

A NEWSLETTER OF THE ONDIRI, NYONGARA AND RUNGIRI WATER RESOURCE USERS ASSOCIATION (ONRU-WRUA)

Welcome to the ONRU-WRUA e-newsletter

Ondiri Wetland: A unique but highly endangered ecosystem

Ondiri wetland is located within close proximity to Kikuyu town. It is an important wetland since it forms the headwaters of Nairobi River within the Athi drainage basin. The area is a unique wetland with macrophytes growing on a floating peat, making it Kenya's only major quaking bog. Peat occurrence in Kenya is scattered and limited to mountainous areas with most valley bottom wetlands having been drained for farming and settlements. In spite of this uniqueness, the wetland is characterized by poor or scanty information on its ecology, utilization and threats as is the case with most small wetland ecosystems in the country.

Stakeholders within Ondiri wetland include local farmers, institutions like schools, hospitals, government departments and civil society organizations. Activities in Ondiri wetland include water abstraction for both irrigation and domestic use and harvesting of macrophytes, mainly for use as forage for livestock, both for commercial and domestic use. Due to its close proximity to Kikuyu town and Nairobi city, it is an important source of horticultural products. Local people also use it intermittently as a recreation site. The peat within Ondiri wetland has also been used previously as a carrier material for rhizobium inoculation bacteria.

Ecosystem destruction in Ondiri wetland dates back to the colonial era, which was marked by extensive deforestation. Currently the ecosystem is highly threatened by various activities within both the wetlands and riparian land. This includes dumping of solid waste and uncontrolled water abstraction. There are several water pumps around the wetland, which are not metered; meaning that it is impossible to gauge the level of water abstraction. In addition, there are fears that the water in the wetland has been decreasing. But again the out-flowing river does not have a gauging station. Kikuyu town also lacks a

sewerage system, which increases the likelihood of pollutants seepage from septic tanks. Previous conservation initiatives, mainly fencing and tree planting by forest

departments in the 1990s, collapsed due to lack of community ownership of the process and enforcement.

Preliminary research reveals that very little has been documented on Ondiri and that may explain why despite the lifeline it gives to many households, it has not been listed among wetlands of national importance or protected as a Ramsar site. Ondiri wetland is one of the few perennial highland bogs. It is a resource that draws interest in various quarters, which include government departments, the local authority, farmers and private developers. Due to the fact that it is not protected, the multiplicity of stakeholders presents a situation where each individual seeks to maximize their benefits; a pure case of the tragedy of the commons. This complicates the position of

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A meeting on the WRUA formation at Kikuyu Country Resort. Photos by Naftali Mungai

management and conservation agencies.

The Ondiri wetland is oval in shape and local legend has it that it used to be an open lake in the early part of the last century and indeed the name itself is Gikuyu corruption of old lake (Ondiri). However, as deforestation and subsequent erosion accelerated, the lake became covered with floating reeds on peat such that now it has an extensive reed mat that covers more than 95 percent of the wetland to form a quaking bog, the biggest one in the country. A quaking bog is made up of a layer of vegetation floating over water. You can walk on the vegetation, but if you jump up and down the whole bog quakes.

The wetland covers an area of approximately 30 hectares with a perimeter of slightly over 3km. Hydrologists say the water sits on a valley of about 10kms. The Ondiri wetland lies at 2000m above sea level. The area gently slopes eastwards to around 1600m above sea level with the wetland sitting approximately 10m below the general topography of the area. To the north of the wetland, a large area on which sits Kikuyu town, slopes southwards towards the wetland.

Kikuyu town (see Picture) is approximately 25km North West of Nairobi city centre. It is most easily accessible via the Nairobi-Nakuru highway (1km southwards) plied by public service vehicles number 105 or via the Dagoretti-Kikuyu Road, plied by public service vehicles number 102.

The wetland's vegetation comprises of reeds and water grass. This vegetation grows continuously and when it wilts, it does not decompose completely. Instead, it accumulates to form a thick layer of peat (up to 50cm thick) that floats on Ondiri's water.

The wetland provides crucial breeding sites for insects, crustaceans and amphibians. These provide adequate food for birds during breeding and migration. An earlier study also noted the huge presence of storks, egrets, ibises, hamerkops, kingfishers, cranes, plovers and painted snipes feeding on frogs, tadpoles and other aquatic fauna during the dry seasons. The marabou stork is also a rare visitor to the wetland. Jackson's widows have been spotted breeding in the tall grass in the wetland. The tall grass provided security for

small carnivores such as mongooses and wildcats. However, that was before the harvesting of the grass became intensive and frequent.

The wetland gets its water through the northern end and discharges southwards into Nyongara River. The wetland is fed by three small streams and several small seasonal springs located at the edges of the wetland and runoff from the neighboring land. It is most likely that it has an underground source of water which explains why it is perennial. In addition, it is also fed by rainfall and overland flow from the surrounding areas. During the



A section of Kikuyu Town: Located about 25 kilometres west of Nairobi City, Kikuyu is home to the Ondiri Swamp, Africa's second largest quaking bog.

rainy season, most floodwaters in this area drain into the wetland. Baraniki and lower Thogoto areas are characterized by valleys and rocks and the latter is evident from the many quarries that dot the two areas. It is no wonder that several small streams and springs sprout from the joints and faults in the area.

The main direction of outflow of the wetland is to the south and east where several small streams join downstream to form larger streams that make the headwaters of Nairobi River. The water body is linked to Kikuyu Springs, which lies to its east through a subterranean passage. The spring is a major source of Nairobi's water throughout the year and it is under a 24-hour guard from the

Administration Police. Together with other streams that emanate from Ondiri wetland and elsewhere it forms a significant

should be given 'Special Aquifer' status (*sensu stricto*) as per the Water Resources Management Rules (2007); and define the limits of a groundwater conservation area or areas that might be gazetted in order that the recharge area or areas are protected in future. It is noteworthy here that the Chairman of the WRMA, Professor Francis Gichaga, was one of the participants in the awareness raising workshop that was organized by a number of organizations in September last year in the Kikuyu Country Resort which is adjacent to the bog.

The south of Ondiri wetland forms the headwaters of Athi River. After passing underground through Thogoto Forest it resurfaces at Karinde near Karen Estate, where locals refer to it as *Gitwe Kia Mbagathi* (headwaters of Mbagathi). To the south-east the water from Ondiri forms the Nyongara River, which passes through highly populated areas such as Thogoto, Dagoretti, Waitthaka, Kawangware and Uthiru finally joining the Nairobi River at Waitthaka. The areas are mainly inhabited by low-income people and if the Ondiri were to be well managed, the residents of these areas would greatly benefit from the water. The conservation will have to extend to its tributaries because a lot of pollution is discharged into the waters as it traverses the areas. The current land use around the wetland is a mix between residential plots, small gardens, some large farms and exotic vegetation. The area has a high population density with current figures putting it at about 500 persons per km². As such, land is very important. The land is divided into small portions on which permanent or semi permanent residential structures are erected. This is attributed to the fact that residential houses have a higher return compared to small-scale agriculture.



A fish pond by the edge of the swamp. Fish farming may conflict with conservation effort

catchment for Nairobi River. On December 4, 2009, a notice in the *Daily Nation*, Kenya's leading daily newspaper, reported that the Water Resources Management Authority of Kenya (WRMA) had received financing from the World Bank towards the cost of the Natural Resources Management project. One of the key objectives of the project is to secure adequate water supply for Nairobi City. Among the Nairobi City water sources to be studied are the Kikuyu Springs and Ondiri Swamp, which constitute the earliest water source for the city. The call for consultancy services defines one of the key objectives as defining and mapping the area or areas which constitute the recharge zone or zones for the Kikuyu Springs aquifer, and to define the geometry of this aquifer and the hydro geological links between the springs and the Ondiri Swamp. The consultant(s) will among other tasks, describe the measures that should be put in place to protect the recharge area and or areas from destructive land uses that are likely to jeopardize recharge and water quality. The consultant will also make recommendations as to whether the aquifer

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Severe grass harvesting exposes water to higher evaporation rate



A panoramic view of the several fish ponds that are part of the government economic stimulus package



Sacred ibis are among the most common birds in the wetland



Participants in an environmental workshop tour the Ondiri swamp

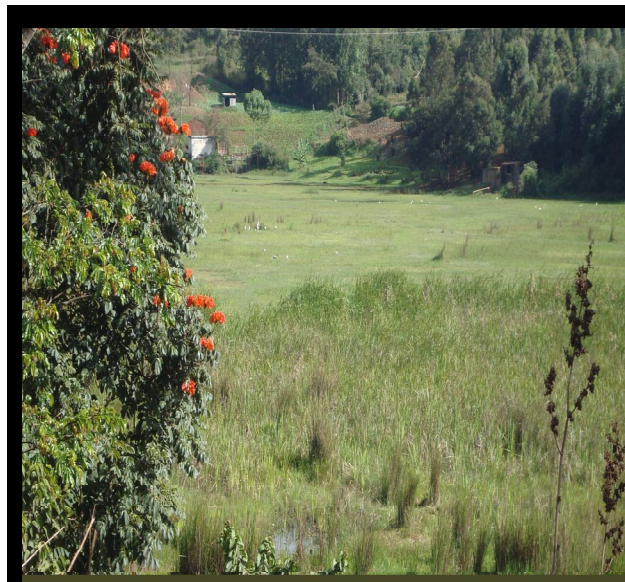
Why Bamboo Plantation at Ondiri Wetland is The Best Option

In order to arrest soil erosion along the swamp edges, bamboo will be planted around the wetland. Bamboo will mitigate the pesticides, and fungicides infiltration while providing the community with alternative lifelines and fuel sources.

No other woody plant matches bamboo's versatility in environmental conservation and commerce. It is a viable replacement for both hardwoods and softwoods. Its growth rate is three times that of eucalyptus, and it matures in just three years. Thereafter harvests are possible every second year for up to 120 years. However, bamboo remains an untapped resource in Africa, a state of affairs that this project hopes to help remedy through a pilot project in Ondiri. It aims to create awareness on the environmental and economic benefits of bamboo in the Ondiri



Giant bamboo propagation trial: A nursery man waters giant bamboo cuttings in a trial plot



Eucalyptus trees in the far end: A threat to the Ondiri Wetland

Swamp, and hopefully popularise it throughout the region. Interestingly, this member of the grass family is not new in Kenya and experts claim that Kenya's water catchments were once covered in

bamboo. However, most of these forests have since been cleared. The World Agroforestry Centre (ICRAF) had taken a first step towards the revival of the plant by introducing the giant bamboo (*Dendrocalamus giganteus*) into selected pilot sites in Kenya (Nairobi, Western Kenya) and Tanzania (Musoma). However, this project is now in hiatus. This commercially attractive species can grow in areas traditionally used for sugar cane and coffee cultivation, thus providing an alternative or additional cash crop. *Arundinaria alpina*, a species of bamboo native to Kenya, will yield as many as 20,000 culms per hectare per year, with each culm growing to a height of 12 metres (40 feet). Most species in fact grow to over 30 metres (90 feet) at full maturity. This means that there is great commercial potential in bamboo. Friends of Ondiri Wetland Conservation (FOWCON) is already trying to propagate giant bamboo in a nursery although this requires expert knowledge and consultations with the Kenya Forestry Research Institute (KEFRI) are ongoing to ensure successful propagation.

Bamboo also absorbs water faster than most plants and is used in some parts of the world for cleaning sewage. Even more important, it soaks up

heavy metals. It is a potential answer to polluted waters. It is nature's fastest growing woody plant, with some species achieving the phenomenal growth rate of one metre a day! Its culms (poles) are the strongest, lightest natural material known to humankind. A square metre of flooring derived from this "wonder plant" will sell for as much as US\$ 100, while in Southern Asia it is used for

reinforcing concrete and for scaffolding on skyscrapers.

Sixty percent of proceedings from bamboo will be retained by the riparian owners. The remaining 40% will be ploughed back to the project. There are about 30 riparian owners.

Its growth rate is three times that of eucalyptus and it matures in three years. Thereafter, harvests are possible every second year for 120yrs. It produces edible bamboo shoots rich in vitamin and low in carbohydrates, fats and proteins. Over 200 million tonnes of edible bamboo are consumed around the world annually. However, bamboo remains an untapped resource in Kenya in environmental conservation, income generation, and food security and as an alternative fuel source. We hope to remedy this situation through the Ondiri wetland conservation programme. This component of the project aims at conserving the wetland by creating awareness on the environmental and economic benefits of bamboo and sustainable development among the people in Kikuyu District.



Mature giant bamboo culms that are ready for harvesting

Botanical Gardens

The project will not be complete if it does not include Botanical and Organic gardens. The gardens will have selected indigenous trees, shrubs, palms (indigenous, naturalized and exotic) commonly found in the East African region. The Organic gardens will produce synthetic tree fertilizer, vegetables and other foods. The Organic garden visitors will be assisted to identify prominent species that can be observed, studied

and enjoyed in gardens and parks, along roadsides and in easily accessible parts of the countryside. The trees' medicinal properties will also be provided.

No other woody plant matches bamboo's versatility in environmental conservation and commerce. It is a viable replacement for both hard wood and softwood

Ondiri Water Resource Users Association Registered

One of the difficulties identified in wetland management is the division of management responsibilities between different administrative authorities in a river basin. This often results in fragmented and competitive approaches to water resources planning and management. The management of wetlands therefore requires a multidisciplinary approach that integrates the technical, economic, environmental, social and legal aspects of water management which does not end at country borders but needs to be carried out on a river basin scale in which people can develop a vision, agree on shared values and behaviours, make informed decisions and act together to manage the natural resources of a river basin.

The primary condition for achieving integrated wetland, stakeholders in a catchment area need to be able to understand management is the willingness of sectoral stakeholders to work together. To achieve the necessary cooperation each other clearly. Steps to achieve understanding of the various views, and to explore how far such separate views can be shared, are the major components of a Water Resource Users Association (WRUA).

Ondiri Swamp faces several conflicts as far as water use is concerned. There is the danger of siltation as soil from the riparian farms gets washed down to the swamp, especially after heavy rains. This soil is accompanied by fertilizers and pesticides which render the water unsuitable for drinking. Harvesting of swamp vegetation for fodder is another source of conflict since the harvesters cut the vegetation and leave the swamp bare, which means that evaporation takes place faster. Recently, real estate projects are coming up and there is a lot of waste, both solid and liquid, that finds its way into the swamp. Recently also, the government has come up with an Economic Stimulus package that is meant to accelerate growth of rural economies. Among its pillars is rural aquaculture which a lot of small scale farmers have taken up. Numerous fish ponds have been dug and naturally, because of its abundant fresh water supply, the swamp has been a



Young domestic tourists explore the beauty of Ondiri Swamp

to produce fish for both domestic consumption and for sale.

It is estimated that fifty percent (50%) of Kenyans obtain their water directly from water sources rather than through improved water supply systems. As a result, the country is at a high risk of losing water catchments and sub-catchment areas, and further disintegrating secure water resources in the future. In order to address this, the Ministry of Water and Irrigation, through the Water Services Trust Fund (WSTF) and the Water Resource Management Authority (WARMA) has started a financing window of protection and management of water at the local level, known as the Water Resource Users Associations (WRUAs)

A WRUA is the name given to a community group which is focused on the management and conservation of the water resources of a particular area, stream, or aquifer. But while the formation of WRUAs has already started in the country, awareness among communities on the benefits of the associations is low and the capacity for conflict transformation is also low Form a Water Resource Users Association (WRUA) for the swamp.



Workshop participants in a group photo inside Ondiri Swamp

favourite site for aquacultural activities. Several fish ponds have been dug. However, these are in the riparian area and there are fears that this will precipitate a conflict between the conservation efforts and the need

After a number of meetings and consultations, the Ondiri, Nyongara and Rungiri Water Resource Users Association was registered in July 2010. This Water Resource Users Association, whose acronym is ONRU-WRUA, is meant to promote conservation and benefit sharing of the waters of the Ondiri Swamp, the Nyongara River which flows from the swamp, and the Rungiri Dam, located a short distance away.

This is a community group that will be focused on management and conservation of the water resources of the Ondiri swamp

- Promote efficient and proper water use of water abstracted
 - Promote sustainable water use, water management and water development
 - Promote soil and water conservation practices within catchment area
 - Promote conservation of water quality
 - Promote a situation in which the available river flow is reasonably shared
 - between the environment, wildlife and all the communities in a manner that recognizes the following priority ranking of water use:-
 - Domestic
 - Livestock
 - Environment, wildlife, fisheries
- § The WRUA has the following objectives and functions:
 - § Promote controlled and legal water use activities
 - § Promote good management practices to make efficient and sustainable of the water resource
 - § Promote water conservation practices to ensure sufficient water reserves that meet the demands of the environment, the wildlife, the livestock and all the stakeholders.
 - Irrigation
 - Recreation
 - Manufacturing industry
 - Other
 - Provide a forum to discuss, prevent and resolve water use conflicts
 - Promote dialogue between water users and Government of Kenya in regard to water policy
 - and enforcement of the Water Act in respect of activities relating to N river
 - Promote a situation in which all modifications to existing river abstractions
 - And, all new river abstractions must be approved by the Association before being considered by the relevant water boards.

FOWCON has also set up a website(www.fowcon.org) that will be highlighting the activities of the organisation from time to time. *The Bog* is supported by Rufford Small Grants Foundation