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Strategic Environmental Assessment (SEA) for the Karas Integrated Regional Land Use Plan (KIRLUP)

Final Report

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EXECUTIVE SUMMARY

This Strategic Environmental Assessment (SEA) looks at the suggestions and proposals of the Karas Integrated Regional Land Use Plan, with the objective to develop sustainable options, identify the potential of the region's natural resources and to achieve the land uses that best fit that potential. The parallel processes of Land Use Planning and SEA, led by the Ministry of Lands and Resettlement, and being piloted in Karas Region as a model for improved planning, can be seen as an assessment and identification of opportunities. In this light, this SEA concludes with some ideas that will help to achieve sustainable development in the region and contribute to achieving Namibia's Vision 2030 goals.

The SEA process involved the following parts:

- Information gathering (data collection and evaluation, site visits, expert discussions)
- Scoping, to identify the main issues and agree on the method of assessment. Meetings were held internally in Windhoek and invited stakeholder input in Keetmanshoop. The agreed method was to assess identified development proposals and trends against a number of criteria (e.g. their impact on biodiversity, livelihoods, sense of place, and others), to arrive at a conclusion of the most significant impacts and concerns.
- Baseline analysis and sector-by-sector assessment through Focus Group Discussions (FGDs). This process involved many technical decision-makers at relatively high level to achieve 'buy-in' from the relevant sectors, to receive well informed opinions and rational proposals, and to achieve integration between sectors.
- Collaboration with the LUP, through properly motivated adjustment and refining of the zoning proposals.
- Compilation of the SEA report

Additionally, the SEA identifies the region's natural strengths and most limiting factors. It considers what's coming in terms of climate change, and how people can make themselves less vulnerable to the present arid climate and the increasing variability that climate change is expected to bring. The main economic sectors and land uses are considered, at present and with an eye to the future. Issues of concern to the region's sustainable growth are highlighted as **RED FLAGS**.

The natural potentials in Karas are based on five main factors:

- Mineral riches, based mainly on the world's largest productive sedimentary diamond deposits, and on other mineral occurrences;
- Open landscapes and beautiful scenery, an asset of increasing value in a crowded world;
- Plentiful sunlight and localised strong winds, both potentially useful energy resources;
- The Orange River valley with its warm climate and perennial water that favours irrigation farming (but with efficient use of water, see limiting factors below)
- The Atlantic Ocean with its rich Benguela Current and a limitless supply of water for potential desalination.

The greatest limiting factors in Karas include:

- The arid climate and an overall shortage of water. Supply of water from the Orange River, although perennial, is limited and getting scarcer. Groundwater potential is low overall.
- Poor soils and rangeland productivity;
- A poor skills base, evident in high unemployment, little value addition and manufacturing, and severe urban poverty.

Climate change is expected to cause a significant decrease in primary productivity (= growth of fodder), brought on by lower rainfall, higher temperatures, increased variability of rains and higher rates of evaporation. The greatest impact will be on livestock farming, which will become even more marginal.

AGRICULTURE

Irrigation farming

Conditions in the very hot lower Orange River valley provide a competitive advantage for irrigated, export-quality, high-value crops such as table grapes and dates. Namibia presently achieves great economic benefit from the irrigation farms at Noordoewer and Aussenkehr, although the low price paid for water allows farmers to use wasteful methods such as centre-pivot sprinkler systems. Since Karas is the most water-deficient part of the country (taking high evaporation into account), irrigation methods should be much more water-efficient. Examples include drip irrigation, micro-sprays and underground irrigation (water delivered directly to the root zone).

The apparent abundance of water in the Orange River is misleading, since both the quantity and quality of water is declining. The wetland at the river mouth, which serves as a good indicator of the river's ecological health (especially in its lower reaches), is classified as internationally important and is listed on the Montreux Record as one that is degraded. Climate change is likely to make the water situation even more critical. Irrigation potential using Orange River water is vulnerable to these risks and to abstraction upstream. Carefully considered tariff systems should be used as a demand management strategy that incentivises farmers to use water-efficient irrigation methods and to concentrate on high value crops.

Orange River water quality is getting poorer from the return flows from irrigation farms (in SA and Namibia) which carry high loads of pesticides and leached fertilizers. This threatens the ecological integrity of the Orange River as an important linear oasis through the arid surroundings, particularly the mouth which is recognised as a wetland of international importance. Return flows of water could be significantly reduced using more efficient irrigation methods.

High-value crops are targeted at discerning overseas customers, so the quality has to be excellent to achieve the profits that are sought. Irrigation farming requires skilled farmers and high capital and running costs. These conditions mean that irrigation farming is not very effective at improving local livelihoods. The main benefit to local people is through their unskilled, seasonal labour. Namibia's draft Integrated Water Resources Management Plan (MAWF 2010a) states that shortcomings in the water sector are "a focus on developing new sources rather than managing existing ones better, and top-down sector approaches to water management result in uncoordinated development and management of the resource." The proposed Neckartal Dam is an example of this approach, and is predicted to achieve far less economic growth and benefit to local people in Karas Region than is being proposed. For eco-

nomic, social and environmental reasons, this SEA considers the Neckartal Dam to go against many principles of Vision 2030, NDP3 and IWRM, and to be unsustainable. This is raised as a **RED FLAG**.

The irrigation schemes at Noordoewer and Aussenkehr, including proposed expansions, are supported by this SEA, only if water-efficient irrigation methods are used. Monitoring of the amount of water consumed for irrigation along the Orange is very poor. Management of this critical resource should be much tighter.

Livestock farming

The greatest part of Karas Region is dedicated to farming with small stock, predominantly sheep. Although this is consistent with the MAWF's agro-ecological zoning, the habitat is marginal even for these hardy animals. Karakul are probably the best suited and most profitable domestic animals for this arid terrain. Goats make up about a fifth of all livestock in Karas. Slaughtering of goats and sheep is dictated by the Small Stock (6:1) Policy by which a farmer can only export 1 live animal (and get a good price for it in SA) for every 6 animals slaughtered in Namibia (where the profit is lower). Although the policy is supposed to create an incentive for local value addition and employment, it has almost no support from local farmers. Many are shifting over to cattle farming which is not affected by this regulation, and small stock numbers in the region are declining. Cattle make up less than 5% of the total livestock but their numbers are growing. They require more grass pasture and water than small stock and so are less suited to the arid shrubby habitat, and their growing numbers have a negative impact on rangeland health. The Small Stock Policy in its present form is noted as a **RED FLAG**. **This SEA does not support the zonation for large stock farming (in north-eastern Karas) as proposed in the KIRLUP.**

Climate change will make southern Namibia even less suitable for stock farming, with primary productivity (= carrying capacity) expected to decline significantly by 2080. Additionally, insect-borne diseases such as Rift Valley Fever are likely to become more prevalent in the south. Wildlife, especially springbok and gemsbok, are far better suited to arid conditions and many farmers are already diversifying to tourism and wildlife for economic reasons. Night culling of springbok for export to SA is a growing market. If managed and monitored properly, this trend is seen as positive for environmental health and is expected to grow steadily.

Indigenous plants and small-scale agriculture

Hoodia, the desert plant with supposed great pharmaceutical potential as an appetite suppressant, has not risen to commercial expectations and may decline in importance. Devils Claw is harvested in the north-eastern parts of Karas, and offers some commercial benefit. The marketing and promotion of these indigenous products for commercial gain is encouraged, as they diversify local livelihoods. Ad hoc harvesting of wild Hoodia and Devils Claw plants is illegal and is not supported by this SEA. Small-scale gardening projects for local food production are plentiful in the region. These are beneficial for local livelihoods and, individually and cumulatively, have very little environmental impact. However, groundwater supplies may, in some cases, limit the extent of these schemes.

CONSERVATION AND TOURISM

This sector has been growing steadily and holds the greatest potential for continued strong growth in Karas Region. The competitive advantage of the region relates to a number of key facts and resources:

- Fish River Canyon, the second largest canyon in the world;
- Nomination of the Greater !Gariiep area (lower Orange River and surrounds) as a World Heritage Site;
- Established and growing populations of desert animals such as gemsbok, ostrich and springbok, and unique vegetation in the world's only plant biodiversity hotspot in an arid region;
- Varied recreational activities including 4x4 routes, river rafting, hiking, and camel or mule or horse treks, through spectacular landscapes;
- Historic relicts of diamond mining in the Sperrgebiet and outstanding coastal landscapes;
- Rich cultural and historic heritage of the Nama people and the German colonial period;
- Interesting geological features such as a meteorite crater, fossils, an extinct volcano;
- Good roads and telecommunications, and a growing number and diversity of accommodation establishments, which provide for most tourist necessities. Transit routes into southern Namibia from South Africa, linked with the Trans-Frontier Conservation Area, are well established.

Formal Protected Areas and areas under conservation management (including private game farms and communal conservancies) make up about 40% of the area of Karas. The reality of climate variability, making livestock farming less profitable, is likely to continue the shift towards farming with wildlife and tourism. In particular, land adjacent to protected areas is more profitable under conservation management than under conventional farming, and leads to a reduction in park-neighbour conflicts as land uses become more compatible. This SEA supports this shift for promoting conservation and the improved socio-economic benefits they can bring. As an over-arching guideline, the continuity of areas under conservation management should be increased, under the motto "Karas Network Natura". The Gondwana Canyon Park complex is seen as a model for turning protected areas and wildlife-landscape resources into economic engines.

Mining is a potential threat to this form of land use but it can and should be managed so that the impacts are considerably reduced. Unavoidable problems only occur if profitable mineral deposits occur in areas of high biodiversity or landscape value.

Other conflicts with conservation and tourism include the loss of aesthetic value from ugly infrastructures such as powerlines, telecommunication towers and roads. These can be planned and constructed so that they provide the necessary services without detracting from the value of scenic landscapes.

MINING

Mining operations are strong economic drivers, and increasingly they are responsible developers. They bring large investments which can be used to tackle significant national priorities such as desalination, skills development and infrastructure e.g. town, roads, solar energy. The mining sector in Karas is dominated by diamonds along the lower Orange River and the coastal strip up to Lüderitz, and by heavy metal deposits at Rosh Pinah and Skorpion. Other mineral occurrences with possible potential are copper at Haib, and uranium at Warmbad, Aus and Garub.

The main environmental threats from mining in the region are the heavy demand for water, and the risk of pollution. Landscape alterations on a large scale, that have occurred during coastal diamond mining operations, are relatively benign except for the visual impact. Rehabilitation of past mine dumps and

ponds along the coast will occur to a limited extent, but all modern earth-moving operations for diamonds are now rehabilitated as an ongoing 'mend while you mine' policy.

Significant pollution threats (contamination of soils and groundwater by heavy metals) have been detected at Rosh Pinah and are identified as a **RED FLAG**. The threat of long-term contamination needs to be properly addressed in the closure plans of this and all mines, so that there is not a legacy of pollution and health risks left by the mines.

Exclusive Prospecting Licences (EPLs) for minerals grant the holder access to any land, and almost the entire Karas Region is covered by EPLs. This is a potential problem in areas that are under farming or conservation management, through activities such as off-road driving, drilling and poaching and just the presence of people where wilderness value is the main land use. The Minerals Ancillary Rights Commission offers a dispute-resolution forum in the case of such conflicts.

An important principle for new mines is that they should not start up new settlements (e.g. for accommodating labour), but should rather invest in existing towns. This is to prevent the future occurrence of ghost towns after mine closure. As part of their social responsibility, mines should invest in training and capacity building programmes that will help to build skills for a diversified economy after closure. The legacy of the mine should continue in improved social and economic conditions, and sustained environmental health, after the mineral resources have been removed.

An idea to consider for the future of Rosh Pinah after closure of the mines is to use the town as a centre for solar power generation, research and development.

ENERGY

Energy developments in the region and in Namibia as a whole are strongly influenced by external factors, especially in South Africa. Local issues are subservient to the strategic decisions of the Southern African Power Pool.

The main manifestation of energy infrastructure in Karas Region is powerlines. Main transmission lines running from South Africa to feed the Namibian network run through Karas, and the network serves all towns and most settlements. The most important impacts of powerlines are aesthetic, as well as the dangers to birds such as large raptors and bustards which suffer mortalities from electrocutions and collisions. These impacts can be mitigated through careful routing of lines and specific bird-related measures.

Generation schemes are proposed along the Orange River and at Oranjemund. Strategically, the development of energy generation capacity using natural resources is supported. Preliminary work on the Lower Orange River Hydro-Electric Power Scheme (LOHEPS) has not identified any fatal flaws, and this project is likely to begin construction in 2012. No major conflicts are identified, but the project is vulnerable to continued adequate flows in the Orange, so that there remain risks of impacts on the wetland ecosystems. The proposed power station close to Oranjemund fuelled by Kudu gas is being started up again as a viable project now that gas price obstacles have been overcome. The most significant impact is the risk of oil pollution from the marine industrial operations. There is a relatively small land-use conflict with Namdeb, since the gas pipeline will exclude diamond mining operations from a specific area. The loss of this potential mining income has been agreed to by Namdeb.

As Namibia's sunniest region, and its coastal strip the windiest, Karas has great potential for renewable energy generation. A wind park is under consideration for Lüderitz. A few solar power generation projects are proposed in the region, but are still only in the very early stages of planning. There is possibly an argument for using the Rosh Pinah town, its infrastructure and mine facilities as a hub for solar power generation, research and development, which would help to maintain the life of the town after the closure of the Rosh Pinah and Skorpion mines. Electricity could be used to power desalination at the coast, providing water for Oranjemund and Rosh Pinah, and possible new mines.

Domestic energy needs in towns are largely supplied by electricity and paraffin, but there is heavy reliance by low income groups on wood. The alien invasive tree, *Prosopis*, is the main source, and it should not be removed unless it is severely harming environmental flows in water courses.

FISHING

The fisheries sector has been the economic backbone of Lüderitz, which serves as one of Namibia's two main ports. The harbour town provides services to the fishing industry and the processing factories which preserve and package fish products mainly for export to Europe. For roughly the last two decades there have been diminishing stocks of important species such as hake and rock lobster, and thus the fisheries sector is in steady decline.

Mariculture, the growing and harvesting of marine products such as seaweeds, abalone, oysters and rock lobster, are growing industries in Lüderitz Bay, and show economic potential. While their development is promoted, their vulnerability to occasional natural marine events such as red tides and low-oxygen water must be noted. Big pollution events have not occurred in Namibian waters; an oil-spill or equivalent accidental spill could be disastrous for this sector.

Marine diamond mining involves disturbance of the sea floor and smothering of biota, but this is localized and affects only about 5 km² per year, so the small scale of it and the natural ability to recover make this overall impact quite small. Again, the greatest risk stems from the possibility of pollution if a vessel capsizes.

Fresh-water fisheries (aquaculture) have some potential in Karas as a diversification of local livelihoods. No significant impacts or conflicts are predicted, while their development synergises with existing and planned infrastructures such as Naute and Neckartal Dams.

TOWNS AND INFRASTRUCTURE

Transport infrastructure such as roads, rail and port facilities are generally well developed in Karas and pose no significant environmental threats as known so far, and mitigation measures at the project level can adequately minimize environmental damage. Especially barrier effects to animal migration mostly due to road kills need to be assessed properly.

With most of its population living in urban settings, there is great pressure on government and local authorities to provide effective social services such as education and health facilities; water, waste and sanitation; and security and recreational outlets. In mining towns such as Oranjemund and Rosh Pinah, these are carried adequately and the towns contain enough employed people that the services can be

paid for. Other centres such as Keetmanshoop and Karasburg do not have the benefit of supporting industries and the high proportion of unemployed people in the towns means that little income is available from rates and taxes to pay for the services. Overall, poverty, accompanied by deterioration of social services and of the social fabric in Karas communities, is identified as a **RED FLAG**.

ASSESSMENT OF CUMULATIVE IMPACTS

The Orange River is understandably a focus area for development in the Region, but is reaching its limit in terms of availability of water for abstraction. Additionally, water quality is declining significantly. This report cites the considerable body of information which shows that the Orange River water resource is over-exploited and abused, and that its Ramsar wetland at the mouth is now placed on the Montreux Record as a degraded wetland. The cumulative impacts of irrigation schemes, water for towns and luxury developments such as golf courses, and mining, is highly significant and is likely to influence how these developments continue in future. Climate change will exacerbate these impacts. Future planning should not take for granted that ample water will always be available. Planners and developers also need to recognise the importance of environmental flow requirements so that the resource is kept in a healthy state and is able to support people's needs in future.

The Fish is the most important ephemeral river in the region, and has been described as Namibia's closest resemblance to a perennial river within its borders. Flows and environmental health downstream are going to be significantly impacted by the Neckartal Dam development, which will also cumulatively add to the pressures on the Orange River mouth since its flow contributions to the Orange will decline.

CONCLUSIONS AND SUSTAINABLE DEVELOPMENT SUGGESTIONS FOR KARAS REGION

Considering the key natural resources and the limiting factors of the Karas Region, the following suggestions are made to help Karas Region achieve sustainable economic development and contribute to Vision 2030.

Strengthen the role of Integrated Water Resources Management

The Orange-Fish River Basin Committee and its parent ministry, MAWF, should take the lead in promoting Integrated Water Resources Management in the region. NDP3 states a key activity in the water sector is to undertake a "pilot study on efficient irrigation methods to be used along the Lower Orange River". Water demand management, i.e. managing the amounts of water consumed through pricing or other incentives, should be urgently introduced. Demand management is also consistent with NDP3 which urges more value addition per unit of water consumed, and a strong role for functional basin management committees.

Since water is the most critical limiting factor in the region, it is appropriate that the management and monitoring systems around water use should be given a high priority. This places a great responsibility on MAWF and the newly formed Orange-Fish River Basin Committee, as well as on Local Authorities who are responsible for implementing water tariff systems.

Strengthen the wildlife and conservation sector

As an over-arching guideline, the continuity of areas under conservation management should be strengthened, under the motto "Karas Network Natura". This supports the existing trend to farm with wildlife as these animals are better suited to the arid conditions, and builds adaptation measures to cope with future climate change. Conservation and tourism are the economic future of agricultural land that is marginal. The protected areas and adjacent areas can be used as economic engines for growth in the tourism sector, by providing services to this industry and thereby improving rural livelihoods. It is recommended to implement the following measures:

- Promote wildlife populations by removing fencing to create larger contiguous management areas that facilitate movements in response to seasonal variations.
- Further facilitate wildlife movements by maintaining a corridor network that will allow animals to respond to seasonal variations and changing climates. The eastern edge of the Namib protected areas should be open with farming neighbours into the escarpment area. Open corridors should be maintained along the Orange and main ephemeral rivers,
- Cooperate with neighbouring states to implement trans-frontier conservation areas, as is being done between South Africa and Namibia. The Kgalagadi Transfrontier Conservation Area (shared between South Africa and Botswana) should be extended to include Namibia's southern Kalahari, where there are currently no protected areas.

Establish Karas as Namibia's solar power hub

As Namibia's sunniest region, its coastal strip the windiest, and the Ocean with almost infinite water, Karas has great potential for renewable energy generation and water provision. This SEA strongly supports the proposed wind park for Lüderitz and the scattered solar power generation projects. The argument goes further, to propose the idea of making Karas a hub for renewables. Specifically, Rosh Pinah with its infrastructure and mine facilities qualifies well to be transformed from a mining town to a centre for solar power generation, research and development. Even a production industry could be established in future. Electricity could be used to power desalination at the coast, providing water for Oranjemund and Rosh Pinah, Lüderitz and possibly Aus, as well as new mines and for tourism facilities. Sea salt production could be considered as well. It is recommended to start with a feasibility study, considering technical, economic and environmental feasibility of this proposal, as well as economic and social benefits.

Build the skills base

With a poor skills base, the region will continue to struggle to really move forward. It is therefore essential to implement effective education and training programmes. As partners in this drive, major economic drivers, such as the mines, large irrigation schemes, and large-scale tourism developments like Desert Star, should include support to schools and vocational training as part of their corporate social responsibility programmes. On-the-job training and experience and apprenticeships are invaluable. Irrigation centres such as Green Schemes and Aussenkehr should run well organised training in irrigation farming. Livestock farming training (e.g. in the karakul sector) is offered and should be expanded. Hospitality training should be offered through tourism enterprises. Technological training is offered through NIMT and Cosdef, and should be expanded. All these initiatives are worthwhile and essential investments in the future prosperity of the region.

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