollution and littering.

Actions

Prevention:

- ◆ Implement waste reduction measures. All waste that can be re-used/recycled must be kept separate.
- ◆ Ensure adequate temporary storage facilities for disposed waste are available.
- ◆ Prevent windblown waste from entering the environment.
- ◆ Prevent scavenging (human and non-human) of waste at the storage facilities.
- ◆ Train employees on the importance of proper waste handling and disposal in the professional and domestic setting.

Mitigation:

- ◆ Alternative waste disposal methods should be investigated for hazardous waste or waste that present specific pollution risks. This include transporting such wastes to recyclers in larger settlements when empty trucks travel there to collect goods.
- ◆ Discarded waste should be disposed of and burned regularly to reduce health and pollution risks.
- ◆ Empty chemical containers that may present a contamination/health risk must be treated as hazardous waste. Workers should not be allowed to collect such containers for purposes of storing water or food. This can be achieved by puncturing or crushing such containers prior to disposal.
- ◆ Ensure all ablution facilities are connected to properly constructed effluent treatment systems to prevent groundwater contamination. A spill recovery plan should be on hand for all mobile chemical toilets.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Maintain a register of disposal of hazardous waste. This should include type of waste, volume as well as disposal method/facility.
- ◆ Record any complaints received regarding waste with notes on actions taken.

2.2.14 Road Maintenance and Traffic

Additional traffic will be generated during the operational phase which will contribute to the cumulative collision- and road degradation risks of the D232 from Ariamsvlei (a gravel road road), especially during the harvesting season. It is however not considered to be a significant impact. Traffic management and road degradation should be considered cumulatively for all operations within the area and a combined initiative (from all operators in the area together with the Roads Authority) should be considered to address possible issues such as road degradation.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- ◆ Erect clear signage regarding access and exit points at the farm as well as speed limits on the gravel roads along the access road.
- ◆ Collective road maintenance initiatives to be embarked upon.
- ◆ All vehicles to be fitted and maintained with adequate signalling devices adequate to increase awareness over and above standard features. All operators / drivers to adhere to all the requirements of relevant traffic regulations.

Mitigation:

- ◆ If any traffic impacts are expected, possibly as a result of delivery of equipment or construction material, traffic management should be performed to prevent these.
- ◆ The placement of signs to warn and direct traffic will mitigate traffic impacts.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

2.2.15 Soil Contamination and Soil Structure Disturbance (Degradation and Erosion)

Site clearing of large areas will result in the loss of terrestrial habitat in the area. Although portions of land identified for expansion are very sparsely vegetated and in many instances considered as bare ground, the topsoil structures of these areas present a unique habitat which will be disturbed and lost once ground breaking activities are initiated. The impact significance is weighted by the cumulative nature of the impact considering the existing and planned surrounding land use. This impact mainly relates to the development phase.

During site excavation, clearance and especially ground breaking, the structure of the topsoil has been and will be disturbed and altered mechanically. Possible fuel and oil spills pose a risk of chemical contamination which may contribute to the soil degradation. Additional activities contributing to a change in the soil structure or composition may result from the additional toilet / sewerage facilities which will be established around new plantations.

The long term operational phase will see a high volume of water being irrigated on to the cultivated area, a portion thereof penetrating the soil (not evaporating or being absorbed by the plants). Poor drainage may result in soil saturation and chemical alteration of the soil. Evaporation of salt and nutrient rich irrigation water may cause salt accumulation on and near the surface of the soil profile. Capillary action during saturated conditions may cause the upward migration of water and dissolved salts in the soil profile. Salts present in the soil will then be dissolved and will migrate to the soil surface. Soil water evaporation can then cause further build-up of salts. Such increased levels of salt in the soil can be harmful to planted crops and soil flushing through the application of high water volumes are then often conducted to leach the salts from the soil. Installation of proper soil drainage mechanisms with the aim of preventing saturated conditions can prevent such situations. A further method that can be applied is improved irrigation methods (e.g. drip irrigation or micro irrigation) that supply only sufficient water to the plants to cater for their needs and for evaporation losses. It is expected that drainage water will collect in the drainage structure among operations.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- ◆ Avoid construction or development phase activities in river courses, hilly areas and riverine vegetation.
- ◆ Limit clearing of land to areas that will be irrigated.
- ◆ Plan roads to minimize impact beyond irrigable land.
- ◆ Prevent off-road driving or movement of earthmoving equipment outside of areas designated for clearing.
- ◆ No dumping of rocks and removed soil in environmentally sensitive areas. Where possible it can be used to fill erosion ditches, if any are present.
- ◆ Soil should be sampled and analysed annually to ensure the correct amounts of fertilizer is applied and soil and groundwater quality is maintained. Inputs on soil quality and fertilisation requirements can be provided by a soil specialist.
- ◆ All SANS standards applicable to fuel handling and storage should be adhered to as well as any additional requirements stipulated by the Ministry of Mines and Energy.

Mitigation:

- ◆ Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS and spills must be cleaned up immediately.
- ◆ The spill containment (drip trays / bunding) of the chemical store must be cleaned if any products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Records of soil assessments kept on file.
- ◆ Registers be kept by the Proponent on the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised in crop production.
- ◆ A bi-annual report should be compiled on all information and of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken.

2.2.16 Groundwater Contamination

Operation of heavy motor vehicles, machines and handling of hazardous chemicals and fuels have the potential to pollute soil and groundwater through spills and leaks. No excessive use of herbicides and pesticides are proposed during the development phase and therefore it is not foreseen that groundwater will be impacted by such chemicals during the development phase.

During the operational phase, as drainage water (potentially laden with herbicides, pesticides and nutrients) moves through the soil, it may dissolve additional nutrients and salts which may lead to a build-up of those nutrients and salts in the groundwater. In addition to the drainage water, chemical and hydrocarbon spills from fuels, herbicides and pesticides may penetrate the soil and contaminate the groundwater. The number of toilets can contribute further to groundwater pollution when contents are not disposed of responsibly. Groundwater can form a pathway for pollutants to the Orange River.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- ◆ Appoint reputable contractors.
- ◆ Vehicles may only be serviced on a suitable spill control structures.
- ◆ Regular inspections and maintenance of all vehicles to ensure no leaks are present.
- ◆ All hazardous chemicals should be stored in a sufficiently bunded area.
- ◆ Follow prescribed dosage of fertilizers and pesticides to avoid over application.
- ◆ Maintain sewerage systems and conduct regular monitoring.
- ◆ All hazardous waste must be removed from the site and disposed of timeously at a recognised hazardous waste disposal facility, including any polluted soil or water.

Mitigation:

- ◆ Appoint a suitably qualified hydrogeologist once impact on groundwater is identified to map the extent and nature of the impact and to implement suitable remedial action when required.
- ◆ Re-use of drainage water where possible (for example dust suppression).
- ◆ Immediately clean any spills that occur and dispose of contaminated material according to the relevant MSDS information.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Maintain Material Safety Data Sheets for hazardous chemicals.
- ◆ Groundwater should be sampled and analysed to test for nitrate concentrations from the fertilizer and for traces of chemicals used in pesticides and herbicides (within the analysis capabilities of Namibia).
- ◆ Registers be kept by the Proponent on the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised during cultivation.
- ◆ A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.
- ◆ All spills or leaks must be reported on and cleaned up immediately.

2.2.17 Water Abstraction

Although water abstraction volumes will remain within the allocated water rights, the continued abstraction will contribute to the overall water demand from the Orange River. The impact on its own is not considered to be significant, however in light of possible climate change considerations and demand increase of the combined water users on the Lower Orange River System, considerations should be given to future use and water security for downstream water users. The impact has a strong cumulative nature. It should however be noted that the Orange River System is a regulated system, in other words, water flow within the river is regulated by the release of water dammed upstream in the river, as determined by related parties. Therefore, international communication between South African and Namibia related to water requirements is of utmost importance. The Proponent, as well as all downstream water users must report their water use (abstraction) to provide MAWLR with updated water requirements.

Desired Outcome: Sustainable and optimal usage of the water resource.

Actions

Prevention:

- ◆ Adhere to water abstraction permit regulations.
- ◆ Adhere to recommended abstraction volumes to ensure over abstraction does not take place.
- ◆ To prevent unnecessary water loss all pipeline and water storage infrastructure must be inspected and maintained regularly, and over irrigation should be avoided.
- ◆ Pressure and flow sensors can be installed that will shutoff water pumps if a leak is detected

Mitigation:

- ◆ Appoint a suitably qualified hydrogeologist once impact on groundwater is identified to map the extent and nature of the impact and to implement suitable remedial action when required.
- ◆ Re-use of drainage water where possible (for example dust suppression).
- ◆ Immediately clean any spills that occur and dispose of contaminated material according to the relevant MSDS information.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Continued monitoring (flow metres) of water use and water quality as per water monitoring regime.
- ◆ Reporting of poor water quality to ORASECOM and the MAWLR.
- ◆ Baseline values should be reviewed every three years based on all historic water level data.
- ◆ Bi-annual summary report based on all information.

2.2.18 Orange River Water Quality

Impacts on the water quality of the Orange River may stem from a variety of sources related to the project. Some of which may be direct and some of which can be considered to be indirect. The latter may for example relate to the increase of vegetation in the river which may be due to increased nutrient levels of the drainage water backflow.

Direct impacts related to the water quality in the Orange River can be a result from possible pollution by chemicals and hydrocarbons and pesticides, herbicides and nutrients in irrigation water which drains to the Orange River. The leaching of soils may further directly contribute to change in the water quality. The effects of the possible water quality changes are strongly cumulative in nature as the operations are part of several other irrigation, industrial and mining activities that can impact on the Orange River. Similar agricultural activities are conducted up- and downstream of the site, e.g. in Aussenkehr, Noordoewer and in South Africa.

Desired Outcome: To prevent degradation of the Orange River water quality.

Actions

Prevention:

- ◆ Soil flushing should be avoided to prevent Orange River water pollution.
- ◆ Registers to be kept by the Proponent showing the type, quantities and frequency of application of fertiliser, pesticides and any other chemicals utilised during cultivation. Over application of such substances should be avoided.
- ◆ All ablution facilities to be operated and maintained according to specification and industry best practise. Education regarding the use of such facilities to be provided.
- ◆ Awareness to be raised regarding environmental degradation due to misuse of implemented systems. Staff to receive training on waste handling and the principles of reduce, reuse and recycle.
- ◆ Chemical and fuel handling and storage according to relevant MSDS. Chemicals to be stored in a way that runoff water would not wash such chemicals into the river. No chemical / fuel storage within the 1:100 year flood line of the Orange River.
- ◆ A pesticide plan should be compiled by a specialist and reviewed annually. This plan should be strictly followed, deviations should be approved by the specialist.
- ◆ MSDS instructions should be strictly followed for the use and application of chemicals.
- ◆ Formulation of best salinity management practices and the application thereof on field and farm level.

Mitigation:

- ◆ Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS and spills must be cleaned up immediately.
- ◆ The spill containment (drip trays / bunding) of the chemical store must be cleaned if any products are present and this waste must be disposed of at a suitably classified hazardous waste disposal facility.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Monitoring of intake water quality and drainage water quality (at various locations along the Orange River).
- ◆ Water quality results kept on file
- ◆ Registers be kept by the Proponent on the type, quantities and frequency of application of fertilisers, pesticides and any other chemicals utilised in crop production.

- ◆ A bi-annual report should be compiled on all information and of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken.

2.2.19 Change in Ecosystem and Biodiversity (Riverine)

The change in the water quality and quantity may result in a change of the related ecosystems. Contribution of toxins and nutrients may alter and promote growth of various organisms. Primary and invader species are prone to proliferate in degraded ecosystems. The nature of the impact is strongly cumulative not only due to the upstream users, but also the other irrigation based agricultural activities on the South African side. Changes in the vegetation growth (as part of the ecosystem) is clearly visible along the Orange River. The banks and drainage water diffuse areas, have more trees, reeds and rivers grasses established, as opposed to the natural and more sparsely populated growth along uncultivated areas.

Poaching and illegal collection of plant and animal materials may occur. Irresponsible pesticide use, for example as method of vermin control, may impact on scavengers such as vultures and in the long run on top predators through biomagnification in higher trophic levels.

Desired Outcome: To avoid pollution of, and impacts on, the ecological environment.

Actions

Prevention:

- ◆ Prevent toxins and nutrients from entering the Orange River and groundwater.
- ◆ Strictly adhere to pesticide application instructions and use pesticides only for the purposes for which it is registered and marketed. Importantly, pesticides should not be used to kill vermin unless specifically registered for that purpose, and even then alternative, environmentally friendly methods should be investigated and used.
- ◆ Prevent pesticides from ending up in the hands of potential poachers.
- ◆ Educate all contracted and permanent employees on the value of biodiversity and strict conditions prohibiting harvesting and poaching of fauna and flora must be part of employment contracts. Include prohibitions or regulations on the collection of firewood.

Mitigation:

- ◆ Take disciplinary action against any employees failing to comply with contractual conditions related to poaching and the environment.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Documentation of all chemicals, herbicide, pesticides and nutrients administered and or used as part of any other operational activity.
- ◆ Incidents record kept of all chemical and hydrocarbon spills inclusive of remediation measures taken
- ◆ Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism.
- ◆ Photographic documentation of the riverbank and vegetation growth of various points as identified for the integrated monitoring plan.
- ◆ Monitoring to be conducted on the water quality, upstream and downstream of the drainage water seepage points. Monitoring also to be conducted on the quality of the drainage water (within drainage when possible).
- ◆ Report on all extraordinary animal or plant sightings or instances of poaching.
- ◆ Keep frequent records of abstracted water volumes to identify any trends or consistent reduction in water levels.

2.2.20 Dust Generation

Dust and noise as one of the results of the development phase may be generated by a range of activities such as site clearance, transportation of goods and labour, general construction activities and especially ground breaking (terrace establishment). Dust may lead to reduced visibility, respiratory difficulty, and providing a habitat for some pests associated with dusty environments (by settling on surrounding vegetation). The Proponent is continually employing dust abatement measures to reduce the impact and are actively engaged in mitigation of the dust effect. Even with considered mitigation measures the residual impact of dust generation will remain cumulative in nature. Effects are considered to be periodic and of very short term.

Desired Outcome: To minimise the dust generated and prevent nuisance and health impacts.

Actions

Prevention:

- ◆ Warning signs to be provided on roads which may have reduced visibility.
- ◆ Monitoring of dust accumulation on surrounding plantations.
- ◆ Personnel issued with dust masks and regular dust suppression as required.
- ◆ Heavy vehicles to maintain low speeds on gravel roads.
- ◆ Cultivation and tillage of soils should be prevented on windy days if practically possible.
- ◆ A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary.
- ◆ All chemical applications should be according to regulations and material safety data sheet instructions.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Any complaints received regarding dust should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

2.2.21 Noise

Noise will be generated due to the operation of machinery and vehicles accessing the site. Construction and maintenance activities may increase the amount of noise generating activities which may lead to hearing loss in workers. It is however not expected that surrounding farms will be impacted by noise generated from the operations and construction activities of the project. During the site visit, general operations observed noise levels which are associated with general farming operations.

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- ◆ For various components of the project and surroundings, adhere to the applicable prescribed noise levels as contained in:
 - Labour Act, 1992: Regulations relating to the health and safety of employees at work
 - World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999). [Applicable where new receptors establish on neighbouring properties.]
- ◆ All machinery must be regularly serviced to ensure minimal noise production.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Bi-annual reports on complaints and actions taken to address complaints and prevent future occurrences.

2.2.22 Visual

Project growth (maturing of plantations) and possible expansion will be conducted in parts which have mostly already been transformed into an agricultural area for the last 30 years. Irrigation areas, along this section of the Orange River, are demarcated on old topographic maps, indicating that the area has long since been recognised as an agricultural area. Satellite imagery of 1985 confirm these agricultural areas on the property. Long before the establishment of surrounding agricultural areas. Expansion areas will therefore add to the existing landscape character which has become one of the main attributes of the area. The operations are uniquely located and serves as a point of interest to tourists and patrons to the area.

Desired Outcome: To minimise aesthetic impacts associated with the farm.

Actions

Prevention:

Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A bi-annual report should be compiled of all complaints received and actions taken.

2.2.23 Greenhouse Gas Emissions

The majority of activities related to the development phase are labour intensive with carbon fuel burning machines mostly associated with ground breaking and transport vehicles. No additional electricity will be required for the irrigation systems (as these will still be established). However, existing operations are reliant on NamPower electricity provision which is partly based on fossil fuel combustion. During the development phase no significant amounts of fertilisers will be administered. It is therefore foreseen that development related activities will not contribute significantly to additional greenhouse gasses. It is estimated that the development phase be of relatively short duration.

Although numerous fuel combusting machines are used during the operational phase; the agricultural project inheritably also absorbs greenhouse gasses. The majority of activities related to the operational phase are labour intensive with carbon fuel burning machines mostly associated with operational vehicles such as tractors and transport vehicles. Additional electricity will be required for the irrigation systems. This demand will be augmented with cooling units which are used to cold store produce. Existing operations are reliant on NamPower electricity provision which is partly based on fossil fuel combustion. During the operational phase, fertilisers will be administered. Such fertilizers are known to be converted to greenhouse gasses by microorganisms while production of fertilizers is fossil fuel intensive.

Desired Outcome: To reduce the carbon footprint

Actions

Prevention:

- ◆ Catalytic converters installed on machines (where possible). All engines should be maintained in good working condition. No unnecessary idling of vehicles or tillage of soil to be conducted.
- ◆ Employ improved efficiencies of grid electricity usage and increase complementary utilization of renewable energy sources for irrigation pumping requirements.
- ◆ Consider reducing nitrogen fertiliser usage through more precise application.
- ◆ Consider using a carbon calculator to determine the carbon footprint.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Internal records kept if carbon crediting is conducted.

2.2.24 Loss of Paleontological and Archaeological Resources

Archaeological resources were identified east of the property, indicating that there may be related resources uncovered on site. However, agricultural activities have been so long established on site that the probability of discovering resources within existing operational areas is very low. There remains a possibility that such resources may be present on areas not impacted by current operations. Site clearance and excavation activities could result in the destruction of other undocumented paleontological or archaeological resources. However, should any resources be discovered, chance find procedures as detailed by the specialist should be followed.

Desired Outcome: To prevent the damage to, or destruction of, any archaeological, paleontological or culturally important (heritage) resources.

Actions

Prevention:

- ◆ If such a site or any other archaeologically important artefact is found during any phase, any work that may damage / impact the site must be halted and the relevant authorities must be informed. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed. Construction work may only continue at that location once permission has been granted.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Record measures taken to protect archaeological, paleontological or culturally important (heritage) resources
- ◆ Record of any discoveries and proof of notifications to authorities on file.
- ◆ All information and reporting to be included in a bi-annual report.

2.3 DECOMMISSIONING AND REHABILITATION

The existing operations, as managed by the Proponent and the proposed expansion areas, are not foreseen to be decommissioned within five years from the date of the compilation of this report. It is also not foreseen that any of the operations will then be decommissioned during the validity of the environmental clearance certificate. However, should in any event, the Proponent be required to sell or cease operations, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings, offices and irrigation systems. All dams and the drainage structure should also be removed, unless they will be of use for post closure activities. It is therefore proposed that the Proponent consider obtaining insurance to cover possible rehabilitation costs which may be associated with the agricultural project. As per recommended guidelines, a closure cost assessment may be conducted and provided as part of the environmental management parameters. Impacts will then be similar to that of the development / construction phase, with a large and diverse waste component.

2.4 ENVIRONMENTAL MANAGEMENT SYSTEM

The proponent could implement an environmental management system (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- ◆ The EMP.

3 CONCLUSION

The above updated EMP, if properly implemented will help to continually minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

The EMP should continue to be used as an on-site reference document during all phases of the project, and auditing should take place in order to determine compliance with the EMP for the proposed site. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports must be submitted to the Ministry of Environment, Forestry and Tourism every six months (bi-annually) to allow for the future renewal of the ECC.

4 REFERENCES

Bosman Q, Faul A; 2022 September; Irrigation and Related Activities of Desert Fruit, //Karas Region, Namibia, Environmental Assessment Scoping Report