Kouga Municipality

Proposed development to address food security and protect biodiversity

Environmental and Sustainability Studies

Mushroom Research Facility

West of Weltevrede Dam next to R102, Kouga, Eastern Cape, South Africa

Hi my name is CarbonSyyingen. I am a Second Life Avatar representing the Qarbon Qampus Virtual World. Today we will be doing a real world assessment for a development. My Role is that of a Research scientist and I am looking to build a Mushroom Research facility to assess new foods we can grow in the Eastern Cape given the anticipated impacts of climate change.
Mushroom Research Facility
Innovative Cultivation!

What is the Mushroom research facility and why is it different?

The Mushroom Research Facility will be a place that links learning with improving commercial mushroom production through disease control, and studying and manipulating microbial ecology and population dynamics during the composting process. The facility will be firstly conducting research on mushroom species that hold commercial value but do not require an exotic environment to grow. A laboratory and shed equipped with a number of climate chambers for the cultivation of edible mushrooms will be created in which research can be carried out on a large number of widely varying subjects like disease control. The facility will also be looking into potential production of porcini mushroom in the local pine plantations.

Agriculture is the key a factor for the development of the countries. Mushroom production is economically important since data have shown that mushrooms can contribute to the economy in terms of nutritional value. Edible wild mushrooms can contribute to the economy but collecting of these mushrooms must be done in suitable conditions, in which it will, without causing any hazard to nature.

White button

Oyster mushroom

Porcini mushroom

Shiitake mushroom

Crimini mushroom
Mushroom Research Facility
Where will it be located!

A potential property for the location of the Kouga Mushroom Research Facility has been identified West of Weltevrede Dam next to R102. The property will be used to house a research facility which will undertake studies in the potential of the local pine plantations (further to the west) to produce porcini mushrooms for the export market. At first a research laboratory and a mushroom growing shed for other potential commercially viable local mushrooms species not associated with exotic trees will be built occupying 0.5 hectare with parking.
Mushroom Research Facility
Organic Growth and Collection of Porcini

Porcini are wild growing mycorrhizal, meaning that the mycelium – the threadlike body – of the fungus has a symbiotic relationship with the roots of vascular plants (complex, woody plants such as trees). The latter gain better access to water and nutrients through the larger surface area of the mycelia, and the fungus obtains sugars produced by the tree. The mushrooms are the spore-bearing bodies of the fungus.

Porcini mushrooms grow best under a layer of pine needles or oak leaves and can weigh up to 1kg each. The porcini is prized for its earthy, nutty flavour and thick, meaty texture. The South African crop is highly sought after overseas. Unlike porcini from Europe or North America, South African porcini are free of worms, which can burrow into the mushroom’s dense flesh.

The porcini crop is dependent on several factors, in particular rain, heat and humidity. The best combination is a spell of dry weather, followed by rain, and then warm temperatures of about 20°C. Wind is enemy number one, as it dries out the forests quickly.

Because Kouga Municipality lacks forest patches – and those it has harbour threatened species - we suggest growing the mushroom in the nearest forest patch which happens to be in another Municipality (Kou-Kamma) only if an agreement is met with the other municipality. The mushrooms will be naturally grown and collected, porcini mushroom are of course wild mushrooms.
Kouga Municipality Profile

Description
The Kouga Municipal area covers a fertile coastal landscape of in the Eastern Cape province of South Africa. The area is characterized by three main topographical regions: The coastal area which stretches from Van Stadens River through surfer’s paradise Jeffrey’s Bay and Oyster Bay. The wide fertile valleys of Gamtoos River, including the agricultural towns of Hankey and Patensie. As well as the largest urban area – Humansdorp. Home to the perfect wave, Kouga is a hotspot for watersports, yet has great cultural diversity, underdeveloped natural beauty and offers a tranquil relaxed family-friendly environment with easy access to modern conveniences.

General statistics
Area: 2133km²
Total Population 2001: 70691

Summary of Overberg Integrated Development Plan IDP
“Effective, Efficient and Economic Land Use for Food Security and Economic Growth
• Agrarian Programmes
• SMME and Co-opts support
• Investments
Support initiatives for agricultural development and related processing Activities”

2.13 GOVERNMENT SECTOR RELATED MATTERS
The following tables list various projects planned by different sector departments in the Kouga municipal area.

2.13.1 AGRICULTURE & RURAL DEVELOPMENT

<table>
<thead>
<tr>
<th>PROJECT NAME</th>
<th>LOCATION</th>
<th>ENTERPRISE</th>
<th>RESOURCES REQUIRED</th>
<th>BUDGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>KRUISKOP</td>
<td>Humansdorp</td>
<td>Vegetables</td>
<td>Irrigation (Phase 2)</td>
<td>R 400,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fencing</td>
<td>R 160,000</td>
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<tr>
<td>JIDA</td>
<td>Humansdorp</td>
<td>Poultry</td>
<td>Poultry House (Pre-Fab)</td>
<td>R 157,800</td>
</tr>
<tr>
<td>UMZOMYE</td>
<td>Loerie</td>
<td>Vegetables</td>
<td>Fencing</td>
<td>R 420,000</td>
</tr>
</tbody>
</table>
Kouga Municipality
Transformation and protection

Total area: 241941.3ha

Landscape transformation
One third of the municipal area has been altered to a state where not natural habitat remains.

Protected areas
Formal land-based protected areas
15 reserves covering 14774.6ha (6%)

Marine Protected Areas (MPA’s)
0 adjacent to municipality
Kouga municipality

Vegetation types – original extent

Main vegetation types (>10% of municipal area)
- Gamtoos Thicket 20.13%
- Humansdorp Shale Renosterveld 13.37%
- Kouga Grassy Sanstone Fynbos 25.59%

Other vegetation types (<10% of municipal area)
- Albany Alluvial Vegetation 4.17%
- Albany Coastal Belt 3.28%
- Algoa Dune Strandveld 3.53%
- Algoa Sandstone Fynbos 0.01%
- Cape Coastal Lagoons 0.05%
- Cape Estuarine Salt Marshes 0.21%
- Cape Inland Salt Pans 0.02%
- Cape Lowland Freshwater Wetlands 0.02%
- Cape Seashore Vegetation 1.07%
- Eastern Coastal Shale Band Vegetation 0.31%
- Eastern nlandl Shale Band Vegetation 0.09%
- Garden Route Shale Fynbos 0.17%
- Kouga Sandstone Fynbos 7.98%
- Loerie Conglomerate Fynbos 8.05%
- Southern Afrotemperate forest 0.18%
- Southern Cape Dune Fynbos 3.45%
- Tsitsikamma Sanstone Fynbos 8.28%
Kouga Municipality

Nationally listed threatened ecosystems

Percentage of municipal area now covered by threatened ecosystem shown

**Endangered (EN)**
- Albany Alluvial Vegetation 1.28%
- Humansdorp Shale Renosterveld 4.23%

**Vulnerable (VU)**
- Algoa Sandstone Fynbos 0.01%
- Eastern Coastal Shale Band Vegetation 0.03%
- Garden Route Shale Fynbos 0.04%
Kouga Municipality
Nationally listed threatened ecosystems

Map showing the original extent of the ecosystems which are now threatened
Garden Route Biodiversity Sector Assessment location and Conservation Plan

Assessment location
The map to the left shows the assessment area which was run for the identified potential location of the Mushroom Research Facility - West of Weltevrede Dam next to R102

Assessment results
The assessment report is a compilation of data of various spatial biodiversity data sets and planning production. These are:

1. National terrestrial or aquatic spatial data sets and protected area boundaries and

2. The most relevant Biodiversity Conservation Plan BCP for the municipality in which the assessment is located. In the case the most relevant SCB is the Garden Route Biodiversity Sector Conservation Plan
Threatened Ecosystems

According to the assessment report there were no threatened ecosystems in the area. Although this information is extracted from the original extents of the area both the SCP results discussed below and examination of imagery confirm that natural vegetation may well exists within the area of the assessment. However it cannot be confirmed whether this natural space harbours threatened ecosystems.

The results for the National vegetation types section 1.1.2 confirms that the only vegetation types (ecosystems) which may occur.

• Tsitsikamma Sanstone Fynbos (FFs 20)

Soils

The soil classes encountered (section 1.1.4) are probably associated with the Tsitsikamma Sandstone Fynbos. Further investigation into their properties revealed that

• Association of Classes 17 and 20: Structureless and poorly drained soils Imperfectly drained soils, often shallow and often with a plinthic horizon.

Indigenous Forest Patches

There were no indigenous forest patches (section 1.1.3)
Garden Route Biodiversity Sector Conservation Plan
Rivers, wetlands and protected areas

National Fresh Water Priority Areas (NFEPA)

Wetlands
No wetlands occur in the analysis area (section 2.1.1).

Rivers Units Sub-quaternary catchments
The analysis area located two sub-quaternary catchments of which one has a NFEPA status of Fish Sanctuary. NFEPA fish sanctuaries are important areas for the support of indigenous fish species.

Protected Areas (NBA 20011)
The analysis area showed no protected areas (section 1.3), formal or informal.
Garden Route Biodiversity Sector Conservation Plan

CBAs and ESAs

In the Garden Route biodiversity Sector Conservation Plan a lookup layer is provided which divides the area of the plan into units each of which gives biodiversity feature information responsible for the classification of the unit’s CBA map category CBA or ESA. The analysis area intersected 16 such units (section 2). In the report each unit is listed separately rather than in a table due to the amount and complexity of information it contains.

Critically Endangered ecosystems (CBAs)

Some of the analysis area intersected with lookup layer units which were classified as Critical Biodiversity Areas 7 natural areas in total. The biodiversity features responsible for this classification indicated potential occurrence of nationally listed endangered species as well as some CBAs listed as critical for hydrological processes. These units corresponds with the two endangered and 3 vulnerable ecosystems which were listed above.

Ecological Support Areas (ESAs)

Most of the analysis area intersected with lookup layer units which were classified as ESA, nine or important for maintaining aquatic processes and may be transformed from natural e.g. farmland.
Kouga Mushroom Research Facility

After a thorough investigation of the assessment site, we suggest and recommend the development of a Mushroom Research Facility. Evidence for support:

- The area is predominantly farmland so it is relatively transformed
- Yes, there is Endangered (EN) and Vulnerable (VU) vegetation however, VU > 0.01% and EN > 8%
- Suggest to build around the vegetation or buy more land to create an offset for the vegetation.
- Since most cultivation will be done indoors and there are environmental regulations done in the mushroom industry like recycling of spent substrate – it is still organic waste thus exploitation of spent substrate could be environmentally beneficial in terms of nutrient release.
- Most importantly, the establishment of such a development can have a positive impact on the socio-economic sector of Kouga Municipality possibly alleviating most families from poverty.

On the other hand, establishing a Mushroom Facility in this area may critically affect the environment:

- The area is surrounded by CBAs and ESAs, and the area is on two sub-quaternary catchment areas – in mushroom cultivation the use of organic manure as substrate is key, however problem arise with operation of open composting yards, uncontrolled disposals of spent compost - create environmental nuisances; like bad odour; water pollution; flies and possibly other harmful insects that act as vectors for diseases.
- Nutrient leaks in the soil can be good for some vegetation in the area e.g. Renosterveld, however since the area has fynbos remnants, nutrient-rich soil will give way for other vegetation types to out compete the natural fynbos.