

# **Invasions by plants in the inland waters and wetlands of Africa**

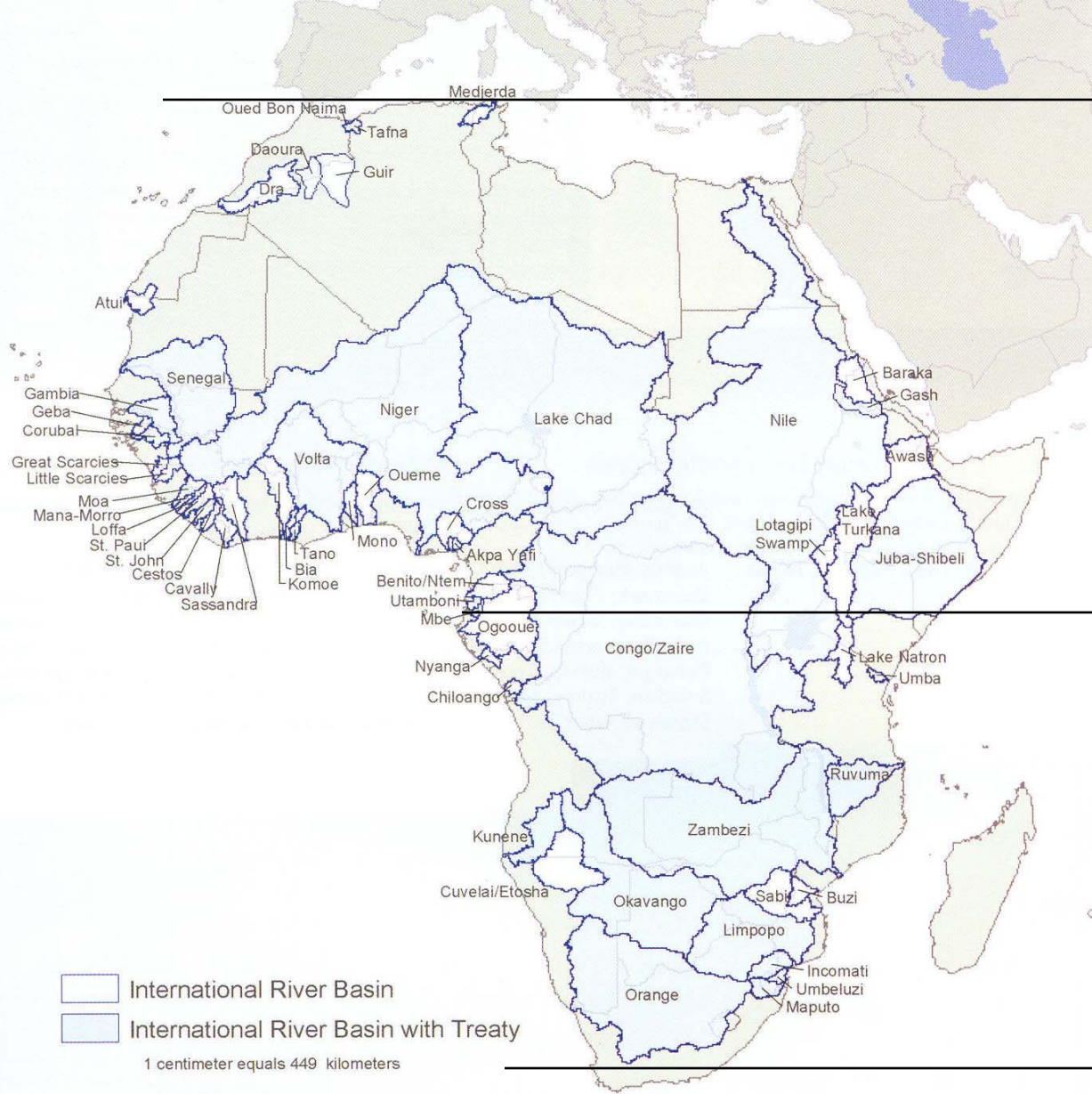
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**IUCN Eastern Africa Regional Programme**

**Nairobi, Kenya**

# **Issues to be discussed:**

- Invasive species are widespread in Africa's waters and wetlands**
- Aquatic invasives alter vegetation patterns and enhance likelihood of more invasions**
- Invasive species are not always “alien”**
- Africa needs more awareness of the prevalence and impacts of invasives**
- Economic valuation of impacts would make the case for more action in detection, prevention and management**



37°N

**Small and large riverbasins, long and short rivers with wetlands**

0°

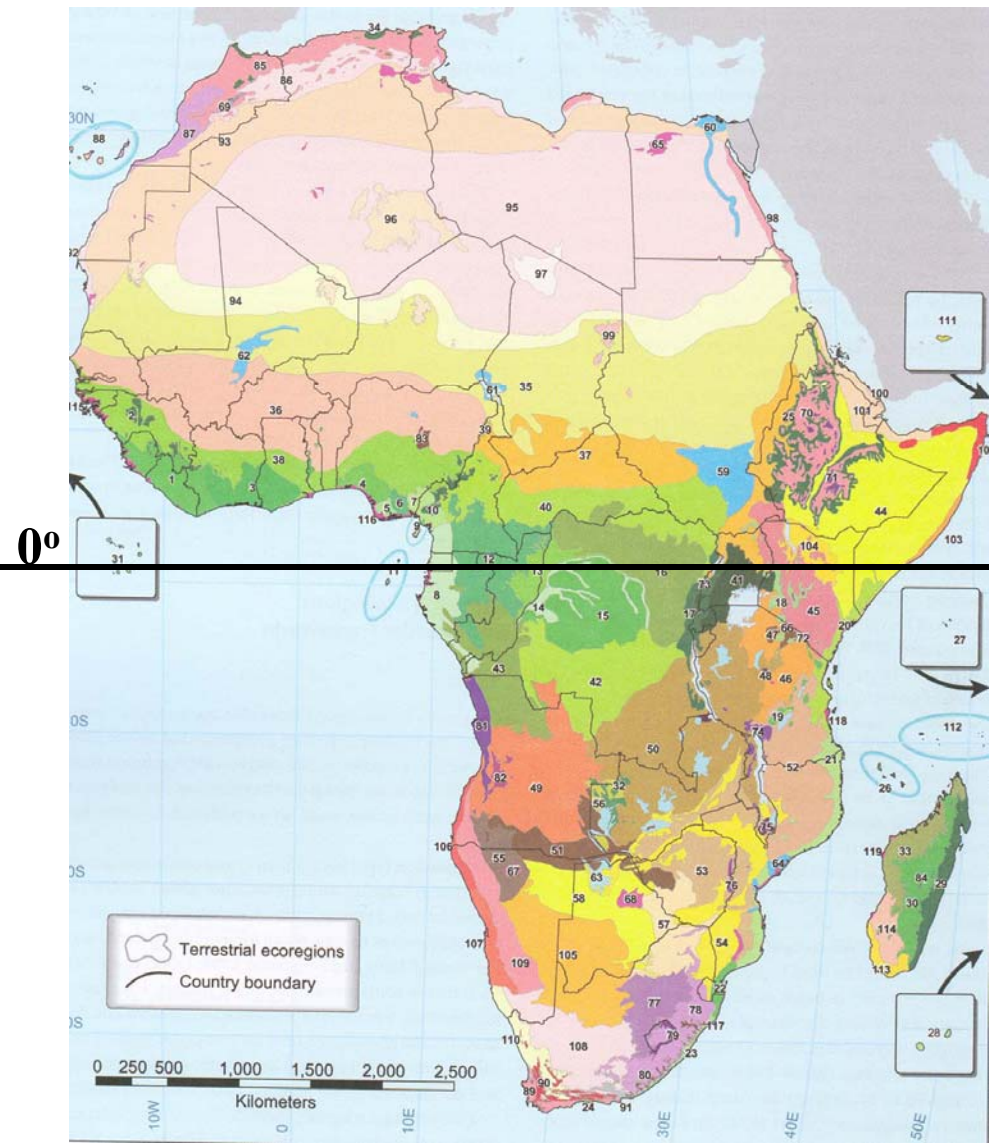
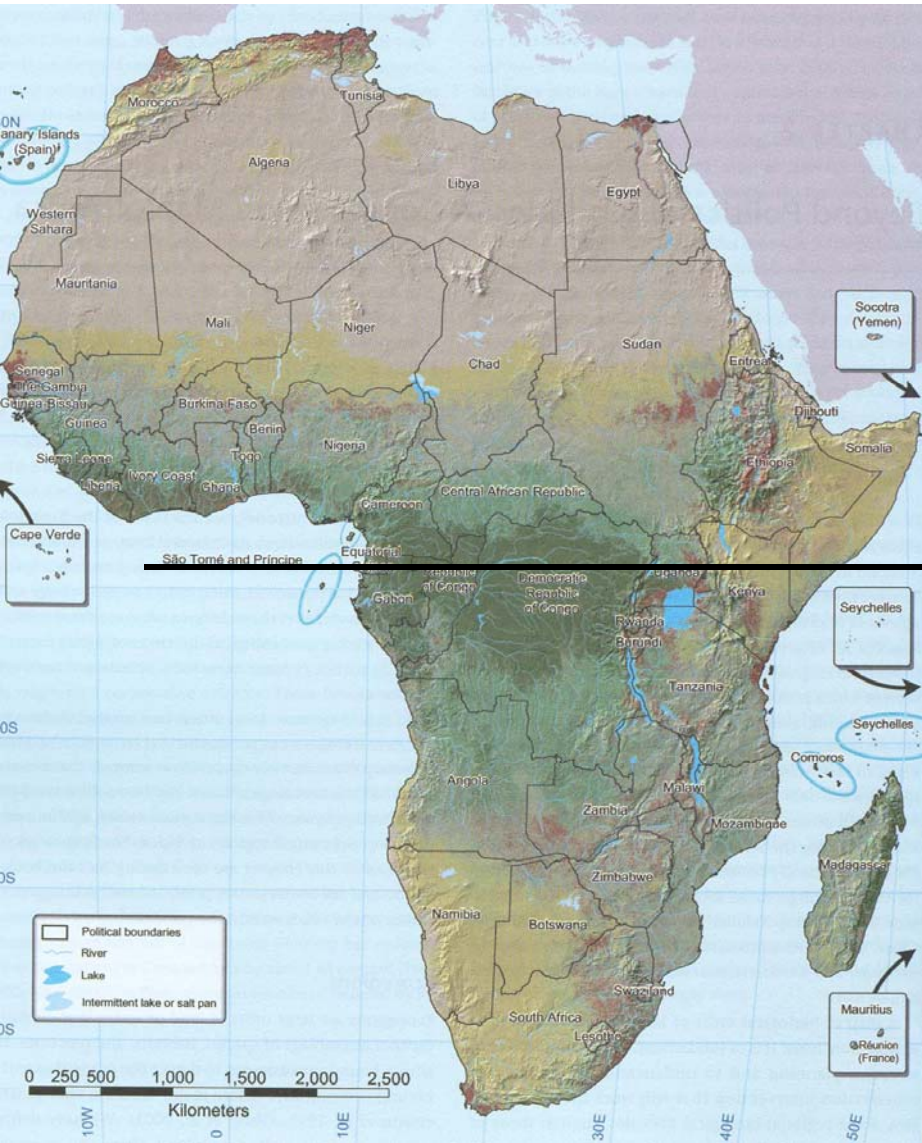
**Large and small lakes, swamps up to 30,000 km<sup>2</sup>**

35°S

**Mostly between the tropics (32°N&S) with Mediterranean drylands at one end and temperate dry and wetlands at the other**



**52 (or 54) countries, many with 5, some with 8 neighbours,  
major ecosystems are unrelated to national boundaries;  
most large lakes, rivers and wetlands cross borders**



# African wetland invasives...

thus have many opportunities for natural and human-assisted unintentional introductions across the continent, and have been assisted by many intentional introductions in the past century.



Thus the inland waters and wetlands harbour invasive:

- Micro-organisms (esp. algae and their blooms),
- Lower and higher plants
- Arthropods (esp. insects and crustaceans) and Molluscs
- Lower vertebrates – fish and reptiles
- Higher vertebrates – birds and mammals (but ....)



# **Aquatic invasive plants in Africa**

**A brief look at the three main types represented:**

## **1. Floating plants – above and below the water surface**

**These are numerous and widespread due in part to the absence of any large floating plants in the inland water and wetland flora of Africa**

## **2. Emergent plants- rooted below water with aerial parts**

**Gradually increasing in diversity and spread and includes some native species (i.e. “non-alien invasives”)**

## **3. Submerged plants – mostly below the surface**

**These occur - but are seldom seen and less seldom reported!**



# 1. Floating invasive plants

**Most common and widespread is Water Hyacinth (WH), *Eichhornia crassipes* – which needs no introduction and is present in ALL of the great lakes of Africa and ALL of the major river systems.**

**WH flourishes in high humidity and with a water temperature around 25°C – especially when nutrients are added**



# Water Hyacinth continued

**Water Hyacinth in Africa has significant impacts on peoples' livelihoods, on development, on water supply and hydropower generation, water transport, fisheries, etc., etc. but also on aquatic biodiversity. However in low density it does provide habitats for invertebrates and young fish that are not otherwise present**

**In most situations it is readily controlled by biological agents – the usual weevils used across the tropical world – provided that the temperature is OK for the insects and plant nutrients are adequate for the beetles' reproduction**



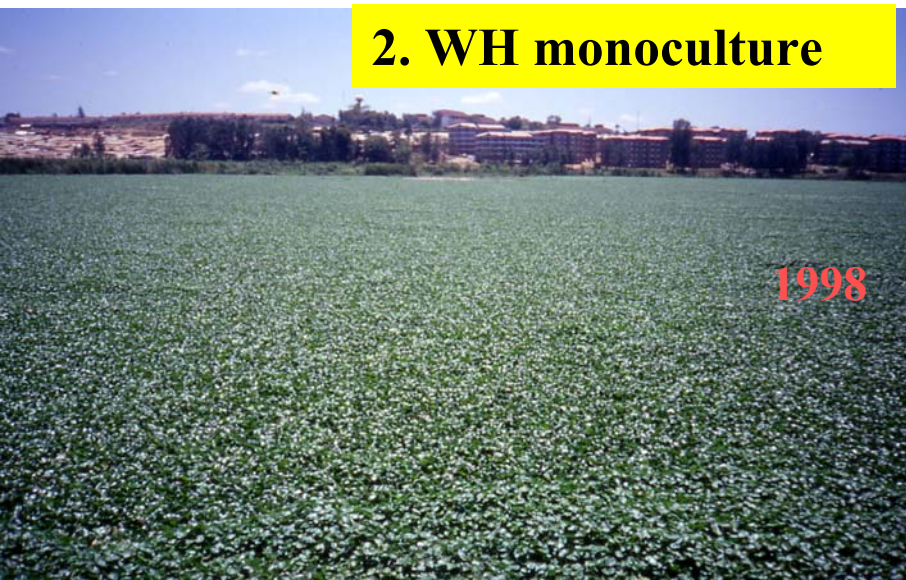


# Water Hyacinth continued



**1. Nairobi Dam**

- 1. Monocultural invasion by WH of an urban lake/reservoir**
- 2. Complete coverage of the water surface**
- 3. Invasions by other species “using” WH for support and so changing the wetland character**



**2. WH monoculture**

1998



2003

**3. Invasion by other species**



# Other floating aquatic invasives

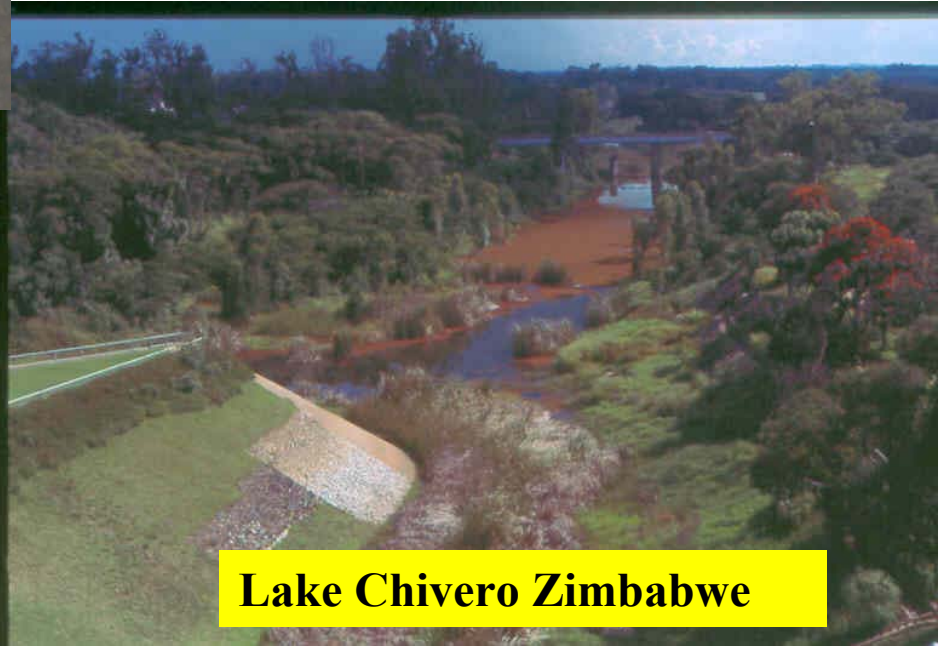


Edge of Lake Tanganyika, Burundi

*Azolla pinnata*,  
floating water fern -  
widespread



Kafue River, Zambia



Lake Chivero Zimbabwe



# Other floating aquatic invasives

**Two common and widespread “culprits” that become problematic with added nutrients - but both are bio-controllable under the best conditions**



*Pistia stratiotes*



*Salvinia molesta*



## 2. Emergent aquatic invasives



**4 species of *Typha* are native to Africa yet often invade waters and wetlands with serious consequences for plant diversity**

***Typha* spp.**



# The term “alien invasive species”

is further confused by *Vossia cuspidata* (hippo grass) that can become invasive when grazing pressures change or when other aquatic invasives impinge upon it





**Vossia can also combine with Water Hyacinth to form floating mats which extend its reach far beyond the normal extent of this grass – blocking waterways and changing vegetation patterns**



***Vossia cuspidata*, Lake George, Uganda**



# The special case of *Mimosa pigra*



The “Giant Sensitive Plant” probably originated in the Americas but has been known in Africa for >200 years. It has become invasive in many places in the last 20 years with varying degrees of impacts – most seriously affecting floodplains

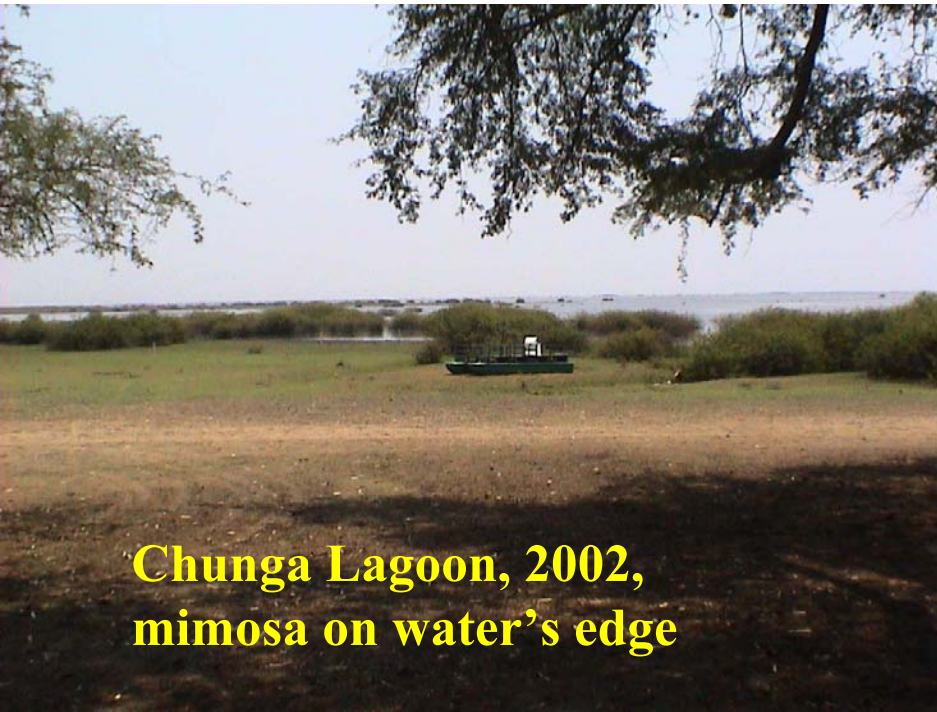




**Chunga Lagoon, Kafue Flats,  
Zambia, 1973 – no mimosa**



*Mimosa pigra* occurred sparsely on the edges of the Kafue River since recorded memory. In 1981 a few shrubs appeared on the edge of the Chunga Lagoon. Now, 2005, it covers a vast area excluding large birds and mammals as well as tourism – **WHAT COST?**



**Chunga Lagoon, 2002,  
mimosa on water's edge**

**Chunga Lagoon, 2004.  
Lagoon covered**



# So what can be done to slow or stop the spread of aquatic invasives and to reduce their impact on people, development and biodiversity?

The standard answer is: “Prevention, Eradication or Control”

**BUT:**

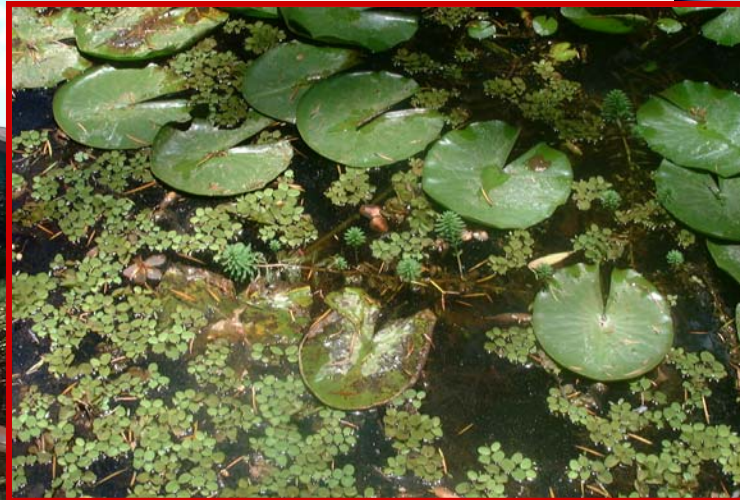
**PREVENTION** is difficult when there are so many borders, some of which are “porous” , where many lakes and rivers are international waters and where quarantine is especially difficult

**ERADICATION** is rarely possible in large and connected wetlands and waterways – especially for submerged species

**CONTROL** is the most effective option – but how?



**But before control can be effective,  
the problem needs to be seen**



**Salvinia,**

**Myriophyllum**

**Water Hyacinth  
as decorative  
plants**



# **In many parts of Africa ....**

**Awareness of the extent and impact of aquatic invasives is:**

- **Restricted to a superficial knowledge of Water Hyacinth**
- **Affected by minimal knowledge of aquatic plants**
- **Complicated by many aquatic invasives being “out of sight”**
- **Recognition of exotics and known potential invasives is low**

**And is complicated by:**

- **Lack of access to information on invasives and their control**
- **Knowledge that some invasives are useful and saleable** ↓
- **Difficulty to act quickly to arrest an invasion**

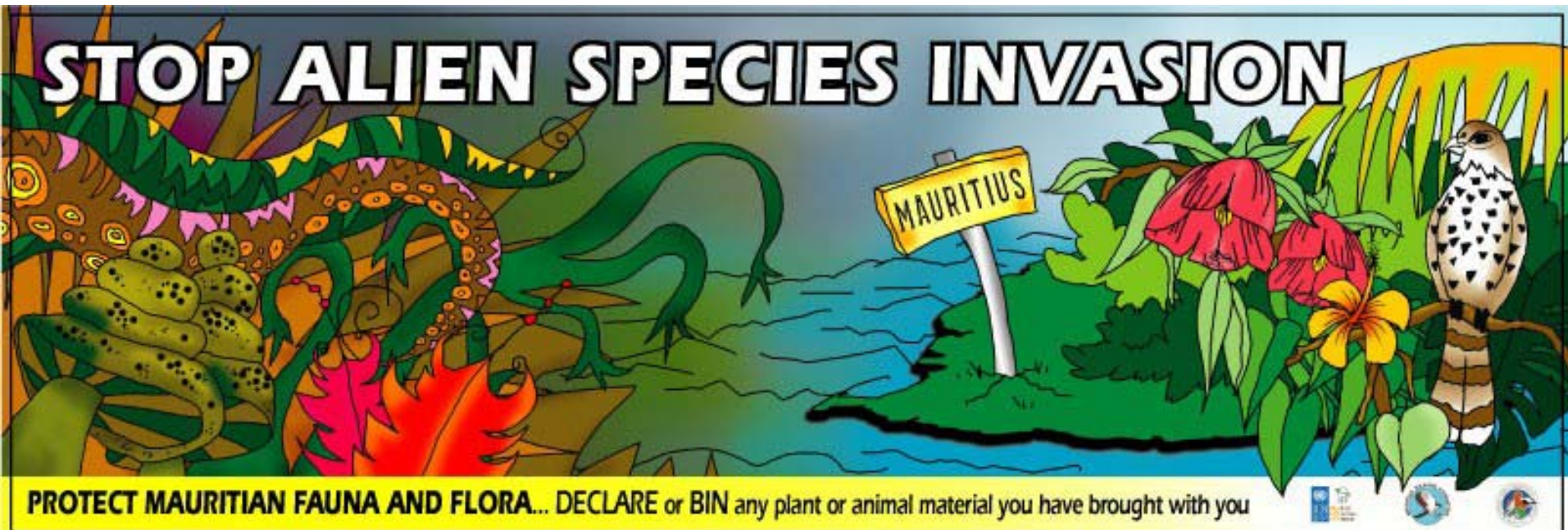




# Solutions??

## 1. AWARENESS

**Awareness of the problem, the impacts, the pathways of introduction and the solutions to existing and potential invasions**







# WildLife

**WILDLIFE CLUBS OF SEYCHELLES  
MAGAZINE**



**ISSUE NO:6**

# Invasive Species

**Awareness at all levels**

## NAMIBIA'S NASTY NINE

• alien invasive species •

**What are alien invasive species?**

Many species from other parts of the world have been introduced to Namibia for a wide range of purposes - for economic reasons, as innocent ornaments or unconsciously. Some of them became naturalised, increased in numbers, spread rapidly over time and space and are today best described as invasive.

None of these species are problem species in their countries of origin. They came from similar habitats - therefore they are well adapted to the new area. Many of them have the ability to reproduce rapidly and grow fast. Most importantly, they are released from control by natural enemies.

**Alien invasive species have many insidious and detrimental impacts on the environment:**

- local species are displaced, outcompeted, attacked and even eliminated;
- they rapidly consume precious resources such as water and/or cause losses in productivity for instance from indigenous forest species;
- they alter the structure and function of the environment;
- through inter-breeding with closely related indigenous species, genetic integrity and diversity of the latter may be affected;
- spoil the aesthetics of natural landscapes.

The consequences frequently go unnoticed until the effects are irreversible and eradication of alien invasive species becomes impossible.

Control is expensive and such measures may have adverse effects on the environment. Control should therefore start well before the problem becomes significant or widespread.

**What can you do ?**

- 1 Be aware of the detrimental impacts alien invasive species have on the environment;
- 2 Remove and destroy small infestations and report mass infestations;
- 3 Report people that promote or sell alien invasive species, including new species;
- 4 Report people whose actions lead to infestations by alien invasive species;
- 5 Do not bring foreign plants or animals into our country;
- 6 Assist whenever you can in the collection of data on alien invasive species in Namibia.

Contact:  
Namibia National Biodiversity Programme  
Working Group on Alien Invasive Species  
Directorate of Environmental Affairs  
Private Bag 13206  
Windhoek

**Argemone ochroleuca subsp. ochroleuca**  
White-flowered mexican poppy  
Witblom blauidisiet

**Family: Papaveraceae**  
Description: Annual, very spiny herb up to 0.8 m tall. Leaves: greyish-green, prominent white veins.  
Flowers: cream white, all year.  
Fruit: semi-capsule, opening, seedling has lobes.  
Cultivated for ornamental.  
Origin: Central America.  
Invasive: road sides, wastelands, cultivated lands, river-banks, river-beds, water edges.  
Invasive status: spread effect weak  
Invasive skin (top)

**Datura innoxia**  
Downy thorn apple  
Harige stinkblaar

**Family: Solanaceae**  
Description: Tree or bushy herb up to 2 m high, solitary grey variety on all parts.  
Leaves: greyish-green, herbaceous, very sticky, very venous smell.  
Flowers: white, solitary, large funnel-shaped, Oct-May.  
Fruit: brown, hardened capsule, ribbed longitudinally, densely covered with slender spines.  
Cultivated for ornamental.  
Origin: North and Central America, Mexico.  
Invasive: urban, cultivated in suburban areas.  
Invasive status: spread effect weak  
Invasive skin (top)

**Leucaena leucocephala**  
Luscumbia  
Reuse wattel/wonderboom

**Family: Fabaceae**  
Description: unarmed shrub or small tree up to 4 m high, branchlets densely grey-hairy.  
Leaves: bi-pinnately divided, dark green, often very hairy, drooping.  
Flowers: white or pale yellow in globose heads, singly or in groups, Jul-Dec.  
Fruit: brown pod, flattened but curved over the seeds, 12-16 seeds, opening into two non-recurving halves.  
Cultivated for: fodder, for wood, construction, timber, ornamental, shade-tolerant.  
Origin: Central America.  
Invasive status: potential transformer  
Potential: whole plant toxic to livestock (more than 25% of dry)

**Melia azedarach**  
Syringa  
Sering

**Family: Meliaceae**  
Description: Deciduous spreading tree up to 20 m high.  
Leaves: dark green and glossy, heavily pubescent underneath.  
Flowers: lilac to light lavender, heavily perfumed, single, Sep-May.  
Fruit: berries, blue, turning purple to black.  
Cultivated for ornamental, shade.  
Origin: Asia, Australia.  
Invasive: road sides, wastelands, river-banks.  
Invasive status: potential transformer  
Potential: irritant respiratory (flowers)

**Nicotiana glauca**  
Wild tobacco  
Wilde tabak

**Family: Solanaceae**  
Description: Slender, herbaceous shrub or small tree up to 6 m high.  
Can form dense, impenetrable thickets on long outcrops and ridges.  
Leaves: blue-green, leathery on long petioles.  
Flowers: yellow, bell-shaped, drooping clusters, all year.  
Fruit: large, fleshy, orange-red capsule, seeds bitter.  
Cultivated for ornamental.  
Origin: South America.  
Invasive: road sides, wastelands, river-banks, water edges.  
Invasive status: spread effect weak  
Potential: irritant

**Opuntia sp.**  
Prickly pear  
Tyrkavv

**Family: Cactaceae**  
Description: Deciduous, upright shrubs 2-3 m high.  
Leaves: deciduous, flattened, spines decurrent (depending on species).  
Flowers: yellow.  
Fruit: green to blue-green or purple.  
Cultivated for ornamental, fencing, edible fruit, animal fodder.  
Invasive: spreading grasslands.  
Origin: South America.  
Invasive status: potential transformer  
Invasive skin (top)

**Pennisetum setaceum**  
Fountaingrass  
Frankgras

**Family: Poaceae**  
Description: Sparsely branching tussock-forming grass.  
Leaves: up to 1.5 m long, 2-3 mm wide, flat, with a sharp point, dark green.  
Inflorescence: cylindrical, 2-3 dm long, light purple or pinkish, nodding, Jul-May.  
Fruit: small, dry caryopsis, enclosed by glumes and lemmas.  
Cultivated for ornamental.  
Invasive: road sides.  
Origin: South Africa.  
Invasive status: spread effect weak

**Prosopis spp.**  
Mesquite  
Prasopis

**Family: Fabaceae**  
Description: Multi-stemmed, glabrous, Acacia-like shrub or tree up to 10 m, armed with prickly, straight spines (10-15 cm long).  
Leaves: bipinnate, scabrous dark green, 10-25 cm long.  
Flowers: yellow, in axillary spikes, Aug-Nov.  
Fruit: slender, woody, semi-inflated and winged, yellow to deep brown.  
Cultivated for: fodder, shade, fuel, honey source.  
Invasive: wastelands, banks and borders of drainage lines in semi-arid to arid landscapes.  
Origin: South and Central America.  
Invasive status: transformer  
Invasive: respiratory tract (pollen)

**Sagittaria laevis**  
Kariba weed  
Watervering

**Family: Saururaceae**  
Description: perennial, stout, branching, Acacia-like shrub or tree up to 10 m tall.  
Leaves: two different types: those floating on the water's surface are green to purple, oval, 10-60 mm wide, 10-15 mm long, with a wavy margin, very velvety surface due to a dense cover of branched hairs, rounded, lobed, and smooth; those borne below the water.  
Fruit: lobed, stipitate, sessile, ripening in brown, globose.  
Invasive: slow moving streams in rivers and dams in flood plain regions.  
Origin: South America (Brazil).  
Invasive status: transformer

References: Henderson, L. 2001. Alien weeds and invasive plants • Henderson, L. 1995. Plant invaders of Southern Africa



## 2. Capacity building for recognition of invasives

Plant taxonomy and recognition have not been priorities in the last 30 years in Africa (and elsewhere!) - so capacity is limited

There is need to understand what is native (endemic) and what is exotic (alien) and what can or might be invasive

Taxonomic capacity is fundamental to understanding plant populations and communities

**BIONET** is assisting - but much more emphasis is needed in education and practice

# 3. Capacity building for management of invasives

Making available information about management options for invasive species in inland waters and wetlands

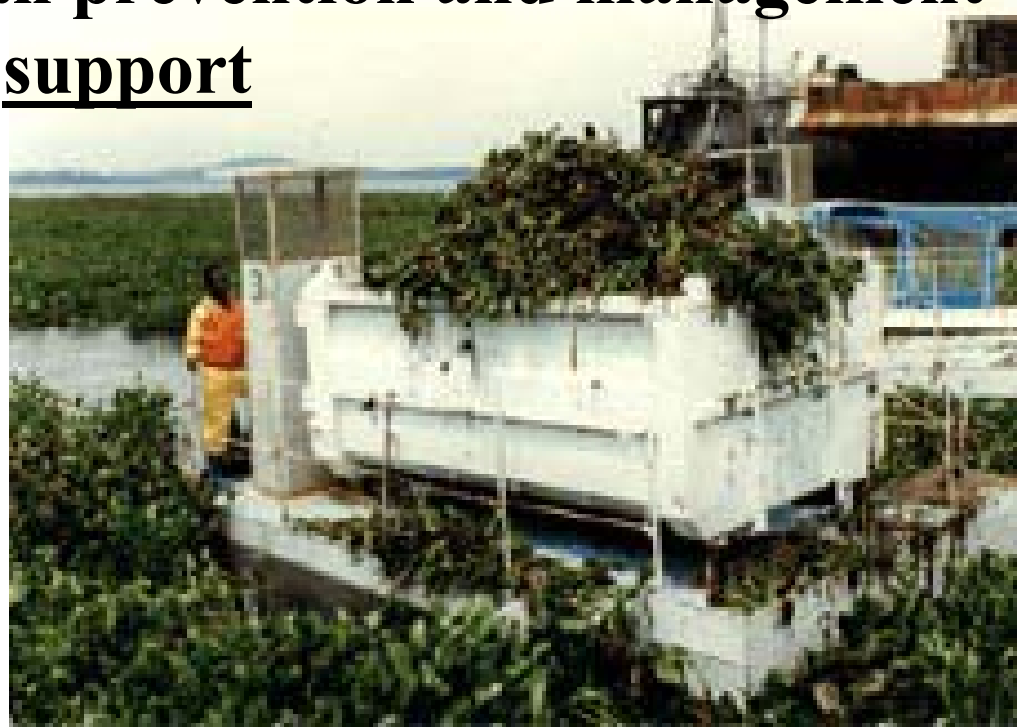
Assisting countries to plan prevention and management strategies and providing support

**Mechanical control?**

**Chemical control?**

**Biocontrol?**

**Integrated control?**





#### **4. Promotion of economic valuation of the impacts of invasive species on people and ecosystems**

**Costs/benefit analyses of various methods of control**

#### **5. Promotion of the idea of ecosystem restoration as an objective for invasive species control**

**Use of the “ecosystem approach” in management strategies**

#### **6. Involving regional and continental organisations to address cross-border spread and management of invasives**

**Emphasising the need for regional action – through, e.g. The African Union, The Sub-Regional Economic Commissions (SADC, ECOWAS, ECCAS, EAC, AMU, etc. + NEPAD and scientific networks – including GISP and the IUCN Invasive Species Specialist Group (ISSG).**

**A few exotic species if managed properly and monitored  
can add to habitat diversity – but is it worth it??**



**Thank you**