IMVELISI

Developing African Enviropreneurs

Potential Market Opportunities for Entrepreneurs in the Water & Biodiversity Sector

Summary market intelligence report

This document has been developed by **GreenCape** for the purposes of providing background information to applicants interested in the **Imvelisi Ideation Programme**.

Forestry, Fisheries & Environment

Science & Innovation

2030 NDP

GreenMatter

WISA Water Institute of Southern Africa

YOUNG WATER PROFESSIONALS EMPOWERMENT PLATFORM

WATER RESEARCH COMMISSION

YWP YOUNG WATER PROFESSIONALS

IWA the international water association

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Introduction

The Green Economy is young of age, but growth is incredibly vital to fast-track Sustainable Development Goals (SDGs) and the National Development Plan (NDP) targets. The green economy is an economy that aims at promoting sustainable development, improved human well-being and socioeconomic conditions while significantly reducing environmental risks and ecological scarcities in a low carbon, resource efficient and socially inclusive manner.

Entrepreneurs are key players in growing the green economy and improving the socioeconomic conditions of the citizens. Moreover, the NDP places the onus on small, medium and micro enterprises (SMMEs) to create 90% of new jobs, with the ultimate goal being the reduction of unemployment to 6% by 2030.

The GreenCape water and sustainable agriculture programme was appointed to identify key business opportunities in the green economy that can be explored, developed and exploited by entrepreneurs. The markets presented are non-exhaustive but only highlight business opportunities mainly in the water and agriculture sector. The report aims to save entrepreneurs time in researching business opportunities and ultimately cut down on the cost of market entry. Many entrepreneurs invest a significant amount of time and money to determine the market potential for their product/service(s). Nonetheless, it is upon enviropreneurs to research the identified business opportunities in depth.

Imvelisi programme is designed to provide support and guidance to aspiring young entrepreneurs in the green economy in developing their entrepreneurship skills and business ideas. The gained market intelligence will guide the applicants to well researched business opportunities that can be further explored through the Imvelisi ideation programme. (Note that there are opportunities beyond those listed in this document such as in the waste, renewable energy, electric vehicles, skills and etc. If an idea is not aligned to a specific category listed in this report, please do not be discouraged as the programme is open to consider all solutions that have potential within the green economy). A total of 39 green business opportunities have been earmarked and are categorised under 11 different markets, namely:

- **Market A:** Smart technology and monitoring
- **Market B:** Resource recovery
- **Market C:** Water harvesting
- **Market D:** Small-scale decentralised water treatment
- **Market E:** Water use efficiency
- **Market F:** Energy services specific to the water sector
- **Market G:** Water sensitive design
- **Market H:** Invasive alien vegetation
- **Market I:** Bioprospecting
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For further resources and more information on the green economy business opportunities, please refer to the **GreenCape's Market Intelligence Reports**, and **industry brief on entering the South African public water sector market**, **IFC Green Buildings Report**, and **bioprospecting industries in South Africa**.

How business opportunities are described in this document

Business opportunity	Name of the business opportunity
Drivers and Barriers	Potential drivers and barriers are discussed in relation to the business opportunity
Market	Broader category of the business opportunity
Description	Outline of the business opportunity, model or technology
Client typology	Target clients for the first products or services, especially the beachhead or market entry clients (primary clients)
Skills requirements	Technical requirement that the business typically requires for success (can be outsourced or recruited onto a team); Low = Basic Education; Medium = Certificate/Diploma/Bachelor's Degree; High = Post-graduate Diploma/Degree and/or industry experience
Start-up capital	Start-up capital required. Low = <R100k; Medium = R100k-R1m; High = >R1m
Market readiness	Stage of development of the technology and market demand; Low = recently commercialised; Medium = gaining traction; High = standard technology and readily adopted

Market A: Smart technology and monitoring

Water use audits and smart technologies play an important role in the effective and efficient management, distribution and use of water resources. Measuring, monitoring, metering and controlling water infrastructure can be done with great precision using these technologies. Included in a number of these opportunities is the emerging field of big data and analytics, as water management starts to integrate a variety of data sources and intelligence.

Drivers

- The increasing water scarcity and drought events cause concern for rising costs and uncertainty in reliability of water supply
- Potential savings (due to reduced water loss and wastage, inaccurate metering and billing, etc.) outweigh the costs as demonstrated by short payback period
- Increasing water and sanitation tariffs
- Regulations and by-laws are increasingly requiring sub-metering per household and business, rather than per parcel of land.

Barriers

- Lack of capital investment and awareness of short payback periods by decision makers
- A lack of locally verified or demonstrated technologies, which raises concerns about seamless integration with existing systems
- Poor business case in municipalities with very low water and sanitation tariffs
- A lack of municipal technical capacity for procuring smart technologies that integrate with existing data software and add data analysis value for decision making.
- Recommended procurement methods can have complex contracting and financing models (e.g. performance based).

Business opportunity A1: Smart home water metering, data logging and data analytics

Market	Smart technology and monitoring
Description	The monitoring of water consumption using standard meters and phone applications, or sub meters and smart meters, the Internet of Things (IoT) and telemetry systems with data logging and analytics. This allows consumers greater access to consumption data and analytics, and can inform decision making.
Client typology	Households, body corporates, residential estates, holiday/rental owners, farms, property developers, municipalities
Skills requirements	M
Start-up capital	L-M
Market readiness	M

Business opportunity A2: Smart water metering, data logging and data analytics for commercial and industrial buildings

Market	Smart technology and monitoring
Description	The monitoring of water consumption in commercial and industrial buildings using standard meters and web-based tools, or sub-meters and smart meters, the Internet of Things (IoT) and telemetry systems with data logging and analytics. This allows managers greater access to consumption data and analytics, and can inform decision making.
Client typology	Industrial water managers, water efficiency consultants
Skills requirements	M
Start-up capital	L-M
Market readiness	H

Business opportunity A3: Leakage detection and consumption control

Market	Smart technology and monitoring
Description	Systems and technologies that detect certain water use behaviour or patterns and either regulate or eliminate flow if there is a leak or excessive consumption. Often a component of smart metering but also increased demand for unique standalone solutions. An example would be the remote tripping of a valve if a leakage is detected.
Client typology	Households, body corporates, residential estates, holiday/rental owners, farms, property developers, industrial water managers, water efficiency consultants
Skills requirements	L-M
Start-up capital	L-M
Market readiness	M-H

Business opportunity A4: Non revenue water - bulk water metering, leak detection and repair

Market	Smart technology and monitoring
Description	Various business models, technology typologies and solution scales to monitor bulk infrastructure or distributed systems (e.g. utilities). Pipe repair or replacement services (traditional or novel) and products are often incorporated as value-adds or additional offerings but can also be delivered separately.
Client typology	Government (municipal utilities, national infrastructure managers), irrigation schemes, farmers
Skills requirements	M-H
Start-up capital	M
Market readiness	M-H

Business opportunity A5: Smart irrigation monitoring and management systems

Market	Smart technology and monitoring
Description	Precision agriculture approaches (using imagery, remote sensing, and drones in situ monitoring) have developed in technologies and demand in recent years. The improved understanding and management of irrigation also leads to opportunities for water distribution and application (pumps, pipes, sprinklers, etc.) enhancements.
Client typology	Commercial farmers, irrigation schemes
Skills requirements	M-H
Start-up capital	M-H
Market readiness	M-H

Business opportunity A6: Water quality monitoring and sampling equipment

Market	Smart technology and monitoring
Description	Low to high technology products, services and applications for water quality monitoring and auto sampling are experiencing increased demand. These are for a variety of applications such as auto sampling and inline monitoring of water and effluents in industries, municipal treatment works and farms.
Client typology	Households, farmers, industrial water managers, mine water managers, government regulators (municipal utility wastewater departments or environmental/pollution control), NGOs
Skills requirements	M-H
Start-up capital	M-H
Market readiness	M

Market B: Resource recovery

There are several resources that can be recovered and converted to marketable products from either municipal sludge or industrial wastewater. Business models and technological complexities vary depending on the resource and target market.

Drivers

- Increasing transportation and disposal costs, as well as the rising price of importing fertiliser
- Environmental regulations are phasing in an organic waste to landfill restriction ban and an existing liquid waste to landfill ban
- Preventing climate change and targeting Sustainable Development Goals (SDG) for Affordable and Clean Energy (SDG 7), Sustainable Cities and Communities (SDG 11), and Responsible Consumption and Production (SDG 12).

Barriers

- The current state of policies and regulations are strict and lengthy processes are required to implement resource recovery projects, especially due to the classification of wastewater sludge as a hazardous waste
- Lack of capital or financing mechanisms due to uncertainty in the market of innovative products
- Lack of locally verified technologies
- Public and industry perception (yuck factor) of the reuse of resources from wastewater
- An ill developed value as evidenced by infrastructure gaps between producers and beneficiaters (potential market opportunity) prevents the beneficiation project from proceeding (e.g. sludge dewatering plants, urine separation toilets and collection system required for urea production).

Business opportunity B1: Biogas production from domestic and industrial wastewater or sludge and other organic solid wastes

Market	Resource recovery
Description	Biogas, a mixture of different gases with value as a fuel source, can be produced by the breakdown of organic matter in the absence of oxygen. Domestic and industrial wastewater or sludge and other organic solid waste contain biodegradable matter that can be anaerobically degraded to produce biogas under the right conditions. The digested cake can also be used for agricultural purposes (see opportunity 10)
Client typology	Households (especially rural or peri-urban), industrial water/waste managers with high organic discharges, municipal wastewater treatment managers, schools and universities, new or existing commercial /industrial /residential complexes
Skills requirements	L-H
Start-up capital	M-H
Market readiness	M-H

Business opportunity B2: Metal or mineral recovery from inorganic sludge and mining wastewater

Market	Resource recovery
Description	Mining or metal processing wastewater can contain a significant amount of dissolved metals which can be recovered and processed further. Opportunities therefore exist where valuable metals can be beneficiated and sold to the metal industry.
Client typology	Mining companies, metal or minerals processing companies
Skills requirements	H
Start-up capital	H
Market readiness	L-M

Business opportunity B3: Compost production from food and beverage wastewater, sludge and solid waste

Market	Resource recovery
Description	The organic components of the solid waste from the agriculture and agriprocessing sector, and wastewater/sludges from these industries and municipalities can be utilized for compost production. The opportunity is predominantly in the fruit and vegetable market, food and beverage sector (particularly kitchen waste from households, and restaurants), Due to the high agricultural activity in South Africa, compost production is a lucrative space to be in.
Client typology	Farmers, NGOs, food and beverage manufacturers
Skills requirements	L-M
Start-up capital	L-H
Market readiness	H

Business opportunity B4: Phosphorus (fertiliser) production from municipal sludge

Market	Resource recovery
Description	Using a series of steps, phosphorus, the main component in most fertilisers, can be recovered from municipal sludge. This is an area that is still new and being explored by academia locally but is in production in international markets and shows huge promise due to the decline of exploitable phosphorus resources and dependence on imported fertilisers.
Client typology	Municipal wastewater managers, sanitation technology manufacturers
Skills requirements	H
Start-up capital	H
Market readiness	L

Business opportunity B5: Urea (fertiliser) production from source separated urine

Market	Resource recovery
Description	Using a series of steps, urea, a crystalline solid or liquid rich in nitrogen and used as an animal feed additive and in fertilisers, can be recovered from urine. This is an area that is still new and being explored by academia locally but is in production in international markets and shows huge promise due to the rising cost of importing fertiliser.
Client typology	Municipal wastewater managers, sanitation technology manufacturers, new or existing commercial/industrial/residential complexes
Skills requirements	H
Start-up capital	H
Market readiness	L

Market C: Alternative water

With many municipalities starting to feel the strain on supplying potable water and hence implementing restrictions, many households and businesses are looking towards alternative water sources which involve some form of water harvesting. It should be noted that the usefulness / viability / feasibility or water harvesting / storage solutions can be enhanced considerably by combining more than one source of alternative water (e.g. rainwater + greywater etc). For alternative water treatment business opportunities, see market D.

Drivers

- Increased climate variability and recurrent droughts (unpredictable rainfall patterns) throughout South Africa have led to the increase in demand for on-site water storage to augment and diversify water supply
- Water security and the risks of interrupted municipal water supply are key drivers for implementing water harvesting solutions
- Increases in municipal water and sanitation tariffs
- Water harvesting is considered an efficient solution to increase the level of supply and access particularly rain water in rural communities without ready supply of drinking water
- A number of green building regulations/by-laws compulsorily require the installation of rainwater harvesting for new buildings of a certain roof size or installation of other alternative water sources

Barriers

- High initial cost of rainwater harvesting systems
- Poor business case for rainwater harvesting systems due to seasonal and uncertain rainfall patterns. Additionally, municipal water is often a cheaper option where its readily available
- Community expectations in South Africa for reticulated water systems and decentralised systems such as rainwater harvesting are sometimes perceived as 'inferior' or 'temporary service provision'
- Any intention to use the alternative water for potable uses by businesses requires them to pay for registration as water service intermediaries. The registration requires constant monitoring of the water quality and adds to the costs of producing drinking water.

Business opportunity C1: Rain water harvesting in residential, commercial and industrial properties

Market	Alternative water
Description	The construction/design/distribution of simple systems (which can comprise of tanks, pipes and basic filtration units) that effectively collect and store alternative water. This type of technology is relevant to South Africa due to long stretches of very little or no rainfall; especially when coupled with an additional water source such as groundwater or greywater treatment.
Client typology	Households, body corporates, residential estates, holiday/rental owners, property developers, green building consultants, architects, schools and universities
Skills requirements	L-M
Start-up capital	L
Market readiness	H

Business opportunity C2: Home, estate or commercial property groundwater development

Market	Alternative water
Description	The construction/design/distribution of systems or technologies for drilling boreholes/wells and efficient pumps that promote groundwater use.
Client typology	Households, body corporates, residential estates, holiday/rental owners, property developers, farmers, green building consultants, architects
Skills requirements	M
Start-up capital	M-H
Market readiness	H

Business opportunity C3: Storm water harvesting

Market	Alternative water
Description	The collection, accumulation, and storing of storm water. Storm water differs from rainwater harvesting in that the runoff is collected from drains, flat surface (e.g. roads, parking lots) or creeks, rather than roofs and that it is often in larger volumes.
Client typology	Body corporates, residential estates, property developers, municipal town planners, green building consultants, architects, municipalities
Skills requirements	M
Start-up capital	M-H
Market readiness	M

Market D: Small-scale, decentralised water treatment

Decentralised water treatment technologies are developing rapidly, while increased competition and demand are providing more solutions that make business sense. There are opportunities for the manufacture, assembly and supply of treatment and reuse components and systems; and in services and products related to industrial symbiosis.

Drivers

- Water security and the risks of interrupted municipal water supply are key drivers for onsite solutions
- Increasingly stringent industrial effluent regulations, drive the demand for onsite treatment solutions that ensure any wastewater discharged from the site is compliant. Depending on where the effluent is discharged to, municipal wastewater by-laws and/or national effluent discharge standards may apply
- A number of green building regulations/by-laws promote the installation of alternative water systems for new buildings and this requires their treatment before use

Barriers

- There are a large number of competitors in this market, so having a unique selling point is critical
- There is often a poor business case for onsite potable water reuse especially where municipal potable water is readily available (which is often cheap and easy to access). Where potable water is not available, or where there are high risks of supply shortages, onsite water treatment becomes more attractive. Similarly, there is often a better business case for onsite water treatment and reuse when it is incorporated into the design phase of the building/facility.
- Depending on the level and type of treatment, a saline brine waste stream may remain after the recovery of water. This presents a challenge for many companies, as most municipalities do not permit the direct discharge of brine into sewerage lines. Companies may then need to incur additional costs to further concentrate the waste stream (e.g. using eutectic freeze technology or evaporative processes), rendering the projects unfeasible in many cases. This also presents a business opportunity for economical brine management solutions.

Business opportunity D1: Small scale, on site, advanced industrial water treatment

Market	Small-scale, decentralised water treatment
Description	The treatment/purification of industrial effluent to comply with municipal standards for effluent discharge or for reuse. Technologies vary from a series of simple filtration units to more complex reactor and separation processes.
Client typology	Industrial water managers
Skills requirements	M-H
Start-up capital	M-H
Market readiness	M

Business opportunity D2: Compact rural water treatment technologies

Market	Small-scale, decentralised water treatment
Description	Treatment/purification packages for upgrading river water or groundwater to potable water. Since the products/technologies are mainly applicable to rural communities, the technologies are often very simple and inexpensive to manufacture.
Client typology	Households, body corporates, residential estates, holiday/rental owners, property developers, farmers, green building consultants, architects
Skills requirements	L-H
Start-up capital	M
Market readiness	M

Business opportunity D3: Greywater collection and recycling systems

Market	Small-scale, decentralised water treatment
Description	The setup and design of systems that enable the reuse of greywater (wastewater from baths, sinks, washing machines, and other kitchen appliances) in households, laundries, restaurants and hotels. Most systems treat the greywater so that it can be reused for non-potable purposes such as irrigation or sanitation. For new developments, there is also an opportunity to design buildings with dual-reticulation to allow for the reuse of greywater for toilet flushing.
Client typology	Mid to high income households, body corporates, residential estates, holiday/rental owners, property developers, commercial businesses
Skills requirements	L-M
Start-up capital	M
Market readiness	M

Business opportunity D4: Compact decentralised sewage treatment and reuse

Market	Small-scale, decentralised water treatment
Description	The treatment/purification of sewage for non-potable reuse by using compact, relatively small package plants that require less capital investment than traditional wastewater treatment plants. This is applicable to new developments or remote areas that do not have access to municipal sewerage system. For new developments, the building reticulation can be designed to allow for the reuse of the treated wastewater for toilet flushing and/or irrigation.
Client typology	Households, body corporates, residential estates, holiday/rental owners, property developers, farmers, holiday resorts, camps
Skills requirements	M-H
Start-up capital	M
Market readiness	M

Business opportunity D5: Decentralised potable water consumer goods

Market	Small-scale, decentralised water treatment
Description	The treatment, bottling and packaging of water to potable (drinking water) standards using various technologies. Some of the technologies include filtration, distillation, ion exchange, mineralisation and atmospheric water generation.
Client typology	General public, body corporates, holiday resorts, NGOs, rural municipalities
Skills requirements	M
Start-up capital	H
Market readiness	H

Market E: Water use efficiency

The growing water scarcity is a key driver for investment in water efficiency interventions due to severe drought conditions and expected longer-term water constraints in the region. Despite South Africa being a water-scarce country, the national average consumption is around 233 litres/capita/day (l/c/d) compared to the international benchmark of 173 l/c/d. The agriculture and the agriprocessing sector are significant water users, and potential markets for technologies that promote water efficiency. Therefore, the market varies from small households to larger corporations and municipalities.

Drivers

- Water scarcity, recurrent droughts and possibility of interrupted municipal water supply that poses risks to business sustainability
- Constrained water sources and poor raw water quality
- Water and sanitation master plan that aims at reducing water consumption particularly in intensive water sectors such as agriculture and agriprocessing.
- Some businesses through corporate social responsibility have committed to achieving water targets
- Increasing water & sanitation tariffs
- Good business case (easy to install, low-cost, and short payback periods) particularly in municipalities with high water and sanitation tariffs
- A number of green building regulations/by-laws require the incorporation of water use efficiency and water efficient technologies in new buildings.

Barriers

- Access to information on best practice and locally validated technologies
- The tenant/landlord relationship presents a barrier to implementing water technologies in rental properties
- A number of businesses have implemented water use efficiency projects particularly during the drought
- Budget constraints and access to capital
- Fear of jeopardising product quality

Business opportunity E1: Efficient water and technologies/processes and sanitation devices

Market	Water use efficiency
Description	Products or technologies that promote efficient water consumption by exploiting or redesigning water and sanitation points of use such as taps, low volume shower heads, fittings, urinals, low flush toilets, sensor taps and etc. There is also an increasing demand for water efficient process units and household appliances (such as washing machines and dishwashers) as process engineers and consumers are becoming more water conscious.
Client typology	Households, commercial and industrial businesses, body corporates, residential estates, property developers, green building consultants, architects, shopping malls, conference venues
Skills requirements	L-H
Start-up capital	L-H
Market readiness	H

Business opportunity E2: Evaporation control systems

Market	Water use efficiency
Description	The control of evaporation from water reservoirs by incorporating barriers (floating balls, covers) and chemicals that reduce evaporation rates. Additionally, cooling towers and industrial evaporators use and lose enormous amounts of water as vapour. This water can be harvested for reuse. These products are particularly relevant for water scarce regions that have little to no rainfall in some seasons.
Client typology	Farmers, municipalities, national government, Industrial businesses
Skills requirements	L-M
Start-up capital	L-M
Market readiness	L

Business opportunity E3: Controlled environment agriculture

Market	Water use efficiency
Description	Achieving a constant/controlled temperature, light, nutrient concentration and/or humidity in agriculture which in turn promotes water use efficiency, reduction in pesticide and fertiliser use without jeopardizing the plant produce. The technology complexity varies from case to case depending on the precision required. Sophistication spectrum exists from shade cloth to hydroponics. The controllable variables for plants may include:
Client typology	Farmers, horticulture specialists, retailers, NGOs
Skills requirements	M-H
Start-up capital	M
Market readiness	M

Market F: Energy services specific to the water sector

Water and energy are closely linked and their interdependencies are strong. Water is needed to generate energy with different uses along the energy value chain, while energy is needed to convey or treat water across the water value chain. The water-energy nexus has started to attract greater attention, primarily due to increased energy and water scarcity along with the recognition of their interdependence. Refer to Water 2020 MIR for energy efficiency opportunities at municipal infrastructure.

Drivers

- South Africa is currently facing an energy crisis due to deteriorating power generation infrastructure. Considering the lack of energy generation capacity and the urban energy demand it is imperative that operational cost savings within the water sector be optimised and that alternative, localised energy sources are explored
- South African energy prices have increased and are expected to continue increasing in the coming years. Energy efficiency offers an important opportunity to achieve long-term environmental and fiscal sustainability
- Water transfer (water pumping and distribution systems), water treatment, wastewater transfer (pumping) and wastewater treatment infrastructure are major consumers of energy leading to high energy bills, particularly within municipal reticulation
- Municipal services, including water and wastewater services, are legally mandated to operate on a cost-recovery basis. Establishing a baseline for energy costs, given that it is one of the largest cost components in delivering the service, is good management practice and provides a strong basis from which to calculate and further motivate the financial opportunities that energy efficiency measures provide
- Energy efficiency and reporting requirements form part of the new Green Drop reporting requirements
- Increased efficiency in operating existing infrastructure have been shown to have short return on investment and can defer costlier larger scale infrastructure upgrades / expansions.

Barriers

- Lack of technical capacity to implement energy efficiency projects is still a constraint
- Access and availability of finance to implement energy efficiency projects. Few businesses and municipalities have ready budgets to invest in detailed audits, energy optimisation studies and energy efficient equipment of wastewater treatment works. Very few municipalities have sufficient high credit ratings to obtain commercial financing to undertake energy projects
- Lack of access to information about energy efficiency opportunities, and their cost benefits
- Lack of technical skills and those required to source financing and engaging contractors to undertake interventions
- Water and wastewater treatment tariffs are often not fully cost-reflective and municipalities struggle to cover maintenance and infrastructure renewal.

Business opportunity F1: Hydro power generation

Market	Energy services specific to the water sector
Description	The use of very small or large turbines to harvest excess energy in water distribution systems or streams. These typically power pumps or charge batteries, but can also be used to provide power to in-situ systems such as monitoring or dosing stations.
Client typology	Farmers, municipalities
Skills requirements	H
Start-up capital	H
Market readiness	L

Business opportunity F2: Solar powered irrigation systems

Market	Energy services specific to the water sector
Description	Solar electricity generation can be used to power water pumping systems, especially where pumping is not time-sensitive and can occur during daylight (e.g. farms). Systems are usually sold as a panel/pump kit, but can also be extended to micro-grids.
Client typology	Farmers, cooperatives, municipalities, estate managers
Skills requirements	M
Start-up capital	M
Market readiness	L-M

Business opportunity F2: Energy efficient technologies and processes

Market	Energy services specific to the water sector
Description	Energy efficient technologies and/or processes for water and wastewater transfer and treatment minimise energy demand, and operating costs, particularly within municipalities, and industrial businesses that deal with bulk water/wastewater.
Client typology	Municipalities, farmers, industrial and commercial businesses
Skills requirements	M-H
Start-up capital	M-H
Market readiness	L-M

Market G: Water Sensitive Design

Historically, water systems have been developed using a linear design approach that lacks sustainability. Water sensitive urban design is an emerging market particularly for dry regions that seek building back better by integrating the urban water cycle, including storm water, groundwater, wastewater management and water supply, into urban design to minimise environmental degradation while improving aesthetic and recreational appeal. The infrastructure design promotes water resilience and security. The market varies from households to corporates and municipalities

Drivers

- Deteriorating ecological infrastructure due to increased water pollution by human activities
- Water scarcity, recurrent droughts and possibility of interrupted municipal water supply that poses risks to business sustainability
- Increasing extreme weather conditions due to climate change such as droughts and floods
- Policies, bylaws and regulations enacted to promote water resilience and security
- Strategies/goals/development plans by cities experiencing water scarcity to become water sensitive cities

Barriers

- Negative perception of high capital costs regardless of environmental benefits in the long run
- Lack of standardised best practice, common standards, and guidelines
- Lack of locally proven designs and technical skill¬sets
- Limited budgets to support such projects particularly at municipal level
- Policies, bylaws and regulations make it difficult to implement projects as general authorisations and water use licences may be required

Business opportunity G1: Water sensitive designing and planning

Market	Water sensitive design
Description	The urban design of property developments, precincts, business districts, industrial parks, and other infrastructure projects taking sustainable design and construction into account are becoming increasingly expected and appreciated.
Client typology	Architects, green building consultants, municipalities, town planners, property developers
Skills requirements	M-H
Start-up capital	L-M
Market readiness	M

Business opportunity G2: Water-wise gardening

Market	Water sensitive design
Description	Water efficient landscaping, planting design and products such as artificial grass, and water-wise plants are used in place of water intensive ones particularly alien vegetation in urban dry regions.
Client typology	Households, body corporates, residential estates, property developers, green building consultants, architects, municipalities
Skills requirements	L
Start-up capital	L
Market readiness	H

Business opportunity G3: Infiltration systems

Market	Water sensitive design
Description	Technological designs and systems that collect, treat and store water on-site, primarily with biological elements therein (e.g. swales, geotextiles, permeable paving, green roofs, etc.). These types of technologies are specified in the water sensitive design stage, and business models allow for manufacturing, installation and maintenance.
Client typology	Architects, green building consultants, municipalities, town planners, property developers
Skills requirements	L-H
Start-up capital	M
Market readiness	L-M

Market H: Invasive alien vegetation

The term 'invasive alien vegetation' refers to plants that are non-native to an ecosystem, and that may cause economic or environmental harm or adversely affect human health. In particular, they impact adversely water security, and biodiversity, including decline or elimination of native vegetation through competition and the disruption of local ecosystems. Invasive alien plants are intensive decrease surface water run-off and groundwater recharge. Business opportunities in this area exist around the clearing and beneficiation of this vegetation.

Drivers

- Water scarcity risks are a key driver for the investment in invasive alien clearing. Invasive alien plants (IAPs) pose a direct threat not only to South African biological diversity, but also to water security
- The increased biomass as a result of alien vegetation results in more intense fires that damage vegetation and soil leading to excessive erosion
- In addition, Invasive alien plants reduce the capacity of rangelands to support livestock and wildlife thereby significantly reducing biodiversity
- There is a number of planned programs and projects on IAPs clearance
- Circular economy approach to using IAPs for downstream value added products such as biochar, furniture and etc.

Barriers

- Lack of funding and programme management (such as integrated control strategies) for programmes such as the Working for Water Programme and similar programmes
- Sufficient and adequate research and development as to how to manage these invasive species effectively
- Market readiness for the products produced from cleared IAPs and their competiveness with other products in the market.
- The removal of felled IAPs and their transportation to beneficiation centres is a challenge especially in remote areas (potential market opportunity)

Business opportunity H1: Alien invasive clearing

Market	Invasive alien vegetation
Description	The clearing of plants that are non-native to an ecosystem and that may negatively impact agricultural produce, cause environmental harm or adversely affect human health. The business model is focused on service and logistics delivery.
Client typology	Rural landowners, waterway managers, national and local government, environmental protection agencies and state reserves
Skills requirements	L
Start-up capital	L-M
Market readiness	H

Business opportunity H2: Alien invasive waste product beneficiation

Market	Invasive alien vegetation
Description	Involves adding value to alien invasive waste through the creation of products from the waste cuttings. The beneficiation processes vary in complexity; examples include using the waste as firewood or manufacturing furniture, and biochar
Client typology	Rural landowners, economic development agencies, waste management companies
Skills requirements	L-H
Start-up capital	M
Market readiness	M

Market I: Bioprospecting

South Africa is the third most biologically diverse country globally in terms of species richness and endemism. Conservation and sustainable utilisation of South Africa's biological diversity and indigenous knowledge is of strategic importance in providing ecosystem goods and services now and in the future and offers lucrative business opportunities.

Drivers

- The growing consumer demand for natural products and alternative medicines is a key driver for the bioprospecting market
- The national bioeconomy strategy that aims to strengthen the bioprospecting sector by improving capacity and capabilities to enhance bioprospecting activities, creating an enabling legislative framework to develop and commercialise the biotechnology industry.

Barriers

- High regulatory barriers for product approval
- Long waiting time and associated administrative costs for permits to be issued
- Limited knowledge and skills in running a bioprospecting business.

Business opportunity I1: Alternative and complementary medicines from indigenous plants

Market	Bioprospecting
Description	Identifying, procuring, extracting and adding value to specialised components of indigenous flora to supply the alternative medicine market, particularly export. Growth areas include weight-loss, mood enhancers, etc.
Client typology	General public, medical practitioners, health and nutrition consultants, pharmacies
Skills requirements	L-H
Start-up capital	M
Market readiness	M

Business opportunity I2: Indigenous plants in skincare and beauty products

Market	Bioprospecting
Description	Indigenous flora extracted for use in the cosmetics market. Growth areas are indicated as "super food" and seaweed extracts. Key consideration is branding, packaging and marketing of products.
Client typology	General public, medical practitioners, health and nutrition consultants, cosmetics manufacturers
Skills requirements	M
Start-up capital	M
Market readiness	L

Business opportunity I3: Pharmaceutical products from indigenous plants

Market	Bioprospecting
Description	Identifying, extracting base compounds of indigenous flora for pharmaceutical production to supply the local and international market (from R&D to production).
Client typology	Pharmaceutical manufacturers, health practitioners and researchers
Skills requirements	H
Start-up capital	H
Market readiness	M

Business opportunity I4: Food additives and food flavourings

Market	Bioprospecting
Description	Identifying, procuring, extracting and adding value to specialised components of indigenous flora to supply the food & beverage manufacturing market as well as the catering, food preparation and hospitality markets.
Client typology	Food and beverage manufacturers, caterers, hospitality
Skills requirements	L-H
Start-up capital	L
Market readiness	M

Market J: Primary agriculture

This involves the sustainable production and cultivation of crops or species. With growing interest in indigenous plants and the need for more sustainable farming practices, the market is expected to grow with a portion of it being the international market.

Drivers

- Increased consumer demand (both locally and internationally) in indigenous products such as *rooibos*, *honeybush*, *artemisia afra*, etc.
- Climate change has resulted in shifting weather patterns that can severely impact the yield and quality of crop production
- The transition to more sustainable farming practices (versus intensive, monoculture production) makes farming land more drought resilient. On the other hand, the adoption of controlled environment agriculture means farmers provided with greater guarantee of yield and quality of their crops
- Popularisation of farm management tools to intensify crop production: low-cost farm management tools that use drones and remote sensing to inform irrigation and plant health management
- Introduction of Carbon Tax Act: the inclusion of agricultural sector in the second phase of the Carbon Tax Act is a great driver of farmers to reduce their carbon output and generate carbon credits over the long-term

Barriers

- Poor access to suitable farming land
- Rising costs of inputs, particularly electricity and fertiliser
- Costly and technically complicated process to obtain quality assurance certifications such as GlobalGap, SIZA, SABS/ISO certifications

Business opportunity J1: Farming of indigenous plants

Market	Primary agriculture
Description	Growing or wild-harvesting of indigenous crops for food, beverage, flower and bioprospecting markets. Markets in the built environment or textiles sectors also exist for certain primary produce.
Client typology	General public, retailers, food and beverage manufacturers
Skills requirements	L-M
Start-up capital	L
Market readiness	H

Business opportunity J2: Aquaculture (freshwater and marine)

Market	Primary agriculture
Description	Growing of aquatic species (in a controlled or semi-controlled environment) for the primary consumption or further processing.
Client typology	General public, retailers, food and beverage manufacturers
Skills requirements	M-H
Start-up capital	M
Market readiness	M

Market K: Ecotourism and training

The growing interest in sustainability and environmental awareness by the general public offers opportunities for businesses in the hospitality and tourism industry that uphold sustainability or offer products and services that promote environmental conservation. Additionally, businesses can offer training to the public on resource preservation, recycling, environmental conservation and awareness.

Drivers

- Increased recognition and interest in indigenous knowledge and traditional medicine
- Tourism is generally a well-supported industry in South Africa. Eco-tourism directly benefits communities, particularly rural as many conservation areas are in rural areas
- South Africa is home to 10% of the world's plant species, 7% of its reptile, bird and mammal species and harbours about 15% of the world's marine species. Endemism rates reach 56% for amphibians, 65% for plants and up to 70% for invertebrates.
- Loss of biodiversity (a number of plants and animal species are facing extinction)
- Availability of technology for remote learning

Barriers

- Scarce indigenous and/or scientific knowledge is a prerequisite for this business opportunity
- Lack of budget towards eco training programs
- Accessibility of eco-tourism destinations and their security
- Eco tourism is still an emerging market

Business opportunity K1: Eco-training services

Market	Ecotourism and training
Description	Providing training on biodiversity, bioprospecting, conservation and ecosystem services to learners (from basic to advanced). Target markets are school camps, corporate training programs, and specialist training for students and interest groups. The impact of Covid 19 has necessitated an increased demand for remote learning and virtual tours.
Client typology	Education organisations, NGOs, national and provincial government, private businesses, environmental protection agencies and individuals
Skills requirements	M
Start-up capital	L-M
Market readiness	M

Business opportunity K2: Digital and remote eco-training tools

Market	Ecotourism and training
Description	Providing digital and remote (virtual) eco-training products or tools to learners (from basic to advanced). Examples include digital identification and tracking tools of native species, and environmental programmes for remote learning. Target markets are schools, corporate training programs, tour guides, and environmental awareness groups
Client typology	Education organisations, NGOs, national and provincial government, environmental protection agencies, nature reserves and individuals
Skills requirements	M
Start-up capital	L-M
Market readiness	M-H

Business opportunity K3: Sustainability themed facilities and eco-labels

Market	Ecotourism and training
Description	Providing guidance, certification and construction services to accommodation and recreational facilities that embrace sustainability (for example water efficiency, clean energy and sustainable building materials) as the core of their business model and branding.
Client typology	Lodges, nature reserves, or other accommodation options
Skills requirements	M-H
Start-up capital	L-M
Market readiness	H

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For more information, visit the following websites:

- www.environment.gov.za
- www.greencape.co.za
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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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