

Draft

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND RURAL DEVELOPMENT

DEPARTMENT OF WATER AFFAIRS

GUIDELINES

FOR

ENVIRONMENTAL ASSESSMENTS OF LARGE IRRIGATION PROJECTS

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1. INTRODUCTION

1.1 PURPOSE OF THE GUIDELINES

The purpose of these guidelines is to describe the requirements for an environmental assessment for large irrigation projects, particularly those requiring permits from the **DWA** to abstract water from any groundwater source in a water control area, or State dam or perennial river. They are intended to be sufficiently broad to allow ready adaptation to different types of large irrigation projects.

These Guidelines are designed to contribute to the sustainable use of the Namibian environment through the appropriate use of water and the activities surrounding irrigation. In this way, an attempt is made to encourage sustainable, economically viable and environmentally sound planning and operation of large irrigation projects.

1.2 ENVIRONMENTAL PERSPECTIVE

Chapter 11 of the Constitution of the Republic of Namibia deals with the Principles of State Policy and in particular promotes the welfare of the people in Article 95 which stresses the importance of maintaining natural ecosystems, ecological processes and the diversity of plants and animals, as well as sustainable utilization and the wise management of natural resources for the benefit of present and future generations. In keeping with this, one of the objectives of the Department of Water Affairs (**DWA**) is to ensure that the available water resources in Namibia are utilized on an equitable, sustainable and environmentally sound basis.

As with many development projects, large irrigation schemes can have both local and far-reaching environmental effects. At present there is no legal requirement for environmental assessments for such projects. In the absence of appropriate legislation, the **DWA** is obliged to, at least, provide guidelines for such assessments and to encourage developers to consider them in their planning and evaluation of large irrigation projects. For the purposes of this document, a large irrigation project is defined as having an area of more than 9 ha under irrigation or consuming more water than 100 000 m³ /a.

At present, permits must be obtained for the abstraction of groundwater from water control areas, from State dams and from perennial rivers. The Department requires that an entrepreneur must apply for a permit to abstract water for irrigation and the applications are mainly assessed in terms of economic viability, soil conditions and water availability. Such projects were subject to approval by the Water Board which, in turn, was advised by the Hydrology, Geohydrology and Planning Divisions of the **DWA**.

Now, in keeping with increasing environmental awareness world-wide and the realization of the need for sustainable utilization of natural resources and sound development, the **DWA** requests water abstraction permit seekers to take into consideration the environmental consequences of proposed large irrigation projects.

In future, environmental assessments will form an integral part of all applications for water abstraction permits for large irrigation projects. The results of these environmental assessments will enable the Research Division of the **DWA** to advise the Water Board on the environmental feasibility of proposed irrigation projects.

Broadly defined, the term **environment** includes biological, physical, social, economic, cultural, historical and political considerations. An environmental assessment should look at all these aspects, their inter-relations, short-, long-term and cumulative impacts, local impacts as well as distant ones, e.g. in the case of water abstraction from a perennial river, downstream impacts are often more important than any at the site of abstraction.

All irrigation project entrepreneurs are strongly urged by the Ministry of Agriculture, Water and Rural Development to conduct environmental assessments, based on these Guidelines, as part of the investigations required to assess the viability of the proposed projects, whether they are considered small or not, requiring water abstraction permits.

1.3 PURPOSE OF THE ENVIRONMENTAL ASSESSMENTS

The purpose of environmental assessments are to identify the environmental

consequences of development projects, in this case, of proposed large irrigation projects, and to ensure that these are given due consideration throughout the planning, implementation and operation of the project.

The extent and detail of the environmental assessment required would depend on the size, nature, location and operation of the proposed irrigation project and **the extent of any assessment will be decided in consultation with the DWA, who may also solicit advice from other Ministries.**

1.4 RECOMMENDED PROCEDURE FOR ENVIRONMENTAL ASSESSMENTS

The procedure for environmental assessments for large irrigation projects recommended in these Guidelines is based on the Integrated Environmental Management (**IEM**) method which divides environmental assessments into the proposal, assessment, decision, implementation, monitoring and re-evaluation phases. This method of determining potential environmental impacts aims to promote sustainable development and facilitate environmentally-sound decision making. **IEM**, allows public participation, ensures the consideration of alternatives, evaluates costs, seeks to minimize detrimental effects and maximize environmental benefits. This method should produce environmentally sound guidelines for decision making throughout the planning, implementation, monitoring and management phases of the proposed irrigation project.

2. GUIDELINES FOR ENVIRONMENTAL ASSESSMENTS

2.1. THE PROPOSAL

The first step when tackling an environmental assessment is to draw up a proposal giving all the relevant information on the proposed project and the current perceived status of the environment. It is suggested that a draft preliminary proposal be drawn up using the guidelines given below and that this be discussed with the Department of Water Affairs before a formal proposal is submitted.

2.1.1 The Proposed Irrigation Project

Briefly describe the proposed irrigation project including:

- a) overall description, need for the project, predicted benefits of the project and alternatives to the project
- b) comparative advantages and disadvantages of the project and alternatives including the no-project alternative
- c) how the project fits into regional and national development plans
- e) contributions of other sectors to the proposed development
- f) essential conditions for project implementation
- g) basic assumptions underlying project success
- h) economic benefits as determined by an economic cost/benefit analysis
- i) how the project will enhance or constrain future development options.

2.1.2 The bio-physical and socio-economic environment

Briefly describe the bio-physical and socio-economic environment, for areas affected by the project, directly and indirectly, paying particular attention to the area surrounding the project site and to rivers and aquifers downstream of the proposed draw off, or abstraction point including the river mouth or delta region, include:

- a) climate, geological and soil conditions
- b) hydrological conditions
- c) present biodiversity - checklists of plants and animals in the area and downstream
- d) existing use of areas and natural resources affected by the project
- e) rare and endangered species and habitats
- f) unique cultural or natural areas including areas of special historic, archaeological, cultural, aesthetic or scientific value
- g) demographic, settlement and socio-economic patterns;
- h) health situation, particularly water-borne disease
- i) project target group
- j) affected local and national populations
- k) previous impacts in the area
- l) existing degradation and underlying causes
- m) current and potential tourism value.

2.2 THE ENVIRONMENTAL ASSESSMENT

Based the proposal and dependent on the size, nature, locality and operation of the proposed irrigation project and expected significant environmental affects, the extent and detail of the required environmental assessment will be decided in consultation with the **DWA**.

The assessment itself involves broad consultation with all interested and affected parties, the assessment of available information, including, if necessary, the gathering of additional data, and the preparation of a report on the assessment. The report should include the consideration of alternatives, the identification and classification of the potential impacts, a review of these, details of possible mitigatory measures and a monitoring programme.

The guidelines which follow give an indication of how the assessment phase should be approached, the variety of impacts both positive and negative which need to be considered, the wide range of environmental considerations and finally possible mitigatory measures and their practicality.

2.2.1 Methodology

Methodology of the environmental assessment should include:

- a) identification of and consultation with all interested and affected parties, local, national and in some cases international
- b) identification and use of available data bases and pertinent literature
- c) identification and use of sub-consultants for technical and social evaluations
- d) interviews with knowledgeable persons
- f) comparison with similar developments in Namibia and elsewhere
- g) minimal basic research to answer major, outstanding questions.

2.2.2 Identification of potential positive and/ or negative impacts

Briefly describe positive and/or negative impacts that are expected to be caused by the extraction of water from the perennial rivers and the irrigation project itself consider separately for clearing, planting, cultivation and harvesting activities at the project site. When a perennial river or an alluvial aquifer is involved in the abstraction of water the

downstream effects including any at the river mouth, estuary or delta region should also be investigated. Take into account:

- a) ecological effects of the irrigation scheme
- b) social effects of the irrigation scheme
- c) effects on the hydrology and water quality of the river downstream
- d) impacts on groundwater dynamics
- e) impacts of altering river flow regimes on the ecology of the floodplain, river mouth, estuary or delta
- f) economic activities and landuse in the floodplain and downstream
- g) impact of altering water supply on urban, industrial, and rural users downstream
- h) potential for increased incidence of water-borne and water related diseases
- i) impact of altered flow regimes and the irrigation project on terrestrial and aquatic wildlife in the area and downstream
- j) effect of existing and predicted landuse in the catchment area, at the irrigation scheme and downstream
- k) effect on historic, archaeological, cultural, aesthetic and scientific elements of the region
- l) potential for establishment of alien and/or invasive plants or animal pests
- m) effect on tourism revenues
- n) effect of evaporation losses
- o) potential for soil compaction and salinification
- p) water provision for local population
- q) potential for water pollution by fertilizers, pesticides and diesel
- r) impact on local populations using natural resources of area
- s) impact on riverbank stability
- t) impact of silt loads in runoff from the irrigation project and downstream
- u) impact of clearing activities, particularly on river margins
- v) impact on riverine forest and communities.
- w) impact on fisheries.

2.2.3 Checklist

In addition to the specific environmental considerations listed above, the environmental assessment should note if the proposed irrigation project, or its associated infrastructure would affect **Negatively** or **Positively**, or be **Constrained** by the following factors at the site of the irrigation development or downstream, during planning, implementation or operation.

a) Water

- natural drainage patterns and runoff
- temporary water flow, i.e. frequency and magnitude, timing and duration
- permanent water flow, frequency and magnitude
- sheet flooding, heavy rainfall, runoff patterns
- seasonal water availability
- drought
- conservation value of surface waters
- recreation and tourist value of surface waters
- groundwater recharge
- quality of surface- or groundwater, for humans and ecological processes
- quantity of surface- or groundwater
- increased pollution, by fertilizers, pesticides and diesel
- increased salinity
- changes in siltation rates and erosion
- wasteful use of water
- functioning of the river mouth, estuary or delta region
- nutrient cycling.

b) Soil/Land

- landuse patterns
- water and wind erosion
- siltation and replenishment of alluvial silts
- contamination by oils or toxic chemicals (including pesticides)
- seed banks
- soil nutrients and impact of fertilizers
- salinification
- soil compaction
- soil moisture
- service roads
- land clearing, particularly near riverbanks
- opening and closing of river mouths or estuaries

c) Socio-Economic considerations

- cultural and traditional constraints
- age and gender issues
- composition of households and communities
- degree and type of community organisation
- authority structures

- growth rate of local populations
- adequacy of local services
- settlement patterns
- displacement and relocation of people and livestock
- land and resource tenure considerations
- traditional landuse patterns
- dependence and utilization of natural resources
- privatisation
- employment situation and income distribution
- public health, safety and social services
- altered access to schools, clinics, and other services

d) Plants and Animals

- biodiversity
- rare and endangered species and habitats
- spread or introduction of invasive species
- bush encroachment
- clearing and habitat destruction
- harvesting of natural resources and over-exploitation
- deforestation and recruitment, particularly of riverine forest
- natural migration
- nutrient flow
- species composition and diversity
- change in habitat structure
- disease vectors
- impact of pesticides and fertilizers
- wild animal vs. crop conflict.

e) National interests

- future development options
- water developments
- industry, mining, agriculture, ecotourism, infrastructure
- archaeological and palaeontological sites
- historical and cultural monuments
- sites of special scientific interest
- landscape features and aesthetic qualities of landscape
- tourist potential
- recreation potential
- cross-border interactions
- public participation, local, national and international

- impact on population demographics
- impact on food security
- impact on subsistence economy and life-style
- impact on sustainable utilization of natural resources.

vi) International interests

- water rights
- wildlife sanctuaries e.g. Ramsar sites
- water quality downstream.

2.2.4 Assessment of the identified environmental impacts

Briefly describe any potential environmental impacts of the proposed project, identified in Section 2.2.2, in terms of the following (differentiate between known and hypothesised):

- a) short term and long term impacts
- b) direct and indirect impacts
- c) cumulative impacts.
- d) trans-boundary and trans-national impacts (legal impacts, international agreements, public opinion)
- e) reversible and irreversible impacts
- f) costs of mitigation versus costs of no mitigation
- g) benefits and costs: economic, social, ecological and interrelationships of these.

2.2.5 Possible Mitigation

Taking into consideration all points evaluated in sections 2.2.2, 2.2.3 and 2.2.5, describe possible mitigatory measures to reduce negative effects and enhance positive effects including:

- a) technological alternatives
- b) local participation in planning and management
- c) institutional changes for management
- e) appropriate technology
- f) restoration or rehabilitation of sites
- g) conservation of riverine belt area.

2.3 THE DECISION

The Department of Water Affairs will take into consideration the findings of the environmental assessment in the decision to grant or refuse a permit for water abstraction. Permission to proceed may be subject to certain conditions to ensure that the permitted water abstraction and the irrigation project as a whole is implemented and operated in a way which will minimize any detrimental effects and maximise the environmental benefits.

2.4 THE IMPLEMENTATION

It is the responsibility of the permit holder to implement the recommendations of the Department of Water Affairs based on the results of the environmental assessment and to implement the proposed monitoring programme. The Department reserves the right to do site inspections from time to time to ensure that the permit conditions are complied with.

2.4.1 Monitoring

A monitoring programme should be included in the final environmental assessment report and should take into consideration all points evaluated in section 2.2.2, 2.2.3 and 2.2.4. The monitoring programme should propose appropriate parameters to be monitored for long-term management including:

- a) rainfall and evaporation
- b) hydrology of rivers downstream
- c) groundwater
- d) vegetation changes: downstream, including at the river mouth, estuary or delta and around the extraction point
- e) effects of shifts of human populations
- f) wildlife and wildlands: migration and dispersal patterns, habitat requirements
- g) erosion
- h) effects on water table and floodplain vegetation
- i) disease vectors, weeds
- j) changes in economic and social status of affected population and changes in landuse
- k) influence of project on regional development: e.g. new population centres

- l) influence of future regional development on project: e.g. lifespan of project, factors likely to affect lifespan, will project cause shifts in landuse that will affect project success/lifespan/sustainability?
- m) impact on water use efficiency
- n) long-term sustainability

2.4.2 Environmental auditing (Follow-up evaluation)

Effective implementation, management and monitoring of mitigatory measures and environmental consequences of the irrigation project will be an important consideration in the renewal of water abstraction permits. All applications for permit renewal should include a report on the ongoing environmental situation based on the results of the monitoring programme. This monitoring report could form the basis of the environmental re-evaluation of the project and make it unnecessary to repeat a full environmental assessment.

3. WATER ABSTRACTION PERMIT PROCEDURE

Applications for permits to abstract water for irrigation purposed must be submitted to:

The Deputy Permanent Secretary
Department of Water Affairs
Private Bag 13193
WINDHOEK

The application will be directed to the Deputy-Director: Law Administration, Training and Media Liaison for processing. He will then determine if the proposed irrigation project qualifies as a large irrigation project, meaning a project which will irrigate more than 9 ha or use more than 100 000 m³ of water per annum. If the proposed project qualifies as a large irrigation project, then he will advise the permit applicant that the

irrigation project requires an environmental assessment before a water abstraction permit can be considered and will make available these Guidelines to the applicant. The applicant will also be informed that the Chief: Research will assist with determining the extent and scope of the environmental assessment required.

The Chief: Research will be advised of the application and the assistance needed. He will discuss the proposed project with the applicant, if necessary undertake a site visit, review the formal project proposal and will advise on the planning of the environmental assessment. The environmental assessment itself is the responsibility of the applicant or his consultant. The final report on the environmental assessment will be evaluated by the Research Division who may solicit comment from the Department of Agriculture and Rural Development or the Directorate of Environmental Affairs at the Ministry of Wildlife, Conservation and Tourism or any other Ministry as deemed necessary. The final report and comment will form part of the documentation required by the Water Board. The final decision on the approval of a water abstraction permit will thus be based on economical, hydrological, geohydrological and environmental considerations. (Refer to **ANNEXURE 1** for a schematic representation of the implementation procedure.)

The approval may be subject to certain conditions and a monitoring programme which the applicant must carry out. The Department of Water Affairs retains the right to do site inspections if necessary and permit renewals will depend on stipulated conditions being met and the results of the environmental monitoring programme.

4. CONCLUSION

In keeping with the Namibian Constitution and increasing environmental awareness worldwide, the Ministry of Agriculture, Water and Rural Development wishes to encourage the sustainable utilization of natural resources, particularly water, and seeks to promote environmentally sound development. To facilitate the development of environmentally sound irrigation projects, the Department of Water Affairs has

compiled these guidelines for environmental assessments of large irrigation projects, particularly those requiring permits for water abstraction.

These guidelines are designed to explain how the permit seeker should go about doing an environmental assessment and although the list of items to consider may be exhaustive, the extent of each assessment required will be decided after consultation with the Department of Water Affairs. The results of the assessment can then be used to evaluate the environmental implications of the proposed irrigation project and will be taken into consideration in the evaluation of the application for a permit to abstract water for the irrigation project.

PERMANENT SECRETARY FOR WATER AFFAIRS

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IMPLEMENTATION PROCEDURE
FOR LARGE IRRIGATION PROJECTS REQUIRING AN ENVIRONMENTAL ASSESSMENT AS
PART OF AN APPLICATION FOR A WATER ABSTRACTION PERMIT

