



IMVELISI

Developing African Enviropreneurs

Become an enviropreneur in the invasive plant biomass economy

Clearing invasive aliens
strengthens South Africa's
water security...

...but there's also huge
benefit for the economy, and
the wealth of communities,
thanks to the businesses it
stimulates.



forestry, fisheries
& the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA



GreenMatter^{ZA}



Entrepreneurs are people who solve, tackle and turn environmental challenges into business opportunities. **Enviropreneurs** need to deliver environmental and social value, whilst creating a profit.



Opportunities in the Biomass Economy

Invasive plants that could change your life

Now is the time for enviropreneurs to source and harvest the biomass of woody invasive alien trees and start a firewood, furniture, charcoal, timber or compost business.

More than ten million hectares of land in South Africa (which is more than 10% of South Africa's land area) are covered to some degree or another by woody invasive alien plants (IAPs) and they are growing at a rate of between 5 and 10% per annum (Stafford, 2017).

It's estimated that 6% of South Africa's freshwater is taken up by invasive alien plants.

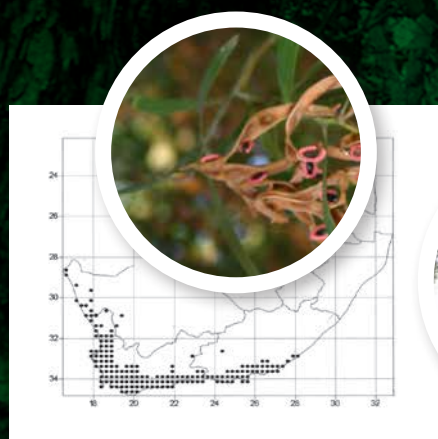
South Africa is spending approximately R1.3 billion a year in public environmental programmes to control invasive alien plants, but these resources, though substantial, are limited in terms of what is needed to solve the challenge.

With leadership and substantial political will, the Department of Environment, Forestry and Fisheries' Working for Water programme is clearing approximately 1% of the total number of IAPs per annum (Stafford, 2017).

To effectively control IAPs, South Africa is calling on groups, teams and networks of entrepreneurs to establish businesses based on harvested invasive biomass. How can you help?

Six of the most high-profile, prolific and damaging invasive woody plants in South Africa are showcased here. Help us to remove them.

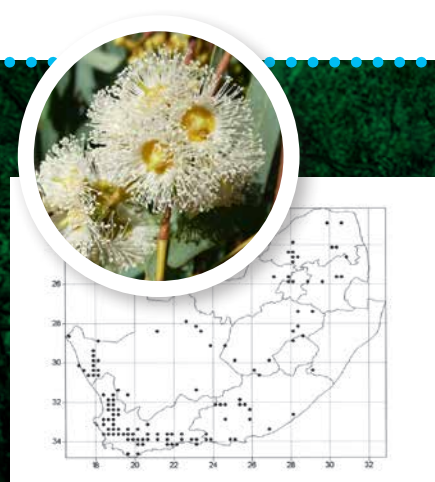
Six of the top 32 listed invasive woody trees



ROOIKRANS



SALIGNA GUM



RED RIVER GUM



Black wattle around George, Western Cape.

Why are Invasive alien plants (IAPs) a problem?

They dry up streams, affect water security, damage the ecological functioning of natural systems and reduce the productivity of land.

They intensify fires and floods, influence soil erosion and threaten the biological diversity of South Africa.

What does the law say?

Invasive species are controlled by the **National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004), Alien and Invasive Species (AIS) Regulations** which became law on 1 October 2014 (updated 18 September 2020).

The **AIS Regulations** list four different categories of invasive species that must be managed, controlled or eradicated. The National List of Invasive Species includes 567 species of which 383 are plants.

The listed invasive woody plant species – that are most important for entrepreneurs – include six invasive gums (*Eucalyptus* spp.),

16 wattles (*Acacia* spp.), white and grey poplar (*Populus* spp.) and eight pines (*Pinus* spp.).

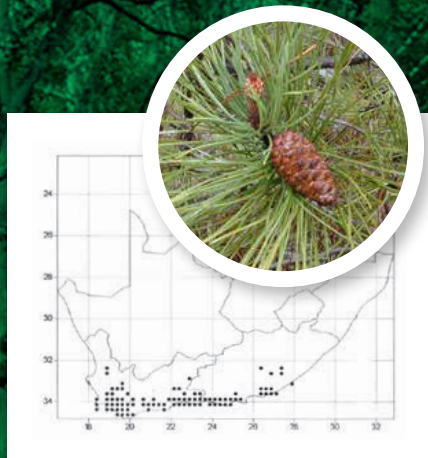
The majority of these 32 species are listed as Category 1a & 1b (which means that they must be removed) or Category 2 invasive species (which means that unless they have a permit to exist, they must be removed).

Gum trees are important to bee-keepers who farm bees for honey production. Only six of 95 gum species are listed as invasive.

Identifying gum trees before harvesting is essential, so that only gums impacting on water resources and biodiversity are removed.



**BLACK
WATTLE**



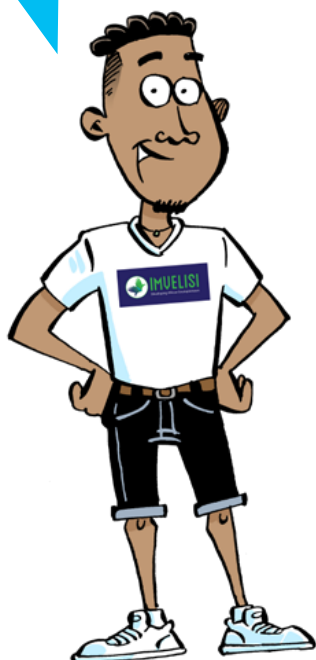
**CLUSTER
PINE**



**RADIATA
PINE**



Enviropreneurs need to link with landowners to gain access to biomass, and need to understand potential markets comprised of private sector players.



Green business value chains

How does an enviropreneur start a business based on harvested invasive biomass?

The Department of Environment, Forestry and Fisheries (DEFF), contracts 3 000–4 000 small, medium and micro enterprises (SMMEs) to undertake invasive clearing.

Clear to Grow, a national initiative funded by DEFF (and with some contribution from the private sector), aims to develop the capacity of 120 micro enterprises to engage with commercially-orientated value chains

associated with invasive alien plant clearing, harvesting and beneficiation activities.

In a Clear to Grow report, author David J. Gardner explains how the initiative aims to reduce invasive alien plant species, boost local economic development, replenish water table levels and grassland environments, create micro industries, and provide entrepreneurial development.

What is the Green Business Value Chain (GBVC)?

The Green Business Value Chain (GBVC) is a Clear to Grow initiative managed by Avocado Vision in partnership with the DEFF, environmental organisations and corporates. The GBVC Programme seeks to create regular, recurrent,

reliable sources of business for SMMEs and their employees by, strengthening their business acumen, expanding the volume of business and widening the opportunities available to them in existing and new local supply chains.

Building a 'business-in-a-box'

What franchise-style structures must a small business in the invasive alien biomass sector adopt?

The business must be close to lots of invasive biomass.



1



2

Team members must be trained and equipped with full personal protective equipment (PPE).

What does the GBVC initiative do in these areas?

- **Locate invasive species:** Map locations where vast forests of IAPs have resulted in rivers drying up, grasslands destroyed, and livelihoods such as cattle farming have been impacted.
- **Training:** Work with local communities to identify, select and train local entrepreneurs to be efficient business owners.
- **Remove invasive biomass:** Ensure the effective removal of invasive alien plant species by the business owners and their trained workers.
- **Create micro industries** to produce value added products from the different IAP biomass – charcoal, timber, furniture, artwork, pulp, paper, firewood, mining and construction poles.
- **Facilitate sales:** Work with local and international business partners to buy, market and distribute products made from invasive biomass.

How do they finance small biomass businesses?

Banks typically don't finance small business start-ups because 94% of them fail after 36 months.

Banks do finance franchises as they have tried and tested processes, recipes and marketing strategies. Lending to a franchise is less risky for banks.

Inhlabathi is developing a franchise-style 'business-in-a-box' recipe for SMME businesses involved in clearing invasive biomass from key water source areas and producing biomass-related products, such as charcoal for local and international markets.

“ Clearing invasive aliens strengthens South Africa's water security, but there's also enormous benefit for the economy, and the livelihoods of the communities, thanks to the businesses it stimulates as a result. ”

Jules Newton, programme director for the GBVC.



Where is the GBVC currently working with SMMEs?

GBVC is currently working with 120 SMMEs in seven selected locations. The aim is to develop opportunities for the effective clearing of invasive species and sustainable value-adding prospects.

- Umzimvubu Catchment (Eastern Cape/ Southern KZN): Matatiele, Cedarberg, Makhoba, Colana and Sibi
- Gauteng: Mogale City, Bronkhorstspuit, Diepsloot, Pretoria, Tembisa, Vosloorus and Roodepoort
- Western Cape: Tulbagh, Franschhoek, Robertson and Paarl
- Free State: Ficksburg, Rosendal, Bethlehem, Clarens, Fouriesburg and Ficksburg
- Eastern Cape: Patensie and St Francis Bay
- North West: Rustenburg

3

Harvesting and manufacturing must comply with **Forest Stewardship Council (FSC)** processes.



4



Supply must be at reliable levels of quality and volume to reassure local and global buyers.



Like a franchise recipe, the 'business in a box' model makes a small business more bankable.



Become a green enviropreneur. Start a firewood business using hardwood invasive species such as **black wattle**, **gum** and **rooikrans**.



Natural indigenous forests are protected by the **National Forest Act, No.84 of 1998**. A license needs to be obtained to cut, disturb, damage or destroy any indigenous tree in a natural forest.

Firewood

Cutting down indigenous trees for firewood will have a devastating effect on ecosystems across South Africa. Now is the time to consider an eco-friendly firewood business that offers hardwood firewood from **invasive gum, black wattle** or **rooikrans**.

Consider these five tips on how to start a firewood business:

Tip 1: Find a big source of invasive biomass

Make sure you have access to lots of invasive gum, black wattle or rooikrans close to your market. Understand that a newly felled log will contain 54% moisture. High value firewood has to have a moisture content of 10–17%. Seasoning wood can take months.

Tip 2: Work smarter, not harder

Selling lots of small bundles yields more profit than a single truckload of uncut wood to one dealer. High value firewood is 28–30cm long and 8–12cm wide to fit into home fireplaces.

Tip 3: Work in a team A firewood business needs negotiators, cutters, splitters, sorters, drivers, storage managers, marketers and sellers.

Tip 4: Become an eco-firewood warrior

Only supply firewood from invasive species. Never move firewood infected with invasive shot hole borer. Market your eco-credentials on social media.

Tip 5: Serve the needs of your customers

Build customer loyalty. Contact customers before cold weather or ahead of holidays. Assist with delivery.

Firewood: the green value chain

1



Find an invasion of black wattle, rooikrans or gum. Negotiate with the landowner to remove the invasive trees.

Cutters need permission from the landowner to cut down invasive trees. Cutters sell the wood in bulk to resellers usually ~10 000 pieces at a time.

2



3



Resellers then sell 1 000 pieces at a time (by a bakkie load) or smaller quantities (bags of 20 pieces) to customers.





Timber value zones

Lowest Value Zone

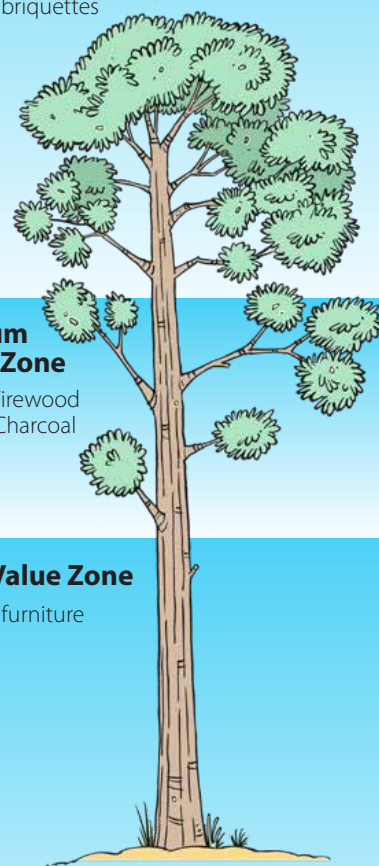
Compost • Kindling
Char for briquettes

Medium Value Zone

Chips • Firewood
Lump • Charcoal

High Value Zone

Logs for furniture



Never cut valuable logs into firewood

The firewood market

A **DEFF report** into the **Gauteng Firewood Market** suggests that:

- 30 000 tonnes of firewood is sold in metropolitan Johannesburg and Tshwane each month.
- 70 000kg of braai wood is sold in Gauteng per day in summer.

These figures double during the winter season and over public holidays.

Invasive gum, wattle and pine firewood is sold in Gauteng. More concerning is that braai wood harvested from over 15 indigenous protected tree species are sold in Gauteng. Uncontrolled harvesting of indigenous, protected species, such as **camel thorn** from the Molopo area of North West, contributes 3 000 tonnes per year to Gauteng says the **DEFF report**.

The Gauteng braai wood market includes compressed, invasive **pine sawdust logs**.

In Cape Town, the indigenous **camel thorn, sickle bush** (sekelbos) and **mopane** firewood all comes from Namibia. Traders

advertising that they only sell invasive **gum, black wattle** and **rooikrans** firewood reflect negative attitudes to firewood sourced from indigenous species.

Invasive **black wattle** is plentiful in KwaZulu-Natal and makes up most of the market in Durban and Pietermaritzburg. Indigenous **mopane, sickle bush** and **camel thorn** firewood is still promoted down the **KZN South Coast**.

Sweet thorn (doringhout) firewood – available from George to East London – is harvested from invasive bush encroachment of indigenous **sweet thorn** in the Northern Cape and North West.

Invasive **karri, black wood** and **black wattle** firewood is sold along the Garden Route. **Oak firewood** sold around George is likely to be infested with **invasive shot hole borer (ISBH)**.

Indigenous **mopane, sickle bush** and **camel thorn** firewood, as well as invasive **rooikrans** firewood is exported to Europe and sold as braai wood in **Britain**.



There is a huge global market for charcoal. As consumers look for 'cleaner' charcoal products, there are enormous opportunities for entrepreneurs to turn invasive alien plant biomass into green charcoal for local and export markets.



Charcoal

Established South African charcoal enterprises have operated for decades. Most have links to the forestry sector. Enviropreneur enterprises that harvest invasive biomass for charcoal are the emerging organisations.

Consider these five tips on how to start a green charcoal business:

Tip #1: Secure a big source of invasive biomass Make sure you have access to lots of invasive biomass. Map your sites. Identify the invasive species. Negotiate with landowners and community leaders. Quantify the biomass. Retailers need a continuous supply.

Tip 2: Understand charcoal production Become an expert. Small-scale artisanal charcoal production techniques use 44 gallon drums as basic retort kilns with charcoal pyrolysis using open fires. Study grassroots training manuals,

charcoal production methods, earth and clay brick kilns, charcoal briquette making, as well as kiln manufacture.

Tip 3: Consider urban opportunities The invasive shot hole borer (ISHB) has decimated Gauteng's urban forests. Dead hardwood trees infected with ISHB could be used for charcoal. Set up a mobile urban kiln business and team up with municipalities, arborists and tree fellers.

Adding value: charcoal



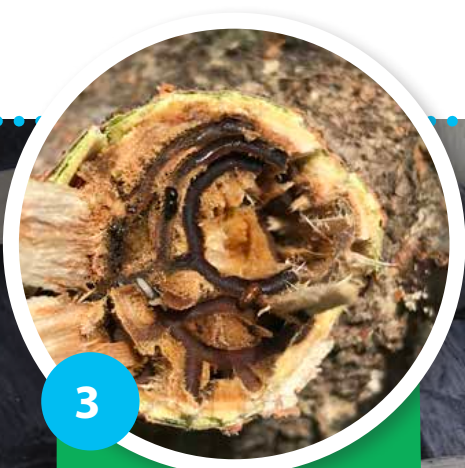
1

Black wattle is the best source of biomass for charcoal making.



2

Briquettes are made from compressed wood char and ash.



3

Urban challenge. Many of the tree species infested with invasive shot hole borer beetle are suitable for charcoal production.

Emerging charcoal markets

Eastern Cape **Clear to Grow** is **Africa's first charcoal project on communal lands**. Situated near Matatiele in the Upper Umzimvubu Catchment, it is a 500 hectare **FSC-accredited CMO Group Scheme**. Two enterprises, **Eco Char** and **KwaBhaca Nature Solutions**, in the pilot project are already producing charcoal from harvested invasive black wattle in the Colana and Sibi traditional authority. Namibian N1 and N3 kiln - licenced designs - are made in the area, produce high quality char and are set to produce marketable vinegar and tars.

Namibia Over 600 Namibian farmers have ventured into charcoal production as a means to combat bush encroachment on their own land. Employing over 5 000 workers, they produce up to 150 000 tonnes of charcoal per annum. One example is **Namchar** who export and sell charcoal to the Western Cape. 115 Namibian producers are affiliated to a **CMO Group Scheme** on 500 000 hectares of **FSC-accredited** woodland bush encroachment. Producers include **Jumbo Charcoal** and **Gideon Kondjeni**. (Source: **Forestry SA**).

Lump charcoal is pure wood. It produces intense heat and can impart flavour to food. Briquettes are made from compressed sawdust and leftover wood. With higher ash content, briquettes burn longer, but not as hot as lump charcoal.



Small charcoal enterprises thrive across Africa. Invasive hardwoods are a superb source of wood for the establishment of local charcoal enterprises.

Tip 4: Work in a team A charcoal business needs project leaders, chainsaw and kiln operators, drivers, storage managers and sales people. To supply chain stores, shisa nyama and restaurants, you may need multiple teams working together.

Tip 5: Support structures are important Successful emerging charcoal producers operate in clusters supported by a CMO Group Scheme with Forest Stewardship Council (FSC) accredited charcoal certification. To access finance, you need a detailed business plan.

For ideation and incubator assistance, look to:

- **Imvelisi Enviropreneurs** in partnership with **Department of Science and Technology (DST)**
- **Avocado Vision's Green Business Value Chain (GBVC)**, in partnership with the **Department of Environment, Forestry and Fisheries (DEFF)** and corporates.
- **Inhlalathi 'business-in-a-box'** plan is to incubate, equip and procure charcoal from over 300 Green Artisanal Charcoal producers across South Africa.



A pilot project on communal lands at Colana, Eastern Cape, is producing charcoal from harvested invasive black wattle in kilns built locally.



A team from KwaBhaca Nature Solutions inspects the first charcoal produced from invasive black wattle in Colana, Eastern Cape.



A study* by David Gardner (Avocado Vision) for DEFF shows that there is a global market for lumber, chips and wood pulp.



* Clear to Grow. Memorandum of investigative progress of potential value chain options for IAPs explored to date by David J Gardner. Fourth Draft Report - Quarter 4 (March 2020) 10th March 2020 (Avocado Vision).

Opportunities in the Biomass Economy

Lumber, chips, pulp and paper

Become a supplier of biomass harvested from invasive alien woody plants, much prized by the huge global pulp and paper sector.

Tip 1: Follow the paper trail Paper production is a two-step process. Woody biomass is converted into pulp and then the pulp is converted into paper. Paper mills require a continuous supply of raw material, comprising 21% logs and chips, 45% sawmill residue, and 34% recycled paper.

Tip 2: Scan the local market SAPPI and The Mondi Group produce wood pulp and paper in South Africa. Mpact is the country's largest recycler of paper, with 70% of the paper recovered being used in the production of carton board and containerboard.

Tip 3: Study export markets Natal Cooperative Timbers (NCT) and

Africa Biomass Company export out of Richards Bay and Durban harbours. Japan and China buy black wattle logs (50mm to 500mm) and debarked logs for their wood pulp mills.

Tip 4: Understand profit margins High transport costs can wipe out profits. NCT purchases mixed-species chips at a lower price - per ton - than single species black wattle wood chips. Black and silver wattle - 300mm chips - are highly prized.

Tip 5: Link biomass to customers Secure a large supply of invasive alien biomass. A large network of chainsaw operators, sorters, drivers, administrators and sellers are needed to get product to market.

Adding value: lumber, chips, pulp and paper

1



HARVESTING

TRANSPORT

2



3



CHIPPING

Mixed species chipping receives a lower price from paper mills than chips from a single tree species.

Erosion control sausages made from shredded invasive grey poplar are used to stabilise erosion on slopes after fires.



Restoration products: blankets and sausages

Biomass from the invasive grey poplar tree is being used to create wood-wool, soil blankets, and erosion control 'sausages'. Aspen Wood Fiber, funded by the DEFF and in association with LEAD Associates, produces the only restoration materials made exclusively from invasive alien biomass in South Africa.

The company uses primarily invasive poplar from riparian zones and on river banks where it consumes vast amounts of water. Over 170 000 hectares of

riparian zones in the most arid parts of South Africa are invaded by poplar which needs to be removed by law.

Sausages and blankets are used by disaster management after fires and floods to stabilise slopes and prevent mud slides.

They are also used by environmental agencies and mines to combat significant land degradation through landscape and resource exploitation. Mines or quarries that close have to rehabilitate the land by law.

Erosion control sausages proved to be vital in stabilising steep slopes around Knysna after devastating fires burnt away thousands of hectares of forest in the southern Cape in June 2017.



4

SAWDUST

Supply paper mills with sawdust – a vital ingredient for making paper.

RECYCLED PAPER

Supply paper mills with recycled paper – a vital ingredient for making paper.



5



6

EXPORT



There is a shortage of six million school desks in the South African educational system. To make a school desk, planks go through numerous machining phases – a laminating wheel, thicknessers, cross cuts and rip saws, sanding, finishing and spraying.



Furniture

Enviropreneurs are encouraged to investigate the use of invasive trees to either start a furniture business or revive an ailing one.

South Africa's Eco-Furniture Programme, funded by the DEFF and managed by SANParks has piloted the use of invasive species (pine and gum) in a host of furniture factory facilities. Eco-Furniture factories use felled invasive wood from government-sponsored, Working for Water, clearance teams. Over the past decade, rural schools have been the beneficiaries of thousands of school desks from the programme. Five tips for furniture enviropreneurs:

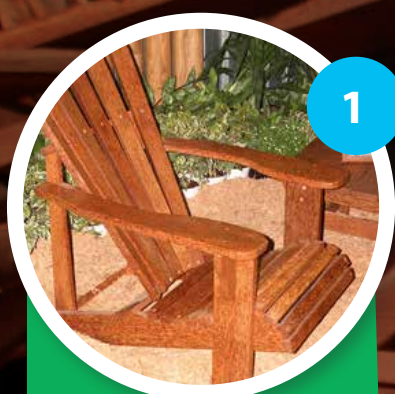
Tip 1: Gather talent Furniture production requires people with exceptional woodworking and carpentry skills which are honed over a lifetime. Gather and nurture them.

Tip 2: Watch the leaders Established in 2010, Cape Town's Eco-Furniture Design have always used invasive gum and blackwood in their furniture. Based in KwaZulu-Natal, Homewood have successfully embraced the use of invasive poplar in their eco-range of handcrafted, custom wood furniture.

Tip 3: Know your invasives Invasive **blackwood** is highly valued, but needs skill when working with glues. The reddish brown heartwood of **red river gum** makes it ideal for decorative furniture.

Tip 4: Build a network A network of skilled enviropreneurs and furniture craftsmen is essential. The team needs to source invasive wood, cut it to specifications, transport it to a furniture factory, design a furniture range, then make, market and sell it.

Adding value: eco-furniture & decor



1

**OUTDOOR
FURNITURE**

**INSECT
HOTELS**



2



3

**SCHOOL
DESKS**

Wood for furniture needs to be felled by chainsaws, undergo canting and planking in a wet mill and drying in solar kilns in a dry mill.



Tip 5: Get certified Plan to export? Organisations such as the Sustainable Furnishings Council encourage consumers to only buy sustainable furniture. Forest Stewardship Council (FSC) certification will raise a furniture company's credibility across the supply chain.



Opportunities in the market

- **Garden centres:** The gardening industry is booming. Garden centres need a continuous supply of insect hotels, owl and bat boxes, bird feeders, timber stakes, decking, planters, benches, archways and wattle screens.
- **Restaurants:** Nando's are committed to sourcing eco-furniture locally. Working with a host of partners, **Homewood** designed a range of colourful, trendy sustainable furniture for a pilot project at a **Nando's** casa in Benoni. Made from invasive grey poplar – aka cottonwood – the wood is sourced from Working for Water clearing projects around Bethlehem and Clarens in the Free State.
- **Game lodges:** Sustainability-conscious eco-tourists appreciate décor made from invasive woody species. Strive for a rustic ambiance with screens, fencing, furniture, shelving, basket ware, toilet roll covers, mirrors and lamp shades designed with invasive poplar or wattle.

4

RESTAURANT FURNITURE

GAME LODGE DECOR

5

6

TIMBER DECKS



Making fungal-dominated compost in heaps takes six months from start to finish. It takes only two months to make bacterial-dominated compost in windrows using a compost turner.

Compost and mulch chips

“There are opportunities for enviropreneurs in geographically niche markets”, says David J Gardner.

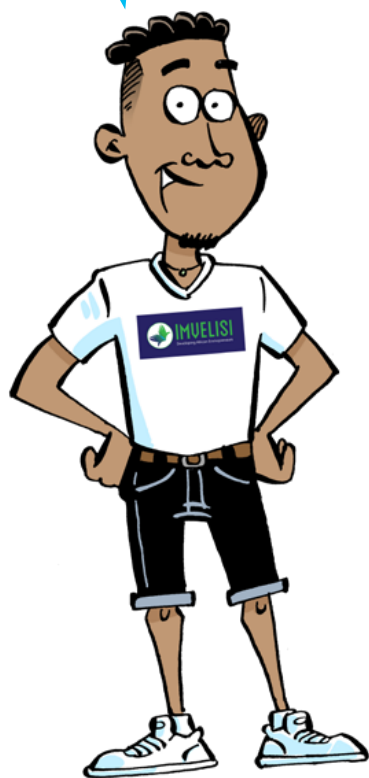
Significant commercial operations exist in this sector. Most convert IAP biomass (wattle, poplar, gum and pine) into soil additives (compost, mulch, bark chips, soil mediums) for landscapers, gardeners, golf courses and municipal parks departments across South Africa. Five tips for enviropreneurs entering the compost sector:

Tip 1: Find biomass Quantify and secure the supply of biomass before you start. Your business must have a continuous and negotiated supply of biomass from suburban garden waste sites, invasive species clearing operations, mushroom growers, tree fellers or forestry agribusiness.

Tip 2: Calculate transport costs Moving compost is a big expense in this value chain. Compost suppliers to garden centres understand trucking logistics, transport costs,

use forklifts and have vehicles fitted with pallet jacks.

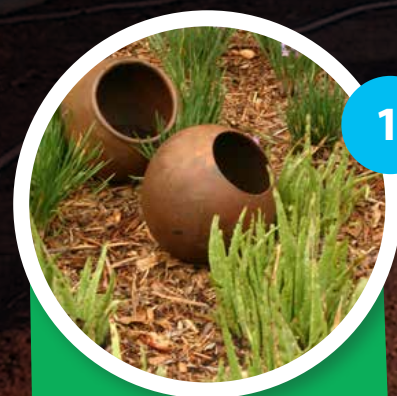
Tip 3: Understand the science Poisonous potting soil that kills thousands of plants in a wholesale growing nursery - because of high acid levels - is a well-documented disaster. Pine bark needs to be composted for six months in piles that heat to 70°C before it loses its acidity. Compost making is a well-established horticultural science.



Adding value: the compost market



Proximity to a constant source of biomass determines the location of most compost manufacturers. Forestry and municipal garden waste drop-off centres have shown to supply the necessary, regular quantity.



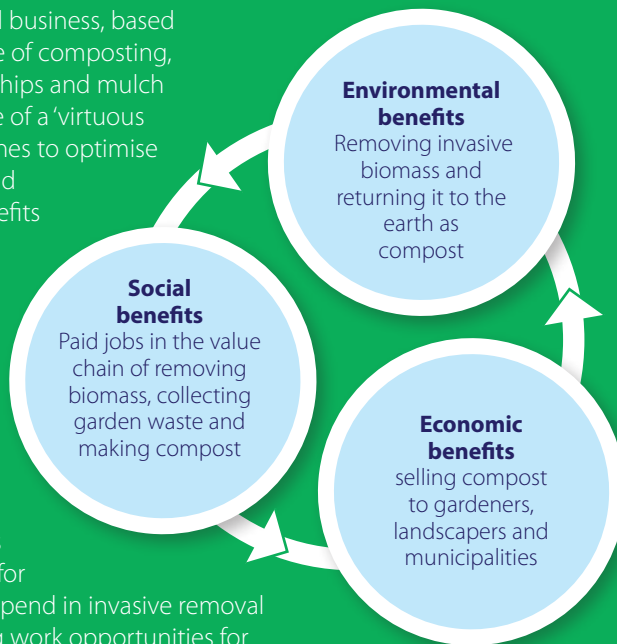
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GARDEN CENTRES

Composting and the virtuous cycle

An enviropreneurial business, based on the manufacture of composting, soil medium, bark chips and mulch is a superb example of a 'virtuous cycle' which combines to optimise economic, social and environmental benefits for society. This virtuous cycle in this green business value chain offers:

"The virtuous cycle is unlocked as increased demand for biomass increases spend in invasive removal activities, increasing work opportunities for SMMEs while at the same time positively impacting water security", says David Gardner.



Some cities in South Africa operate sites where residents can dispose of garden biomass waste, which is then transferred to a city composting site. There are opportunities for enviropreneurs to work with smaller municipalities who do not yet have this infrastructure in place.



Tip 4: Assemble a team Four decades ago, three brothers – a mechanic, an accountant and a horticulturist – established a small composting company on the West Rand. With diverse skills and teamwork, this family now manages the largest compost company in Gauteng and delivers compost nationwide.

Tip 5: Operate legally Compost can *only* be sold legally, if registered with the Department of Agriculture. Compost has a legal definition: It must be fine enough to pass through a 12mm sieve; must not exceed more than 670g/kg of ash; must not have a moisture content that exceeds 400g/kg; and 80% of seeds grown in it, must germinate.



2

GOLF COURSES

LANDSCAPERS



3



4

MUNICIPALITIES





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Become an enviropreneur in the invasive plant biomass economy

For information about regulations that are important to know, visit these websites and search your topic of interest:

- Department of Agriculture, Land Reform and Rural Development
- Department of Environment, Forestry and Fisheries (DEFF)
- Department of Science and Innovation (DSI)
- Department of Water and Sanitation (DWS)
- Eco-Furniture Programme
- Forestry and Agricultural Biotechnology Institute (FABI)
- Forestry in South Africa
- Forestry South Africa (FSA)
- GreenMatter
- Imvelisi Enviropreneurs
- Indalo Inclusive South Africa NPC
- Inhlabathi Investments
- Invasive Shot Hole Borer - FABI
- Invasive Species South Africa (ISSA)
- LEAD Associates
- Mondi
- MPact
- SAFCOL
- SAPPI
- South African Green Industries Council (SAGIC)
- South African Landscapers Institute (SALI)
- South African National Biodiversity Institute (SANBI)
- South African National Parks (SANParks)
- South African Nursery Association (SANA)
- Turf Grass Managers Association of South Africa (TGMA)
- Vuthisa Charcoal
- Water Research Commission (WRC)
- Working for Water
- Young Water Professionals in South Africa (YWP-ZA)
- WWF-South Africa

For ideation and incubator assistance, look to:

- Imvelisi Enviropreneurs
- Avocado Vision Green Business Value Chain (GBVC)
- Indalo Inclusive South Africa NPC
- Inhlabathi 'Business in a box' Programme

Imvelisi Imvelisi is a programme designed to support and guide aspiring young environmental entrepreneurs through activities that take them through the ideation phase of business development. Thus preparing them for pitches, business incubation, early stage investors and potentially startup. They are given practical steps to implement in order to take their idea into a potentially successful business.

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