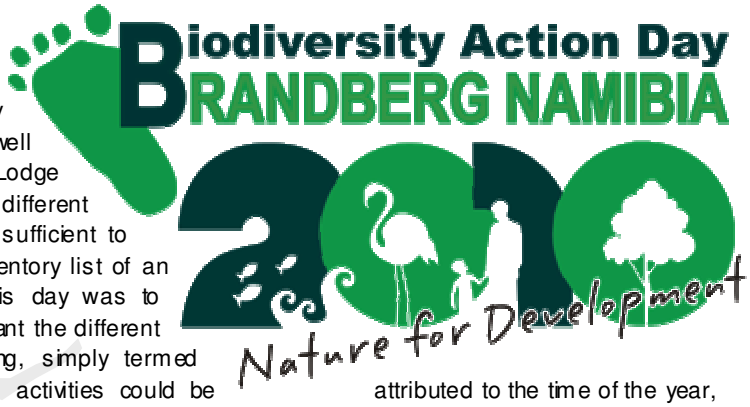
Outcomes of the



The six action groups of the Namibian Biodiversity Action Day at Brandberg explored the immediate as well as distant surroundings of the Brandberg White Lady Lodge to inventory and summarize the services provided by different ecosystems. However, in reality a single day is not sufficient to provide information that can be used to draw an inventory list of an area. The use of biomonitoring methods during this day was to demonstrate with hands-on experience to the participant the different biodiversity and its uses to the human well being, simply termed "Ecosystem Services". Limited findings and animals activities could be attributed to the time of the year, winter, when most animals are less active due to reduced temperatures. Nevertheless, the findings of the Biodiversity Action Day revealed a variety of species with restricted ranges, species of economic significance, umbrella species, Keystone species and rare desert wetlands which serves as shelter to a variety of species. Brief overviews of the findings are discussed below by experts who participated in the Biodiversity Action Day at Brandberg.

- **CBNMRN**
- **ROCK PAINTINGS**
- **PLANTS**
- **VERTEBRATES**
- **INVERTEBRATES**
- **WETLANDS GROUPS**

CBNMRN (Community Based Natural Resource Management)

Corris Kaapehi (EduVentures) with inputs by John Kasaona (Integrated Rural Development and Nature Conservation)

The policy of CBNRM was establish with the perceptive that once ownership and benefits over wildlife resources is handed over to the people who live and suffer from living with these resources, they would be more obliged to look after these resources hence they have a reason to protect them because they feel the ownership and can see the tangible benefits. Consider the adage; Tragedy of the commons, "I will kill this warthog because if I don't, my neighbour will kill it anyway". In addition, the concept of CBNRM enthusiastically emphasizes SUSTAINABLE use of natural resources, thus a utilization pattern that focuses on rational harvesting of resources. Since the implementation of the concept 14 years ago, significant progress has been made with more than 50 registered communal conservancies and benefits to local communities have greatly increased. Today, Namibia is legendary as a world leader in CBNRM and another phase where community forest and aquatics resource will be considered is currently underway.

For a community to obtain ownership over certain resource, a Community Based Organization (CBO) has to be formed with a Legal constitution, a least of members and the committee. The process is over seen by the Ministry of Environment and various NGO's and stakeholders. In the North-West part of Namibia, around the Brandberg, the 'Tsiseb Conservancy' is one such organization.

Activities by the CBNRM group consisted of the following:
A visit to water infrastructures developed for humans so as to reduce competition with wildlife was conducted followed by a visit to water infrastructure developed for wildlife with extensive discussion on Human Wildlife Conflict (HWC) going on. HWC is considered one of the biggest threat facing CBNRM in Namibia. This activity was followed by a visit to the Conservancy office where a tour was conducted to visit the Internet Café, Curio shop and Coffee shop run by the Conservancy. After the tour, a reflection on resource management, utilization and capacity building by the conservancy was held. This includes topic such as Game Guard System, Event Book System, Game Count Techniques, Joint Venture Trophy Hunting and Tourism was discussed. Interviews with locals and conservancy committee members were held.

From the conservancy office, the destination was Uis township for a brief overview of local livelihoods and standard of living which proofed not easy at all followed by a visit to old mining pits left from historical mining activities that ran dry. Here, due to natural spring open by miners, a discussion on the possibility of Aquaculture by the youth of the township. A high possibility that could be beneficial is definitely an option but due to lack of finances, this will still have to be investigated.
Last but not least, on the drive back to Brandberg White Lady Lodge, some game count routes where followed for a game drive and practical discussion of some of the earlier discussion held.

ROCK PAINTINGS

Dr. Tilman Lenssen-Erz (Heinrich-Barth-Institut für Archäologie und Umweltgeschichte Afrikas e.V. Koeln- HBI)

Due to its more than 1000 rock art sites that are between 2000 and 4000 years old, the Brandberg can provide insights into the significance of biodiversity in a historical perspective.
The group that surveyed the region of the famous "White Lady" (that actually is a black medicine man) identified eleven species of mammals that still today may be found near the Brandberg/Daureb, e.g. in the Ugab river (in descending quantity): springbok, giraffe, gemsbok, ostrich, unspecific antelope, zebra, lion, elephant, dassie and kudu. Habitats of these animals are largely savannah and half desert but some can temporarily live in desert environment.
One team within the larger group looked closely at the artefacts that the people in the art are shown with. In the first place hunting equipment was depicted but also some ornament. It turned out that the artefacts are derived from a wide variety of resources, from animals (mammals and birds), plants and from minerals.
Another team investigated the link of rock art sites to their surroundings. It was found out that the sites have no relation to the habitat and behaviour of the animals depicted but instead are the home for animals (insects, reptiles, few rodents) that almost never turn up in the art.

The learning effect for the group was that the ancient hunter-gatherers did not produce a complete catalogue of the animals surrounding them, but instead they picked a number of species from their most favourite prey. These were mainly antelope and buck from the savannah regions and hardly any from the mountain habitat. These animals were chosen because everyone from the early inhabitants needed to have a profound knowledge about them. This knowledge would include the entire surroundings of these animals because their behaviour and habits are determined by features of the habitat, their place in the food chain etc. This knowledge would have been with everyone in these early societies because without schools and other formal learning everyone would have to make sure that the next generation has full access to the entire cultural knowledge.

PLANTS

Salome Kruger (National Botanical Research Institute of Namibia)

Both the rock corkwood (*Commiphora saxicola)* which cramped to some granite outcrops in the middle of grass-grown plains and the *Welwitschia mirabilis* are near endemic to Namibia and the Namib Desert respectively. The Welwitschia is an extremely long-lived (maybe more than 2000 years) and weird-looking plant that many idolize as Namibia's informal national symbol. The distribution range of the Brandberg acacia (*Acacia montis-ustii)* is even more restricted - to the Brandberg alone.
The habitat closer to the dry riverbed revealed various species of plants that provide vital services to the local community:
The Mustard bush's *(Salvadora persica)* young branches and roots can be used to clean teeth when chewed. The Blue Sour Plum (*Ximenia americana*) was still bearing edible fruit. This plant is also important commercially, as its seed oil is used in cosmetics. The Ana tree *(Faidherbia albida)* bears pods that are a significant fodder for livestock and game. The Camelthorn tree *(Acacia erioloba)* provides not only good shade, but also fire wood and building material although it is prone to being overexploited these days.
Alarmingly, alien invasive species such as wild tobacco (*Nicotiana glauca*), *Datura sp.* (a solanaceous herb) and the castor-oil bush (*Ricinus communis*) were observed, the latter even in a remote valley high up on Brandberg. This can be considered critical as this area supports 90 of Namibia's endemic plants e.g. *Acacia montis-usti* (Brandberg Acacia) while eight plants occur only there.

VERTEBRATES

Joerg Melzheimer (Leibniz Insitut für Zoo-und Wildtierforschung - Berlin)

Amongst others, very shy or rare vertebrates where either sighted or detected by their spoors. A highlight in this respect was a fresh track of a black rhino or hook-lipped rhinoceros (*Diceros bicornis*) in the Ugab wetlands whose IUCN red list status is "critically endangered" – very next to the status "extinct in the wild".

Other remarkable amongst the mammal species ascertained

- The African elephant (*Loxodonta africana*) - a keystone species in the African savannah where they help shape the savannah to keep them open. Personal communication with the local Uis community revealed that goats follow Elephants because they benefit from seed pods dislodged by the trees by Elephants. In addition, a variety of dung beetles (*Scarabaeus* spp.) have been observed to use Elephants dung.
- Leopard (*Panthera pardus*) a top predator, was recorded via tracks crossing into the mountain, their favourite habitat.
- Antelope species in the area, the Springbok (*Antidorcas marsupialis*) is of most significant economical importance for the local community via trophy hunting - a herd of hundreds was spotted.
- Small spotted genet was observed for two consecutive nights at camp on a tree by the EduVentures team

The most remarkable species of rare bird species sighted:

- Ludwig's Bustard *(Neotis ludwigii)*
- African Hawk-Eagle *(Hieraaetus spilogaster)*
- Rüppell´s Korhaan *(Eupodotis rueppellii),* edemic to north west Namibia.

The most remarkable species of reptiles spotted include:

- Bernhard´s Dwarf Gecko *(Lygodactylus bernardi)*
- Giant Plated Lizard (*Gerrhosaurus validus*)
- Anchieta's Dwarf Python (*Python anchietae*). This is a rare species that only occurs in Northern Namibia and Southern Angola. It was captured while nestling in the lodge's garden and released in the vicinity of the lodge as the first activity of the B-Day. Behaving site-attached, it will hopefully remain there in peace.

INVERTEBRATES

Corris Kaapehi (EduVentures) with contribution by Dr J. Irish (Freelance Entomologist Consultant).

Invertebrates (Phylum Arthropoda) contribute the most species to the richness of any ecosystem; this is due to their ability to adapt to almost any terrestrial ecosystem. This generalisation is no exception for the 2010 Brandberg Biodiversity Action Day where more than 150 specimens were collected via a 24 hours pitfall trapping session in three different habitats and active hand collecting involving stone turning, sweep netting UV light search and light trapping.

However, the famous Gladiator (Mantophasmatodea) was not collected during the Biodiversity Action Day. The Gladiator is a representative of the first new insect order to be described in 2002 since 1914. Gladiator was initially known from amber by German scientists. Live populations were first discovered on the Brandberg in 2001.

Below are the highlights of the most common Invertebrates groups discovered;

Insects

Family *Tenebrionidae* – "Tok Tokie" beetles

This family of beetles comprise one of the most well represented families of beetles in Namibia with approximately 572 species known to occur in Namibia with most species being endemic. There is no internationally accepted character that tells Tok Tokie beetles from all other beetles because they are so diverse and comes in many different shapes. During the Biodiversity Action Day the following genera of this family were discovered; *Zophosis, Stips, Eurychora, Somaticus, Stenocara, Gonopus, Rhammatodes* and *Epiphysa* to name but a few.

Family *Scarabaeidae* – Dung and Scarab beetles

To date, at least 383 species of this family are known to occur in Namibia, in 110 genera. This family of beetles comes in a variety of shape and appearance but they are easily recognised by the antennae which have an apical club of flat and movable plates that can be open out fanwise. Adults in many species feed on fresh and decaying plant matter, nectar, dung and fungi. The family contains many serious agricultural and horticultural pest as well as highly beneficial Flower beetles (*Peritrichia* sp) which assist with pollination and dung beetles which helps maintain nutrient cycling by burying dung. Genera encountered in the Biodiversity day comprised *Peritrichia* (at least 2 different species observed in flowers), and at least two different species belonging to *Scarabaeus* were collected

Family *Carabidae* – Ground beetles
Ground beetles comprise approximately 251 species in 117 genera in Namibia and are commonly found in arid sandy areas of the country. Nearly all species of Carabidae are predators and feed on almost any prey they can overpower. Due to their predacious behaviour, Carabids are used in many ecosystems studies to indicate the health of the ecosystem and thus they contribute significantly to ecosystem services in nature. Genera of family Carabidae observed during the Biodiversity Action Day are *Graphiterus* (at least three different species), *Passalidius* and *Caminara*.

Family *Meloidae* – Blister beetles
Commonly known as blister beetles because they secret a liquid poison from their jointed legs and causes blisters and irritation on bare skin, this family comprise at least 105 Namibian species in 24 genera. This family has a long and soft body with a large head separated by a distinct from the narrow protonum. They come in different colour variation ranging from black, grey, red, yellow and sometimes a combination of these colours. Adults feed on flowers, foliage and nectar and sometimes act as a pollinator of flowers. One species, *Lydomorphus bisignatus* was observed on flowers and from pitfall traps, another species, *Mylabris oculata* was found on the Brandberg.

Family Hodotermitidae – Harvester termites
Harvester termites are commonly known for their grass collecting habit and can be seen carrying grass on the soil surface in broad day light, especially in winter. In infested areas, Harvester termites can become an agricultural pest where they can significantly reduce the carrying capacity of the veld and expose the soil to severe erosion. At least two species are known to occur in Namibia, with *Hodotermes mossambicus* being the commonly distributed species through the drier savannah region of the country. At the Brandberg, this family was observed foraging in the open savannah areas while setting pitfall traps.

Arachnids
A variety of other invertebrates species were also observed and collected, including scorpion from genus *Parabuthus*, which is a medically important species that can cause severe pain and sometimes death in victims of their sting. Other *Arachnida* observed range from the order *Araneae* (Families; *Salticidae*, *Araneidae*, *Eresidae*, *Sparassidae*, and *Pholcidae* to name but a few).
During the nocturnal light traps set in various areas, other Invertebrates ranging from *Neuroptera*, *Orthoptera*, *Blattodea*, *Mantodea* and *Hemiptera* were observed.

Invertebrates in general are one of the least groups of animals studied and this presents big problems with the provision of information to species level, hence the presentation of information to family and genus level with invertebrates. However, it is ascertained that invertebrates are an important group of animals and they contribute significantly to a variety of food chains as prey and predator and other services (pollination, nutrient cycling e.t.c), hence their use as indicators of the condition of the ecosystems they occupy.

WETLANDS GROUPS

Corris Kaapehi (EduVentures) with contribution by S. Bethune (Polytechnic of Namibia) and identifications by Eugene Marais (National Museum of Namibia - Entomologist)

The Ugab River, the longest westward flowing ephemeral river in Namibia, originates in the north central highland between Outjo and Otavi and flows all the way to ocean, just north of Brandberg. Further west, where the environmental conditions become progressively arid, this “Linear Oasis serves significant importance to the fauna and flora of the area, correspondingly induding the species *Homo sapiens*. Due to occasional flooding scenarios, high rainfall in the catchments area and local seasonal rainfall, enough ground water has accumulated and has caused seasonal and permanent wetlands and the Riparian vegetation found along Ugab the riverbed. This Riparian vegetation is used by many animals as shelter and food and provides also a source of livelihoods to local communities, hence the distribution of human settlement along the river. The wetlands are great supply of water to the vegetation and wildlife.

Findings of the wetland group include the following species;
A fish (belonging to the bigger group Tilapia) was found in the permanent wetlands. The presence of fishing nets indicates harvesting of the fishes by the local people, whether this is controlled harvesting or not, it is still to be confirmed, however, the Conservancy is now aware of this issue.
Marsh or Helmeted Terapin – *Pelomedusa subrufa* (Class *Reptilia*), *Trithemis kirbyi ardens*, *Orthetrum trinacria*, *Nesciothemis farinosa*, *Crocothemis erythraea* (Order *Odonata*, Suborder *Anisoptera*), Fairy shrimp (Order *Anostraca*) and at least two species belonging to Family *Hydrophilidae* (Order Coleoptera) were observed in the permanent wetlands.