

EVALUATING THE SUSTAINABILITY, DEVELOPMENT IMPACT AND NATURAL CAPITAL IMPACT OF INVASIVE ALIEN PLANT BASED VALUE-ADDING ENTERPRISES

by

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DECLARATION

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March 2017

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“The people we surround ourselves with either raise or lower our standards. They either help us to become the best version of ourselves or encourage us to become lesser versions of ourselves.... We all need people in our lives who raise our standards, remind us of our essential purpose, and challenge us to become the best version of ourselves.”

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ABSTRACT

Invasive alien plants (IAPs) are a significant threat to South Africa's biological diversity, water security and agricultural resources, and are associated with increasing human and ecological vulnerability to climate change. In response to this threat, the South African government established the Working for Water Programme (now part of the Department of Environmental Affairs [DEA] Natural Resources Management [NRM] Programme), which has cleared nearly three million hectares of IAPs since its inception in 1995. The Programme has also provided jobs and training to more than 20,000 people each year from amongst the most marginalised sectors of society.

However, despite significant government investment in the DEA NRM Programme, IAPs continue to spread. In addition, most of the felled IAP biomass is left *in situ*, which can result in a significant fire hazard. In response, government began promoting the use of IAP biomass as an input material for value-adding activities. This was also expected to increase the economic sustainability and social benefits from IAP eradication, as well as encourage private sector investment into IAP clearing.

The DEA NRM Programmes' support of IAP biomass value-adding enterprises has yielded variable outcomes, with many of the enterprises initially assisted proving unsustainable. This raised the question: "what makes IAP biomass value-adding enterprises survive or fail?"

This research study has evaluated a selection of existing, failed and emerging IAP biomass based value-adding enterprises with the aim of determining the key internal structural factors that make these enterprises sustainable. In addition, criteria that affect the performance of these enterprises in creating jobs, developing human capital and restoring natural capital, in line with the key aims of the DEA NRM Programme, were identified. A Multi-Criteria Decision Analysis tool was developed and used to evaluate and compare the enterprises studied. A further aim of the study was to identify the kinds of support that the DEA NRM Programme should provide to IAP biomass value-adding industries to leverage the best possible outcomes.

The study findings suggest that government and private enterprise need to work together in establishing IAP biomass value-adding industries. However, appropriate structuring of such relationships is important to ensure there is sufficient value and fair sharing of risk between the partners. Government will not only need to carefully select the enterprises that it partners with to ensure its investment has maximum impact, it will also need to invest in the development of the IAP biomass industry sector through developing markets for IAP products and filling key research and development gaps that are unaffordable for the private sector.

OPSOMMING

Indringerplante is 'n groot bedreiging vir Suid-Afrika se biologiese diversiteit, water sekuriteit en landbou hulpbronne, en word geassosieer met 'n toenemende menslike en ekologiese kwesbaarheid tot klimaatsverandering. In reaksie op hierdie bedreiging het die Suid-Afrikaanse regering die Werk vir Water Program (nou deel van die Departement van Omgewingsake [DEA] se Natuurlike Hulpbronbestuur [NRM] Program) tot stand gebring wat sedert sy ontstaan op 1995 byna drie miljoen hektaar indringerplante skoongemaak het. Die program het ook voorsiening gemaak vir werkseleenthede en opleiding aan meer as 20,000 mense elke jaar uit die gelede van die mees gemarginaliseerde sektore van die samelewing.

Ten spyte van aansienlike regeringsbelegging in die DEA NRM Program, het die indringerplante probleem steeds uitgebrei. Daarbenewens, word die meeste van die afgekap indringerplante biomassa in die veld gelaat wat kan lei tot 'n aansienlike brandgevaar. In reaksie hierop het die regering begin om die gebruik van indringerplante biomassa, as 'n inset materiaal vir waardetoevoegende aktiwiteite, te bevorder. Dit was verwag dat dit die ekonomiese volhoubaarheid en maatskaplike voordele van indringerplante uitwissing sal verhoog, en ook privaatsektor belegging in indringerplante uitwissing aanmoedig.

Die DEA NRM Programme se ondersteuning van indringerplante biomassa-waardetoevoeging ondernemings het veranderlike uitkomste opgelewer. Baie van die aanvanklik ondersteunde ondernemings was onvolhoubaar. Dit lei tot die vraag: "Wat laat indringerplante biomassa-waardetoevoeging ondernemings oorleef of misluk?".

Hierdie navorsingstudie het 'n seleksie van die bestaande, mislukte en opkomende indringerplant biomassa gebaseer waardetoevoeging ondernemings geëvalueer met die oog op die bepaling van die belangrikste interne strukturele faktore wat hierdie ondernemings volhoubaar maak. Daarbenewens is kriteria wat die prestasie van hierdie ondernemings beïnvloed in die skep van werkseleenthede, die ontwikkeling van menslike kapitaal en die herstel van natuurlike kapitaal, in ooreenstemming met die sleutel doelwitte van die DEA NRM Program, geïdentifiseer. 'n Multi-kriteria besluit analise-instrument is ontwikkel en gebruik om die ondernemings wat bestudeer is, te evalueer en te vergelyk. 'n Verdere doel van die studie was om die aard van die ondersteuning wat die DEA NRM Program moet verskaf aan indringerplante biomassa-waardetoevoeging bedrywe, om die beste moontlike uitkomste te verkry, te identifiseer.

Die studie bevindinge dui daarop dat die regering en private ondernemings moet saamwerk in die vestiging van indringerplante biomassa-waardetoevoeging nywerhede. Toepaslike strukturering van verhoudings is egter belangrik om te verseker dat daar voldoende waarde en billike risiko

deling tussen die vennote is. Die regering moet nie net ondernemings versigtig kies met wie dit vennootkappe vorm om maksimum beleggings impak te verseker nie, dit moet ook belê in die ontwikkeling van die biomassa bedryfsektor deur die ontwikkeling van markte vir indringerplant produkte en vulling van sleutel gapings in navorsing en ontwikkeling wat onbekostigbaar vir die private sektor is.

ACRONYMS

ABI	Agulhas Biodiversity Initiative
BBBEE	Broad-based Black Economic Empowerment
BI	Business incubator
Co-op	Co-operative
DEA	National Department of Environmental Affairs
DTI	National Department of Trade and Industry
DWAF	National Department of Water Affairs and Forestry
EPWP	Expanded Public Works Programme
FAO	Food and Agriculture Organisation of the United Nations
FBCT	Flower Valley Conservation Trust
GDP	Gross domestic product
IAP	Invasive alien plant(s)
IDC	Industrial Development Corporation
ILO	International Labour Office Geneva
IRR	Internal rate of return
KZN	KwaZulu-Natal
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
MAR	Mean annual run-off
MCDA	Multi-criteria decision analysis
NFEPA	National Freshwater Ecosystem Priority Area
NPC	National Planning Commission
DEA NRM	Natural Resources Management Programme (of the DEA)
OECD	Organisation for Economic Co-operation and Development
PPP	Public-private partnership
SAB	South African Breweries
SANParks	South African National Parks
SCLI	Southern Cape Landowners Initiative
SETA	Skills Education Training Authority
SMME	Small, medium or micro-enterprise
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organisation
US	United States (of America)
VAI	Value-adding industry
VCC	Venture capital company
VCF	Venture capital fund
WWF	Worldwide Fund for Nature, South Africa

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CHAPTER 1

INTRODUCTION TO THE RESEARCH STUDY

1.1 BACKGROUND AND INTRODUCTION

Invasive alien plants (IAPs) are non-native species that have been introduced into South Africa and have demonstrated the ability to colonise and / or transform natural ecosystems and associated species compositions (Richardson *et al.*, 2000). Throughout the world, IAPs have become one of the primary drivers of change in the structure and functioning of ecosystems with negative consequences for human welfare, agriculture, forestry, conservation of biodiversity, the economy and the delivery of ecosystem services (Mack *et al.*, 2000; Mooney, 2005; Millennium Ecosystem Assessment, 2005; Hulme, 2006).

Kotzé *et al.* (2010) and van Wilgen, *et al.* (2012) estimate that IAPs occur on about 10% of South Africa's land area and that the national coverage of selected species of IAPs could have increased by over 16% between 1996 and 2008, despite an investment of over R2 billion in control measures implemented for these species. This ongoing transformation of South Africa's natural vegetation by IAPs results in a reduction of ecosystem services supply, the economic costs of which have been estimated to be as much as R6.5 billion annually (2008 values) (De Lange & van Wilgen, 2010).

IAPs are therefore considered a significant threat not only to South Africa's biological diversity, but also to water security, the ecological functioning of natural systems and the productive use of land. They are also considered to cause increased human and ecological vulnerability to the effects of climate change (De Lange & van Wilgen, 2010; Department of Environment Affairs [DEA], 2013). The prevention of such costs and losses, especially those associated with loss of water resources, was the primary reason for the South African National Government initiating the Working for Water Programme in 1995 (van Wilgen *et al.*, 2011), which has since become established as the country's primary IAP control response (van Wilgen *et al.*, 1998; Koenig, 2009). This Programme combines mechanical and chemical control of all IAP species in targeted areas, along with habitat management, and achieves this through employment of people from impoverished rural communities to undertake the work (van Wilgen *et al.*, 2012).

The Working for Water Programme, which was originally initiated by the Department of Water Affairs and now forms part of the Department of Environment Affairs (DEA) Natural Resources Management (DEA NRM) Programme, has cleared over three million hectares of IAPs and has provided jobs and training to more than 20,000 people each year from amongst the most

marginalised sectors of society (DEA, 2016). The Working for Water Programme (and the DEA NRM Programme more generally) actively aims to create jobs, develop human capital, and restore natural capital to protect the supply of ecosystem services such as water production (van Wilgen *et al.*, 2012; DEA, 2016). However, this requirement for IAP control creates a substantial fiscal burden to the South African economy (De Lange *et al.*, 2012).

In 1998, an initiative was launched under the Working for Water Programme to promote the utilisation and value-adding to biomass from IAP clearing operations. This Value-Adding Industries (VAI) Programme has three primary objectives (DEA, 2016):

1. Maximising the positive economic benefits of the Working for Water Programme by creating extra jobs through the process of adding value to cleared IAP biomass;
2. Reducing the net cost of clearing, thereby contributing to the sustainability of the Working for Water Programme;
3. Minimising potential negative environmental impacts, such as fire damage, by removing a proportion of the cut IAP biomass left behind after clearing.

The VAI Programme was therefore seen as offering an opportunity to increase the economic sustainability, as well as the range and extent of social and economic benefits from the investment being made into IAP clearing operations by the Working for Water Programme (DEA, 2016). However, very few of the value-adding enterprises that were originally established by the VAI Programme are still functioning (Braack, 2016). Despite this, the DEA NRM Programme is increasingly being approached to support the establishment or expansion of IAP biomass based VAI (Polonsky, 2015).

1.2 RESEARCH PROBLEM

Even though the Working for Water / DEA NRM Programme has been operating for more than 20 years, utilisation of IAP biomass removed through the Programme has been limited and most of the biomass is left *in situ*, which often results in a fire hazard (De Lange *et al.*, 2012). National Government has attempted to promote the development of IAP biomass value-adding enterprises through its DEA NRM VAI Programme (DEA, 2016), but this has yielded variable outcomes: while some of the initial enterprises which were supported by the DEA NRM VAI Programme have failed, others have continued operating (Polonsky, 2015). These enterprises are using different value addition processes, from simple handcrafting of baskets and walking sticks using IAP sticks and bark, to the machine-based manufacture of significantly more complex IAP timber products such as laminated wood furniture and coffins (De Lange *et al.*, 2012; Braack, 2016). These enterprises

also have varying levels of financial and / or management support from the DEA NRM Programme or other government programmes with similar objectives (Braack, 2016).

At present, the differences between the VAI enterprises that are successful, are on the margin of surviving, and those that have failed, has not been researched and is not generally well understood (Braack, 2016). It is therefore not clear what makes enterprises which add value to IAP plant biomass more likely to be sustainable, and therefore worthy of financial or other forms of support from the DEA NRM Programme (Polonsky, 2015). Similarly, different enterprises appear to perform differently in achieving the Working for Water / DEA NRM Programme goals of job creation, human capital development and natural capital restoration (Department of Water Affairs and Forestry [DWAF], 2001). If government and private sector financial institutions are to support the establishment of such enterprises, a better understanding is required of how these enterprises should be structured for sustainability and maximum developmental and natural capital impact (Polonsky, 2015; Miller, 2015; Braack, 2016).

1.3 RESEARCH OBJECTIVES

The research study evaluated a selection of existing, failed and emerging IAP biomass based VAI with the aim of:

1. Determining the primary internal structural factors required for IAP biomass based VAI to be sustainable business enterprises;
2. Identifying the factors that can be used to evaluate enterprise performance in job creation, human capital development and natural capital restoration;
3. Determining the kind of support the DEA NRM Programme should offer to promote the establishment of sustainable, high impact IAP biomass based VAI;
4. Developing and testing a Multi-Criteria Decision Analysis (MCDA) tool for the evaluation of enterprise sustainability and performance in job creation, human capital development and natural capital restoration.

1.4 RESEARCH METHODOLOGY

A literature review was undertaken to formulate the background for the study. Secondary sources were used, which included published books, academic articles, research reports, news articles, websites and other relevant documents.

Primary data collection for the study was done through undertaking: (i) ten case studies on existing, failed or emerging IAP biomass based VAI; (ii) key informant interviews with three Venture

Capital Companies (VCCs) and two business incubators; and (iii) ten key informant interviews with individuals working on IAP value-adding projects or business development processes.

The primary data was analysed to identify criteria that could be used to evaluate the sustainability of IAP biomass based enterprises, and their performance in job creation, natural capital restoration and human capital development. These criteria were used in the development of a MCDA tool, which was applied to the ten case studies to rank and compare their sustainability, developmental impact and natural capital impact.

1.5 STUDY OUTCOMES

The MCDA tool developed through the offers a framework which could be used: (i) to support government evaluations of which IAP biomass based VAI it should support; and (ii) for the development of guidelines that enterprises can use to structure their businesses and business plans to ensure optimum sustainability and performance in developmental and natural capital impact.

CHAPTER 2

LITERATURE REVIEW

2.1 INVASIVE ALIEN PLANTS IN SOUTH AFRICA

2.1.1 Extent and Impact in South Africa

South Africa's indigenous vegetation is diverse, occurring across nine terrestrial biomes (Figure 1), within several of which high levels of endemism are a feature (Mucina & Rutherford, 2006). Each biome is characterised by specific fire and rainfall regimes, levels of agricultural and human use, and tend to be invaded by distinctive suites of IAP species (van Wilgen *et al.*, 2012).

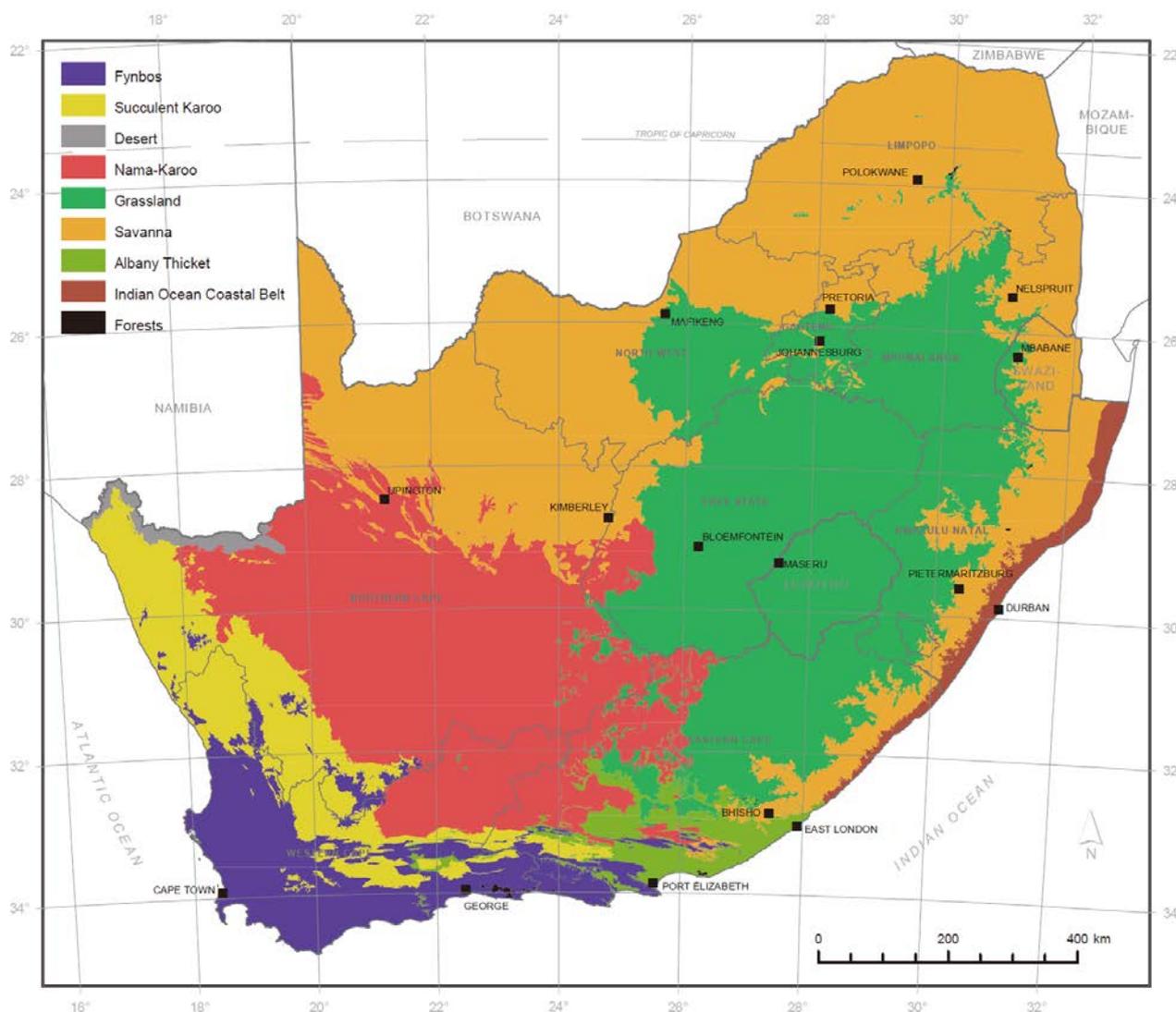


Figure 1: Map of the nine biomes in South Africa (Mucina & Rutherford, 2006)

Untransformed natural vegetation provides economically and socially important ecosystem services, including livestock production, water production, provision of natural resources for sustaining rural livelihoods, and tourism benefits from protected and other areas (Daily, 1997). Transformation of natural vegetation by IAPs results in a reduction of ecosystem services supply (Le Maitre *et al.*, 1996; Mack *et al.*, 2000; Richardson & van Wilgen, 2004), increased human and ecological vulnerability to climate change (Masters & Norgrove, 2010; DEA, 2013) and economic losses (Pimentel 2002; Perrings *et al.*, 2010).

Of the estimated 9,000 plant species introduced to South Africa for agricultural, silvicultural, horticultural or other purposes, 617 are currently classified as invasive or alien species by the National Department of Environmental Affairs (DEA, 2014). It is estimated that IAPs occur on at least 10% of the South Africa's land area (Figure 2) (Kotzé *et al.*, 2010) and their coverage continues to expand, despite billions of Rands of investment into control (van Wilgen *et al.*, 2012).

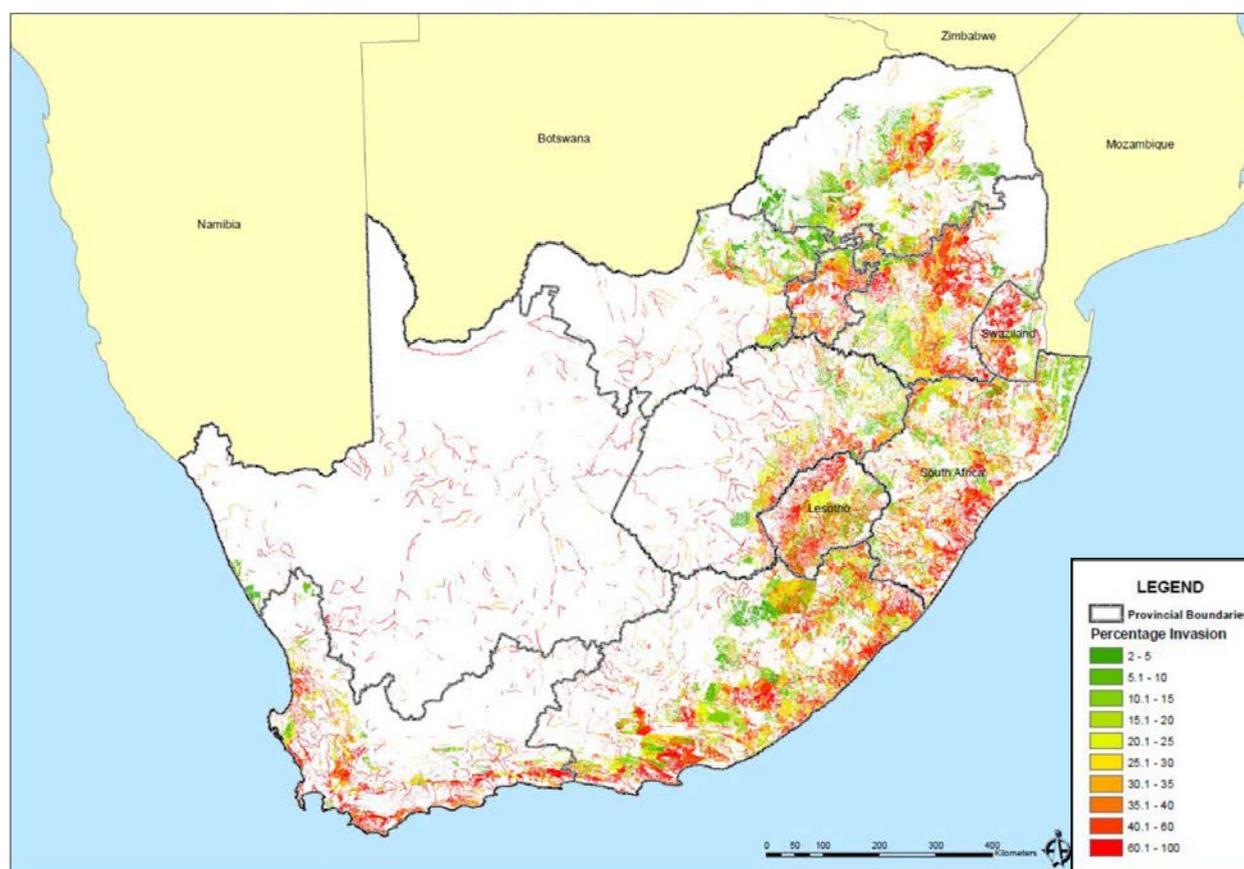


Figure 2: National Invasive Alien Plant Survey map (Kotzé *et al.*, 2010)

Le Maitre *et al.* (2013) assessed the impacts of IAPs on water flows in South Africa and estimated that the total reduction in water flow due to IAPs is 1,444 million m³/annum, or 2.9% of the country's naturalised mean annual runoff (MAR). However, this is likely to be an underestimate, given current gaps in knowledge and systems for modelling flow reductions from IAPs (Le Maitre *et al.*, 2015) and is significantly lower than the previous estimate of 6.7% reduction in MAR published

by Versfeld *et al.* (1998). De Lange & van Wilgen (2010) estimate that ecosystem service losses from transformation of natural ecosystems by IAPs costs the South African economy R6.5 billion annually (2008 figures), but indicate these losses could have been as high as R41.7 billion without any IAP control measures having been implemented.

2.1.2 Working for Water and the Natural Resources Management Programme

The South African National Government established the Working for Water Programme in 1995 in response to growing concerns around the economic cost of water resource and ecosystem services losses caused by the spread of IAPs (van Wilgen *et al.*, 1998, 2011). This Programme became the DEA NRM Programme, which adopts an integrated IAP control approach (DEA, 2016). This includes application of mechanical, chemical and biological control methods to all IAP species in targeted areas, supported by ecosystem restoration and management activities (van Wilgen *et al.*, 2012; DEA, 2016). The primary objective of the Working for Water Programme is to “reduce the density of established terrestrial IAPs by 22% *per annum* through labour intensive, mechanical and chemical control” (DEA, 2016). National Governments’ approach to the restoration and management of natural capital through this Programme is deliberately labour intensive (van Wilgen *et al.*, 2012) and includes significant emphasis on the development of human capital, particularly amongst women, disabled people and the youth (DEA, 2016).

The control of IAPs creates a substantial fiscal burden to the South African economy (De Lange *et al.*, 2012), with R3.2 billion reported to have been spent by the Working for Water Programme on control measures between 1995 and 2008 (van Wilgen *et al.*, 2012). It has been recognised that there are insufficient resources to reach all invaded areas and all invasive species, and decisions relating to where and when to control IAPs must therefore be made (Forsyth *et al.*, 2012). In this regard, the DEA NRM Programme commissioned the CSIR to develop a generic model for prioritising areas to clear. The model uses criteria based on reducing impacts on ecosystem services, particularly hydrological services, conservation of biodiversity, and socio-economic factors, including agriculture and tourism (Le Maitre *et al.*, 2012).

2.1.3 Value-Adding Industries Programme

In 1998, a VAI Programme was initiated as part of the DEA NRM Programme aiming to promote utilisation and value-adding to IAP biomass from its clearing operations (DWAF, 2001; DEA, 2016). The objectives of the VAI Programme include creating additional jobs, reducing the net cost of clearing IAPs, and reducing fire risk associated with IAP biomass left behind after clearing (DEA, 2016; Mander & Blignaut, 2016). Importantly, these benefits can be created in rural areas, where employment and skills development opportunities are lowest (Statistics South Africa [StatsSA], 2014).

While the initial focus was on supporting the establishment of small-scale handicraft enterprises producing walking sticks, simple furniture and décor items (Polonsky, 2015; Braack, 2016), this evolved to facilitating the establishment and operation of large-scale, state-run coffin, furniture and school desk manufacturing factories in partnership with various National and Provincial Government departments (Jacobs, 2015; Braack, 2016). These initiatives have been named the Eco-furniture and Eco-coffins Factories and are managed as part of the VAI Programme. In addition, the DEA NRM Programme has contracted with various private sector companies to clear IAPs and use the biomass as part of their mainstream business activities, for example in the production of charcoal and furniture (Polonsky, 2015; Braack, 2016).

More recently, and linked to the need for enhanced energy security in South Africa (Mander & Blignaut, 2016), interest has turned to the potential for the DEA NRM Programme to support the establishment of VAIs that use IAP biomass for the energy generation (Mugido *et al.*, 2014). The DEA NRM Programme estimates that there are some 113,592,402 tonnes of woody IAP biomass in South Africa that could be used for this purpose, with the potential to generate 4.7 million megawatt hours of electricity *per annum* (Preston, 2010). While there are several pilot biomass-to-energy generation plants currently being established, there are no working examples in South Africa of such enterprises that can demonstrate financial profitability (Miller, 2015).

2.2 PLANT BIOMASS VALUE-ADDING INDUSTRIES

2.2.1 What are Plant Biomass Value-Adding Industries?

Value-adding industries that use plant biomass as a primary input, for example in the agricultural, forestry and natural products sectors, transform raw plant materials from their original state to a more valuable processed state (Coltrain *et al.*, 2000; Sathre & Gustavsson, 2009, Ham *et al.*, 2010). According to Sathre & Gustavsson (2009), forest products industries are increasingly seeking to manufacture products with greater added value. Added value is defined as the difference in economic value between the physical inputs and outputs of a production process (European Commission, 2006).

In any industry, value may be added through processing of raw product, packaging, marketing and / or co-ordination of the value chain (Coltrain *et al.*, 2000; Ham *et al.*, 2010). A VAI may control the whole value chain, or one or more parts of it (Antoniou *et al.*, 2009).

2.2.2 The South African Context

In South Africa, plant biomass VAIs include a wide range of enterprise types, ranging from small medium and micro enterprises (SMMEs) that produce limited quantities of high value end-product

(for example plant-based cosmetic and medicinal products) (Ham *et al.*, 2010), to large corporate enterprises producing high quantities of end-product (for example sawn plantation timber) (Sathre & Gustavsson, 2009).

Plant biomass VAI provide an opportunity for rural development in South Africa (Mander *et al.*, 2007; Ham & Thomas, 2008; Mander *et al.*, 2015). Rural people can play a role in such enterprises by supplying raw material, undertaking processing activities, or becoming business partners (Mayers & Vermeulen, 2002; Howard *et al.*, 2005; Ham *et al.*, 2010; Mander *et al.*, 2015). The raw material inputs may be harvested from the wild, or produced in small-scale agricultural, agro-forestry or silvicultural operations. However, VAI using plant biomass not produced in organised agricultural or silvicultural operations are at a higher risk of failure due to increased variability and logistical complexity in the raw material supply chain (Ham *et al.*, 2010, Mander & Blignaut, 2016).

The increasing demand for energy generation and the growing IAP problem in South Africa has led to explorations into the possible synergies between these two problems (see for example: Preston, 2010; Mugido *et al.*, 2014; Mander & Blignaut, 2016). Mander & Blignaut (2016) identified that IAP biomass based VAI face specific risks because, unlike in commercial biomass production systems, the availability of IAP biomass from clearing operations is highly variable spatially and temporally.

2.3 EVALUATING ENTERPRISE SUSTAINABILITY

2.3.1 What is a Sustainable Enterprise?

The definition of a sustainable enterprise varies between SMMEs and corporates. Sustainability in corporate enterprises is generally defined, measured and reported in terms of 'triple bottom line', i.e. the management of financial, social and environmental risks, obligations and opportunities (Financial Times, undated). These three impacts are sometimes referred to as profits, people and planet. For SMMEs, sustainability is generally more simply defined as the resiliency of the enterprise over time (Financial Times, undated). Given that the focus of this research is on IAP biomass based SMMEs, enterprise sustainability is defined here as enterprise resiliency over time.

2.3.2 The South African Context

Small medium and micro enterprises can play an important role in sustaining and growing country economies, but are particularly important in developing countries such as South Africa, which tend to suffer major employment and income distribution challenges (Naude, 1998; Butcher, 1999; Urban & Naidoo, 2012; Cant & Wiid, 2013). Fatoki & Garwe (2010) indicate that SMMEs are vital to economic prosperity and the avoidance of economic stagnation.

In South Africa, SMMEs account for roughly 91% of formal business entities, contributing between 51% and 57% to the country's Gross Domestic Product (GDP) and 60% of employment (Kongolo, 2010). However, SMME failure rates are very high, with up to 63% of new SMMEs reported to fail within the first two years (Robert, 2010), and up to 75% failing within the first three years (Moloi, 2013).

2.3.3 Key Factors affecting Enterprise Sustainability

Like all businesses, SMMEs are exposed to various internal and external constraints and challenges. The primary external variables found to impact South African SMMEs include interest and exchange rates, inflation, unemployment, crime, HIV/Aids, technological advancements and government regulatory requirements (Brink *et al.*, 2003; Abor & Quartey, 2010; Cant & Wiid, 2013). Some of the main internal structural issues reported as playing a role in the high rate of SMME failure are the lack of management, marketing and operational skills, social influences, and financial related matters (Urban & Naidoo, 2012; Cant & Wiid, 2013). Cant & Wiid (2013) note that lack of marketing capacity is possibly the most important internal factor affecting enterprise sustainability. This can result in incorrect pricing strategies, low demand for products, inappropriate location of the business and insufficient knowledge of the target audience.

The crucial existence of a passionate and skilled entrepreneur has been widely researched and reported as a key factor influencing SMME sustainability and performance (see for example: Department of Trade and Industry [DTI], 2004; Von Broembsen *et al.*, 2005; Ham & Thomas, 2008; Di-Masi, 2009; Herrington *et al.*, 2011; Dean, 2015). SMME sustainability and growth potential is shaped by two key dimensions to entrepreneurship: entrepreneurial capacity and entrepreneurial opportunity (DTI, 2004). Capacity refers to the resources, including financial, physical, technical or intellectual (for example a specific skill) that an entrepreneur can draw on to operate his / her business. Opportunity, in contrast, refers to whether the market is fully saturated or if business opportunities are presenting themselves.

Through evaluating a series of southern African case studies, Ham *et al.* (2010) highlight the importance of the following aspects in the establishment of successful and sustainable plant biomass value-adding SMMEs: (i) the presence of a passionate and determined entrepreneur; (ii) the need for training and support related to management, marketing and accessing finance; (iii) appropriate structuring of business relationships between role players in the value chain and ongoing management of these relationships; and (iv) the need for product marketing to strongly reflect its production in an environmentally and / or socially beneficial manner.

In designing a tool to evaluate the feasibility of IAP biomass based VAI proposals, Mander & Blignaut (2016) suggest enterprise sustainability could be improved by: (i) adopting an hierarchical

approach to the use of different IAP materials for energy generation (and other value-adding purposes) so that financial returns on the raw material are optimised; (ii) creating economies of scale through pooling of IAP feedstock across multiple landowners; and (iii) supplementation of IAP feedstock with other sources of plant biomass (e.g. forestry or agricultural waste) to balance the spatial and temporal variability of supply.

2.4 ROLE OF EXTERNAL SUPPORT AGENTS IN ENTERPRISE DEVELOPMENT

2.4.1 Government Support

South Africa's National Development Plan 2030 (National Planning Commission [NPC], 2012) sets out the country's strategy for eliminating poverty and inequality. A key thrust of this plan is to promote faster and more inclusive economic growth, thus creating a virtuous cycle of job creation, poverty alleviation, human capital development and associated improvements in social equality and human well-being. The Plan recognises the role of SMMEs in achieving these goals and suggests that the state should play an enhanced role in supporting their establishment and development.

In 2005, South Africa released its Integrated Small Business Strategy, which focused on increasing the supply of financial and non-financial support to SMMEs, creating demand for SMME products and services, and reducing regulatory constraints (DTI, 2005). In line with this Strategy, several government departments are required to respond by providing support to SMMEs, which includes: (i) specific tax allowances and incentives for SMMEs; (ii) a lower regulatory burden; (iii) various programmes to provide improved access to grant and loan finance; (iv) Broad-based Black Economic Empowerment (BBBEE) scorecard incentives for corporates to use SMMEs in their supply chains; and (v) business incubators and development finance institutions (such as the Small Enterprise Finance Agency [SEFA] and National Empowerment Fund [NEF]) which provide technical assistance and financial support to SMMEs (Brey & Mhlaba, 2013; DTI, 2016). In addition, government has a direct role to play as a buyer of goods and services from SMMEs.

However, many SMMEs fail despite support from government and private initiatives that aid small businesses (Cant & Wiid, 2013). Ham *et al.* (2010) evaluate several natural plant product SMME case studies and conclude that community-based enterprises established by outside agents may fail if the beneficiary community lack a sense of ownership. Large investments on the side of government projects or donor agencies in equipment and subsidised production also do not ensure sustainability. The exact nature and structuring of government support to SMMEs is therefore important for the desired impact to be achieved (Levin, 2012).

2.4.2 Business Incubators

The Department of Trade and Industry's Business Incubation Support Programme was established in 2012 to facilitate private sector partnerships with government for the development of incubators that nurture SMMEs into sustainable enterprises (DTI, 2013). The programme, which was envisaged to run for 10 years, encourages partnerships between small and big business, with big business assisting SMMEs with skills transfer, enterprise development, supplier development and creating marketing opportunities (DTI, 2013). Government provides funding for incubators on a cost-sharing basis, with the intention that over time the incubators would generate sufficient revenue through the provision of their services to become self-sustaining (DTI, 2013).

2.4.3 Private Sector Support

2.4.2.2 Commercial and Private Banks

Most banks recognise the importance of the SMME sector and offer various forms of finance, ranging from short-term loans to overdrafts, invoice discounting and equity finance (Parliamentary Monitoring Group, 2012). The option of borrowing capital from commercial or private banks may be one of the most obvious to consider for a new or emerging business (Mander *et al.*, 2015). However, banks have not proven to be an easy source of such finance for SMMEs, due to reasons such as a lack of collateral security, failure to meet requirements in terms of personal capital contributions, blacklisting, lack of entrepreneurial skills, management skills and business experience, and the lack of a business plan that meets the bank's criteria (Goslett, 2014).

2.4.2.2 Venture Capital Companies

Venture capital is a type of equity financing that addresses the funding needs of new or emerging businesses that for reasons such as limited size, assets or track record cannot obtain capital from other sources, such as commercial or private banks (US Small Business Administration, undated). VCCs pool funds from a combination of sources, such as off-shore investors, pension and endowment funds, government, development finance institutions and insurance companies, and manage the investment of these funds into SMMEs with anticipated high growth potential (Mander *et al.*, 2015; Investopaedia, 2016). These investments are mostly made as cash in exchange for shares in the business and an active management role in the invested company (Miller, 2015; Investopaedia, 2016). Venture capital investment may come at a higher cost to the SMME than traditional forms of finance (Rajan, 2010) and the investor usually seeks to exit the investment within three to five years (Miller, 2015).

The venture capital industry is considered to play a catalytic role in the development of SMMEs by identifying, financially supporting and nurturing growth-minded businesses with strong entrepreneurial capabilities (Mbhele, 2012). Venture capital support brings not only the required

funding into a business but also expertise that may significantly enhance the performance of the enterprise (MacMillan *et al.*, 1989; Rajan, 2010). South Africa, however, does not have a well-developed venture capital industry. The amount of money in the hands of South African VCCs reportedly remains limited (R126.4 billion in 2012), and has grown at an average of only 11.6% since 1999 (Cartwright *et al.*, 2013).

2.5 ENTERPRISE EVALUATION USING MULTI-CRITERIA DECISION ANALYSIS

One of the major problems facing business investors and enterprise support agencies is deciding which enterprises to invest in. There are usually multiple criteria which must be considered when making such choices (Ahmed *et al.*, 2012). A useful class of models that can be used to make decisions involving the choice of a best alternative from several options and using several criteria is called Multi-Criteria Decision Analysis (MCDA) (Ahmed *et al.*, 2012).

According to Dodgson *et al.* (2009), MCDA techniques can be used to identify a single most preferred option, to rank options, to short-list a limited number of options for subsequent detailed appraisal, or simply to distinguish acceptable from unacceptable possibilities. In MCDA, the identified options are given scores based on criteria normally on interval or ratio scales. Weights can be assigned to the criteria and then computed with appropriate algorithms based on value or utility functions, goal programming, outranking or descriptive/multivariate statistical methods to determine the rank of the alternatives (Ahmed *et al.*, 2012).

The use of multi-criteria methodologies in financial decision making is well documented and researched (Zopounidis & Doumpos, 2002). This includes their use in investment portfolio selection (Bouri *et al.*, 2002), extension of credit (Matsatsinis, 2002), and foreign direct investment (Doumpos *et al.*, 2001). Beim & Levesque (2004) investigated the application of MCDA for the selection of enterprises that a VCC should invest in and concluded that MCDA might present an enhancement to established venture capital decision making practices. Gundry & Kickul (2007) indicate that many questions can be asked during the enterprise evaluation and suggest the use of a 'Business Evaluation Scoring Technique' that uses a scale of 1 to 5 (low to high) to rank a series of questions posed in respect of the enterprises being evaluated.

Attributes of MCDA deemed useful for this study were its capability to work with multiple diverse objectives and with mixed data, where analysis need not be data intensive and allows the incorporation of both qualitative and quantitative information (Mendoza & Prabhu, 2005).

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

A mixed method research approach and process was used. Mixed method research is defined by Johnson *et al.* (2007) as an intellectual and practical synthesis based on qualitative and quantitative research. Within the research process, certain questions were structured to gather quantitative data (e.g. number of people employed, quantity of product manufactured), while other questions were structured to gain insights into the structure and functioning of enterprises, as well as opinions regarding enterprise sustainability and risks (i.e. qualitative data). The quantitative data was used in descriptive statistical analysis and comparisons, while the qualitative data served a descriptive purpose (Babbie & Mouton, 2001). The research process included the following:

1. **Case studies:** Ten case studies comprising existing and failed IAP biomass based VAI were conducted with the intention of determining the internal structural factors and / or criteria that are likely to affect enterprise sustainability and performance in respect of job creation, natural capital restoration and human capital development.
2. **Key informant interviews:** Five institutions that provide financial and / or business incubation support to start-up and emerging enterprises were interviewed with the aim of determining what criteria these institutions use to decide which enterprises to support. Ten additional key informant interviews were conducted with individuals working on IAP value-adding projects or business development to gain further insights into possible factors that affect enterprise sustainability and performance.
3. **Development and application of a MCDA tool:** The data from the case studies and key informant interview research were used to inform the construction of a MCDA tool. This MCDA tool contains several weighted criteria with associated indicators. The criteria and indicators were used to rank and compare the sustainability, developmental impact and natural capital impact of the ten case study VAI.

3.2 CASE STUDIES

3.2.1 Case Study Research Method

A case study is defined by Yin (2009) as an empirical enquiry about a contemporary phenomenon (i.e. a 'case') set within its real-world context. Case studies are a useful research method for producing a deeper understanding or insightful appreciation of the case(s) and so resulting in new learning about a real-world situation and its meaning (Yin, 2012). In addition, this approach allows for cross-comparisons between cases (Coldwell & Herbst, 2004).

Case studies are used across a range of disciplines and have become a widely accepted research tool (Babbie & Mouton, 2001). The successful use of case studies as a research methodology requires unbiased selection of cases, the collection of comparable data between cases, and the need to avoid using too few cases from which to deduce generalised conclusions (Yin, 2012).

3.2.2 Selection of Case Studies

The aim of most social research is to study a representative number of events or people with a view to generalise the results of the study to a defined population or universe (Mouton, 1996). Babbie & Mouton (2001) define a representative sample as, "... a sample will be representative of the population from which it is selected if the aggregate characteristics of the sample closely approximate those same aggregate characteristics in the population".

Potential case studies were identified through reviewing the DEA NRM Programme list of IAP biomass based VAI that had been engaged with since 1998, an internet search, and through telephonic and email consultation with various government, non-governmental and private sector agencies working in the field of environmental management and green economy. This process confirmed that:

- (i) There are currently relatively few working examples IAP biomass based VAI in South Africa (De Lange *et al.*, 2012; Braack, 2016). Thirteen working and fifteen failed IAP biomass based VAI were identified. Two of the failed VAI and eight of the working VAI were contactable, creating a total of ten possible case studies. These ten case studies (35% of enterprises identified) were deemed sufficient to provide representation of typical enterprises based on VAI biomass utilisation.
- (ii) There were differences in the level of government support given to the existing and failed IAP biomass based VAI identified.

As the differences in levels of government support was considered a potentially important influence on enterprise sustainability and / or development and natural capital impact (Goldstuck, 2004; Orford *et al.*, 2004; Ham *et al.*, 2010), the ten case studies were categorised using a stratified sampling approach (Babbie & Mouton, 2001; Explorable, 2016a) where three categories (or strata) were identified that formed a 'continuum of investment / support' from the DEA NRM Programme and / or other similar government programmes. Within each category, between two and five existing or failed IAP biomass based VAI were grouped to represent a differentiated range of spatial locations and scales of enterprise. The three categories (or strata) were as follows:

- (i) **High Government Investment:** DEA NRM / other government programme has provided direct financial support to the enterprise and maintains a high level of ongoing involvement, support, or management of the enterprise.
- (ii) **Limited Government Investment:** DEA NRM / other government programme has provided some form of direct financial support to the enterprise, often through funding the IAP clearing component of the value chain, but does not maintain ongoing involvement, support, or management of the enterprise.
- (iii) **No Government Investment:** DEA NRM / other government programme has not provided any kind of support to the enterprise and does not have any involvement therein.

Table 1 provides a list of the ten case studies, their categorisation in terms of government investment or support, and a brief description of their location and operations. Figure 3 shows the location of the ten case study sites across South Africa. Three of the case studies were in KwaZulu-Natal (i.e. Blaze Braai Products, Durban Eco-furniture and Eco-coffins), four in the Western Cape (i.e. Apex Wood World, Farleigh Eco-furniture, Green Ticket and Skills Exchange Co-operative), one in Mpumalanga (i.e. KwaMhlanga Baskets), one in Limpopo (i.e. Invader Crafts) and one in Gauteng (i.e. Wood@Heart). Wood@Heart also used IAP biomass harvested in the Free State Province around Ficksburg.

Table 1: List of case studies

Continuum of Government Investment / Support	Case Study Name	Location	Description
High Government Investment	Durban Eco-furniture Factory	Durban, KwaZulu-Natal	A state-funded and state-operated enterprise. South African National Parks (SANParks) manages the value chain, producing school desks from IAP biomass harvested from the greater Durban area and KwaZulu-Natal South Coast.
	Farleigh Eco-furniture Factory	Farleigh, Sedgefield, Western Cape	A state-funded and state-operated enterprise. SANParks manages the value chain, producing school desks from IAP biomass harvested from National Protected Areas and former plantation areas in the Outeniqua Mountains near George. Includes the Rheenendal Eco-coffin Factory.
	Eco-coffins	Cedara, KwaZulu-Natal	A state-funded and operated enterprise. The KZN Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA) operates the entire value chain, producing coffins, church pews and other furniture from IAP biomass harvested around Hilton and the KwaZulu-Natal Midlands.
Limited Government Investment	Wood@Heart	Waltloo, Pretoria, Gauteng	A privately-owned business producing school desks and environmental restoration mats using IAP biomass harvested around Ficksburg in the Free State Province. The business receives DEA NRM Programme funds for the IAP clearing, as well as funds towards the labour costs of production. DEA NRM Programme markets the desks and buys the environmental restoration products.
	KwaMhlanga Baskets	KwaMhlanga, Mpumalanga	A close corporation that was established in the early 2000's to make and sell baskets made from Poplar sticks. Originally supported by the DEA NRM Programme financially and technically, this enterprise's operations diminished significantly after the two-year support period ended. It is still functioning, but on a limited basis.
	Invader Crafts	Haernertsburg, Limpopo	A co-operative established in the early 2000's to make and sell interior décor products and furniture made from Black Wattle wood and bark, and <i>Eucalyptus</i> branches. The business has diminished and is functioning only on a limited basis since the primary entrepreneur was bought out by other co-operative members.
	Blaze Braai Products (Pty) Ltd	Cato Ridge, Durban, KwaZulu-Natal	A privately-owned charcoal manufacturing business using IAP material as an input. The business receives funding from the DEA NRM Programme for IAP clearing in various locations in KwaZulu-Natal, but the business also uses wood from other sources, including Namibia.
	The Green Ticket	Plettenberg Bay, Western Cape	A community initiative clearing IAP on municipal land, running a nursery and growing Honeybush and <i>Sceletium</i> . Also adding value to cleared IAP biomass (compost, wood chips and garden latte). A development trust is still being established to operate the enterprise and ensure re-investment into the local community.
	No Government Investment	Apex Wood World	George, Western Cape
Skills Exchange Co-operative		Stanford, Western Cape	A pilot project established by a co-operative to encourage low income homes to improve energy security, health and safety by using efficient wood cook stoves instead of paraffin cookers or open fires. Branches from clearing of IAPs by the Agulhas Biodiversity Initiative (DEA NRM Programme IAP clearing project) are used as input materials. While not currently a viable VAI, the project has demonstrated important social benefits from small scale biomass-to-energy at household level that can be achieved through DEA NRM investments.

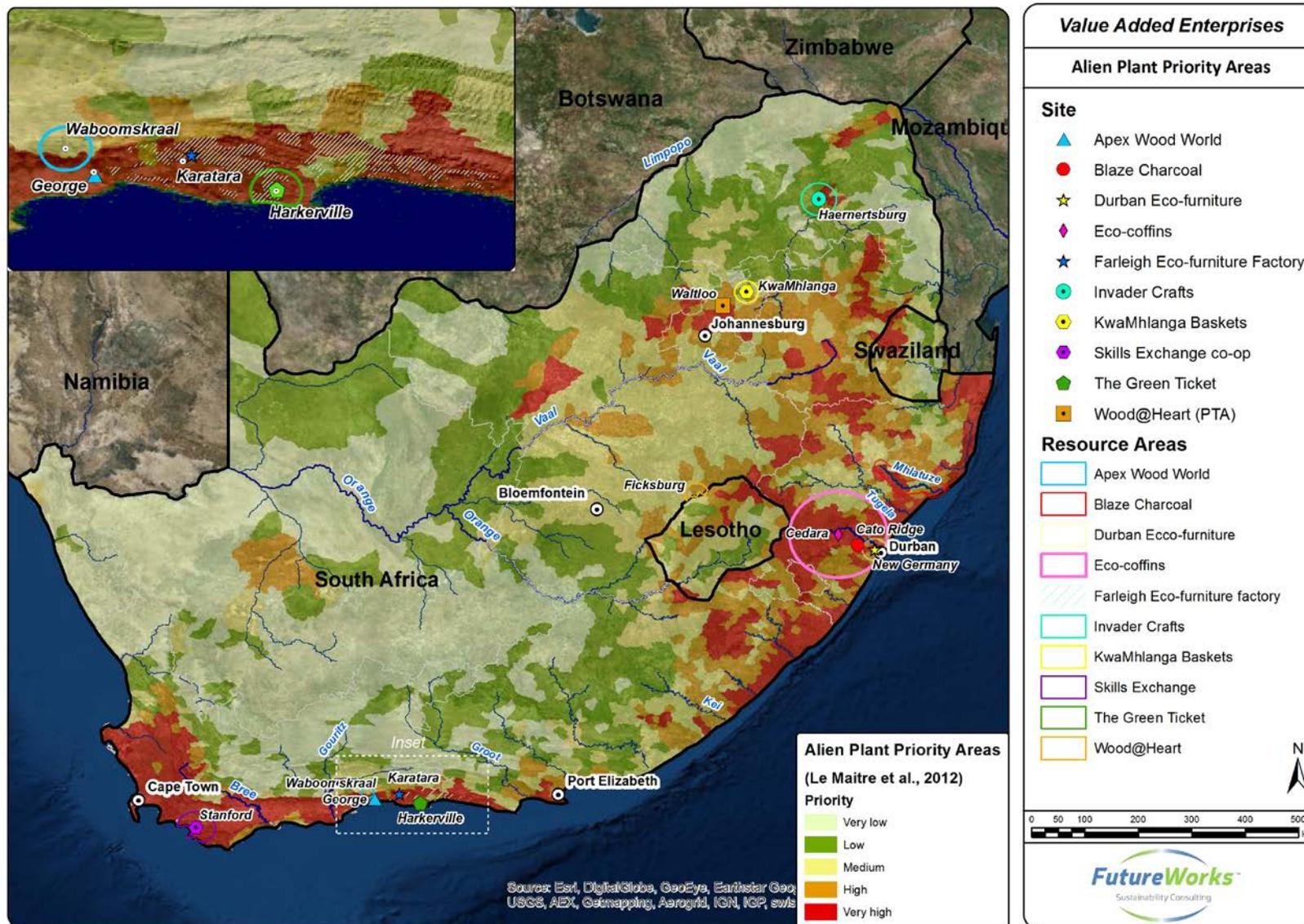


Figure 3: Location of case study enterprises

3.2.3 Questionnaire Development

The use of questionnaires in case study research is important for ensuring that similar types of information is collected between cases, so that these can be compared (Yin, 2012). Before questions are formulated, the different research issues need to be identified with knowledge of the kind of data necessary to study these issues (Bless & Higson-Smith, 1995).

Two questionnaires were developed for the case study research to guide the interviews. The primary questionnaire was designed for use with enterprises that were still in business, and was therefore used in eight of the ten case study interviews. The secondary questionnaire was a slightly modified version for use with the two failed enterprises studied (i.e. KwaMhlanga Baskets and Invader Crafts). The secondary questionnaire omitted certain questions and added others, with the purpose of gaining insights as to the key reasons for business failure and what could have been done to avert it. In both questionnaires, open-ended and closed-ended questions were used to facilitate the collection of relevant numerical and narrative data (Bernard, 2000). Both case study questionnaires included questions intended to gather data on the following issues:

- (i) The structure of the business, including ownership, number and profile of employees, investment in employee training, relationships to other businesses, and company organogram;
- (ii) How the business idea was arrived at and how the business was initialised;
- (iii) Details of the enterprise value chain;
- (iv) Involvement of the DEA NRM Programme;
- (v) How the business was financed;
- (vi) Costs and risks in the business.

The two case study questionnaires are included in Addendum A.

3.2.4 Data Collection

Seven of the ten case study interviews were conducted through face-to-face interviews and associated visits to the enterprise operations, and three were conducted telephonically. All interviews took place in the 6-month period between October 2015 and March 2016. The unit of analysis for the interviews was individual persons (Bless & Higson-Smith, 1995). The interviewees were either the owners of the enterprise, or senior project managers in charge of the enterprise operations.

There are distinct advantages to administering questionnaires face-to-face, including that unclear questions can be explained and sensitive questions can be asked more easily (Bernard, 2000). As the research involved asking potentially sensitive questions about the enterprise structure,

operations, markets and risks, face-to-face interviews were the preferred approach where possible. It was also useful to visit the enterprises to see the location and the value-adding processes and equipment, as this led to deeper discussions with the interviewees and greater insight into the context, challenges and achievements of each enterprise.

It was not possible or practical to conduct face-to-face interviews for three of the case studies and in these cases, telephonic interviews were undertaken. Two of these were failed businesses and one was a recently established enterprise in Plettenberg Bay in which the interviewee was based in Cape Town and unable to come to the site of the enterprise to be interviewed.

3.2.5 Data Analysis

The data and information from the questionnaires was imported into Microsoft Excel worksheets. This involved coding, grouping and ranking of answers to allow for analysis. Descriptive data analysis was conducted within Excel.

3.3 KEY INFORMANT INTERVIEWS

3.3.1 Purpose of the Key Informant Process

Key informant interviews were conducted with five institutions that provide financial and / or business incubation support to start-up and emerging enterprises with the primary aim of determining:

- (i) What factors these institutions use to evaluate the potential sustainability of enterprises seeking their support;
- (ii) The criteria and processes used to select which enterprises to invest in or support;
- (iii) The common terms and conditions applicable to investment / support given;
- (iv) How risks are managed in respect of the investment / support relationship.

In addition, ten individuals working on IAP value-adding projects or business development were interviewed with the aim of gaining additional insights into possible factors that affect enterprise sustainability and performance.

3.3.2 Selection of Key Informants

Using purposive sampling (Babbie & Mouton, 2001), three VCCs and two business incubators identified on the internet were selected for interview (Table 2). The broad criteria used for selecting appropriate institutions for interview were:

- (i) Institutions that finance or provide incubation support to start-ups and early growth enterprises where risk of failure is high (e.g. venture capital investors);
- (ii) Institutions that may finance or provide incubation support to enterprises that use novel technologies in untested / new markets;
- (iii) Institutions that finance or provide incubation support to enterprises that have a strong focus on job creation, training or empowerment.

Table 2: Key informant interview list: VCCs and business incubators

Category	Organisation & Interviewee	Location / Area of Service	Description
VCCs	Industrial Development Corporation (IDC) – Bulunko Govusa (Western Cape Regional Office)	National	IDC is a national development finance institution set up to promote economic growth and industrial development. It funds existing or emerging businesses that will benefit the South African economy, build industrial infrastructure, create jobs and alleviate poverty.
	Grovest Venture Capital – Jeff Miller (Director)	National	Grovest's investment strategy is to utilise the Income Tax Act Section 12J Venture Capital Structure as a base to create individual funds that invest in high growth, sector specific verticals. This strategy allows the investor to leverage the tax incentive to achieve above average risk adjusted returns.
	Kgatelopele Venture Capital and Private Equity – Keo Sibubane (Director)	National	Kgatelopele Venture Capital and Private Equity Pty (Ltd) is a 100% Black owned firm that seeks to invest in a variety of businesses. The firm focuses primarily on private equity and venture capital asset classes and targets mostly Black under-developed businesses that have a potential for growth if supported.
Business Incubators	Shanduka Black Umbrellas – Khaya Swazi (Port Elizabeth Branch)	National	Shanduka Black Umbrellas is funded by Transnet and focuses on supporting 100% Black owned businesses to become sustainable businesses. Enterprises that have been operating for 3 years are eligible for support, and only enterprises in sectors that could become suppliers to Transnet are considered.
	Furntech – legshaan Ariefdien (Chief Operating Officer)	National	Furntech focuses on supporting SMMEs in the woodworking and furniture sector.

Using a snowball sampling process (Babbie & Mouton, 2001; Explorable, 2016b), an additional ten key informants were identified during the case study, BI and VCC interviews. These additional key informants were representatives / professionals from various organisations around the country that are working on IAP related value-adding projects or business development (Table 3).

Table 3: Key informant interview list: professionals working on IAP VAI projects and business development initiatives

Project / Organisation	Interviewee	Location	Description
Western Cape Department of Environmental Affairs and Development Planning – Eco-Invest	Albert Ackhurst	Western Cape Province	The Department was requested to provide information on known IAP biomass based VAI in the Western Cape.
Berg River Improvement Project	Jason Mingo	Berg River, Western Cape Province	The project plans to establish IAP biomass based VAI, the opportunities for which are being assessed through a series of technical studies. The opportunity for business creation through restoration of cleared areas has also been identified.
Southern Cape Landowners Initiative (SCLI)	Cobus Meiring	Southern Cape	SCLI is a programme clearing IAPs in the greater George region. Some of their funding is from the DEA NRM Programme.
SANParks - Eco-furniture Programme	Olga Jacobs	National	SANParks experiences in operating the Eco-furniture Programme was discussed.
SANParks - Eco-furniture Programme	Grant Trebble	National	Requested to provide additional technical information on the two Eco-furniture Factory case studies.
DEA NRM Programme	Michael Braack	National	Discussed experiences, lessons learned from the DEA NRM VAI Programme.
DEA NRM Programme	Sarah Polonsky	National	Discussed experiences, lessons learned from the DEA NRM VAI Programme.
Eden Project	John Thorne	Vermaaklikheid, Western Cape	The Eden Project intends to create jobs and restore biodiversity through harvesting IAPs to produce briquettes and firewood. Opportunities and challenges discussed.
Flower Valley Conservation Trust (FVCT)	Lesley Richardson	Agulhas Plains area, Western Cape	FVCT clears IAP in the Agulhas region. Opportunities and challenges for IAP biomass based VAI discussed.
Better Beer Better Barley (SAB-WWF programme)	Jan Coetzee	Riviersonderend – Western Cape	Discussed a pilot biomass-to-energy project that was being established in relation to South African Breweries' (SAB) barley production and IAP clearing projects.

3.3.3 Questionnaire Development

A questionnaire was developed to guide the five key informant interviews conducted with VCCs and business incubators. The questionnaire included a series of open ended questions intended to gather data on the following issues and is included in Addendum A:

- (i) Details of investment / support given to start-ups and emerging enterprises;
- (ii) Enterprise selection approach and methods used;
- (iii) Application process and minimum requirements that must be met by the enterprise;
- (iv) Involvement with IAP biomass based VAI;
- (v) Terms and conditions of loans / support / investment that are applied;
- (vi) How risks are managed.

No information / question checklist was used for the other ten key informant interviews. These interviews were intended to be open-ended discussions in which individuals working on the development of projects or enterprises using IAP biomass were given the opportunity to talk about their work, and / or provide their insights and perspectives on the kinds of issues and criteria that they felt were important to the context of the research study.

3.3.4 Data Collection

The key informant interviews with the three VCCs and two business incubators were conducted telephonically for reasons of practicality and cost (Babbie & Mouton, 2001; Robson, 2002). Seven of the remaining ten key informant interviews were conducted telephonically, two *via* email correspondence, and one as a face-to-face meeting. All interviews took place in the 6-month period between October 2015 and March 2016. The unit of analysis for the interviews was individual persons (Bless & Higson-Smith, 1995).

3.3.5 Data Analysis

The data and information from the questionnaires was imported into Microsoft Excel worksheets. The data was grouped, coded and ranked to allow for analysis. Descriptive data analysis was conducted within Excel.

3.4 DEVELOPMENT AND APPLICATION OF A MULTI-CRITERIA DECISION ANALYSIS TOOL

3.4.1 Overview

In line with the research objectives, this stage of the research process aimed to identify whether it was possible to develop and use a MCDA tool to evaluate IAP biomass based enterprise sustainability and performance in job creation, natural capital restoration and human capital development.

The problem of making choices within a given set of constraints and objectives has been a focus of management-related sciences for many years (Forsyth *et al.*, 2012). Sophisticated approaches (such as multi-criteria decision making) have been developed to allow for simultaneous consideration of multiple objectives and constraints in relation to information which may vary in both type and quality (Saaty, 1990; Forsyth *et al.*, 2012).

MCDA is a set of procedures that analyse alternatives based on distinct criteria and by deriving scores that can provide an overall ordering of options, from the most preferred to the least preferred (Ahmed *et al.*, 2012). A series of techniques may be used to facilitate scoring, ranking

or weighting of the decision-making criteria by stakeholders (i.e. weighted summation, concordance, analysis etc.). These techniques ideally operate within a transparent framework that encourages informed decision-making through participative processes (Ahmed *et al.*, 2012). This framework can also be supported by using the best available scientific knowledge (Suedel *et al.*, 2011). MCDA typically involves the following seven steps (Mabin & Beattie, 2006; Dodgson *et al.*, 2009):

Step 1: Establish the decision context: This includes the aims of the MCDA and its target audience or users.

Step 2: Identify the options to be evaluated in the MCDA.

Step 3: Identify the criteria that reflect the value associated with the consequences of each option.

Step 4: Describe or score the expected performance of each option against the criteria.

Step 5: 'Weighting' - assign weights for each of the criteria to reflect their relative importance to the decision.

Step 6: Combine the weights and scores for each of the options to derive an overall value.

Step 7: Examine the results.

Step 8: Conduct a sensitivity analysis of the results to changes in scores or weights

A standard feature of MCDA is a performance matrix, or consequence table, which sets out how each of the options being appraised scores on each of the weighted criteria (Dodgson *et al.*, 2009).

3.4.2 Development and Application of the Multi-Criteria Decision Analysis Tool

In accordance with the accepted MCDA process (Dodgson *et al.*, 2009), the steps that were undertaken in the development and application of the MCDA tool for evaluation of the ten IAP biomass based VAI case studies are outlined below.

3.4.2.1 Establishing the Decision Context

The decision context was defined as the need to evaluate IAP biomass based enterprise sustainability and performance in job creation, natural capital restoration and human capital development. The eventual users of the MCDA would be the DEA NRM Programme executives making choices in respect of which IAP biomass based VAI they should provide support to.

3.4.2.2 Identify the Options to be Evaluated

The options to be evaluated are the 10 case studies selected for research as part of the study process.

3.4.2.3 Identify the Criteria

In recognising that IAP biomass based VAI are of interest because of their potential to deliver desired public benefits in line with the DEA NRM Programme goals (e.g. creating jobs, developing human capital and restoring natural capital) (DEA, 2016), the aim was to select MCDA criteria that would permit the evaluation of enterprise sustainability as well as the abovementioned beneficial impacts.

According to Dodgson *et al.* (2009) it can be helpful to group criteria into sets that relate to separate and distinguishable components of the overall objective for the decision. Based on the data gathered during the case studies and key informant interviews, three categories of criteria were identified:

1. **Enterprise sustainability** – criteria for scoring the key internal structural elements of each enterprise that influence its resiliency over time;
2. **Development impact** – criteria for scoring the contribution of each enterprise to employment generation; skills development; empowerment of Black people, women and youth; poverty alleviation; household energy, water and food security; and local economic development.
3. **Natural capital impact** – criteria for scoring the performance of each enterprise in eradicating IAP, protecting water resources and restoring natural capital.

After being considered for completeness, redundancy, operationality, mutual independence, and double counting (Dodgson *et al.*, 2009), the criteria and indicators were placed in a performance matrix and linked to a numerical value scale. The numerical value scale ranged from -2 (negative impact, performance or risk), to 0 (neutral), and then +1 through to +5, with scores of +1 to +5 indicating increasing levels of positive impact or performance. For ease of use, the performance matrix was constructed in Microsoft Excel.

3.4.2.4 Score the Performance of each Option

The performance matrix was completed using quantitative and qualitative data collected during the case study and key informant interview research, where each of the ten case studies were scored in respect of their performance against the identified criteria and indicators.

3.4.2.5 Weighting

The setting of weights brings to the fore the question of whose preferences count most (Dodgson *et al.*, 2009). Given the decision context (see Section 3.4.2.1), the main DEA NRM Programme

objectives (DEA, 2016) as described in Chapters 1 and 2 were used as the basis for identifying preferences and setting the weightings.

A method of 'swing weighting' was used to elicit weights for all the criteria (Goodwin & Wright, 1998; Dodgson *et al.*, 2009). This approach is based on an assessment of the relative importance of each criterion in relation to the others in the same category. The criteria were weighted by taking into consideration: (i) the number of case study enterprises that had indicated the issue was important for sustainability; (ii) whether one or more of the VCC and business incubator interviews had indicated that the issue was an important selection factor; and (iii) whether the criteria were identified during the literature survey as factors affecting enterprise sustainability. The relative importance of various criteria was also discussed during the other ten key informant interviews.

Owing to the limited number of criteria in each category, a weighting scale of 1 to 5 was used, where 1 represented low importance and 5 represented high importance. To make these comparisons, assessors must consider both the difference between the least and most preferred options, and how much they care about that difference (Dodgson *et al.*, 2009).

Each of the three categories of criteria (i.e. enterprise sustainability, development impact and natural capital impact) were considered to be equally important in the decision-making process. Given that some categories had a greater number of criteria than others, the weighting of each criterion was normalised to a percentage of the total weights of all criteria in that category. This allowed the total weight of all criteria in each category to be normalised to 1. This allows for comparison of the relative performance of each alternative in respect of each category of criteria.

3.4.2.6 Combine the Weights and Scores to Derive an Overall Value

Microsoft Excel was used to prepare a performance matrix containing the weighted scores for each alternative. The overall preference score for each alternative is the weighted average of its scores on all the criteria. If the preference score for option i on criterion j is represented by s_{ij} and the weight for each criterion by w_j , n being the criteria, the overall score for each option, S_i , is given by:

$$S_i = w_1s_{i1} + w_2s_{i2} + \dots + w_ns_{in} = \sum_{j=1}^n w_j s_{ij}$$

(formula extracted from Dodgson *et al.*, 2009).

Simply put, this process involved multiplying each case study's score on each criterion by the importance weighting of the criterion, then adding the products to give the overall preference

score for each case study.

3.4.2.7 Examine the Results

The ordering of options is given by the weighted average of all the preference scores. The results were graphed in Microsoft Excel using bar charts, and analysed in several ways including:

- (i) Comparison of the total scores of each enterprise, providing an indication of which enterprises performed better overall on all criteria than others;
- (ii) Comparison of the relative performance of each enterprise in respect of each category of criteria;
- (iii) Individual analysis of each enterprise to determine which criteria, and categories of criteria it performed well on and which it did not.

3.4.2.8 Sensitivity Analysis

Sensitivity analysis provides a means for examining the extent to which scores allocated or weightings given affect the final overall results (Dodgson *et al.*, 2009). It involves testing how the ranking of options might change under different scores or weightings and identifying ways in which options might be improved. This process involves the identification and evaluation of 'advantages' and 'disadvantages' in the results. An advantage is a high score on a heavily weighted (important) criterion and a disadvantage is a low score on an important criterion (Dodgson *et al.*, 2009). Disadvantages are important because they reduce the overall preference. Understanding the advantages and disadvantages helps to point to areas where options might be improved.

Sensitivity analysis was carried out on the completed performance matrix, resulting in the adjustment of several criteria scores and weightings.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

The results of the research are presented according to the research methods followed in the study and include:

- (i) Results of the case study research;
- (ii) Results of the key informant interviews;
- (iii) The MCDA tool that was developed;
- (iv) Results of the evaluation of the ten case studies using the MCDA tool.

4.2 CASE STUDIES

4.2.1 Overview of the Case Studies

4.2.1.1 Durban Eco-furniture Factory

The Durban Eco-furniture Factory is one of five Eco-furniture factories being operated by South African National Parks (SANParks) as a service provider to the DEA NRM Programme. The Eco-furniture Factory programme is a social and environmental initiative and does not aim to generate profit. The Durban Eco-furniture Factory produces school desks made from IAP wood (mainly *Eucalyptus*) collected through clearing operations on private and state land in the greater Durban region, the KwaZulu-Natal midlands and South coast.

The factory is funded by the DEA NRM Programme, the National Jobs Fund and from the sale of the desks it produces. The factory leases dry mill premises at New Germany and a wet mill facility at Alverstone. It also has a wet mill at Howick, which is located on a land reform farm, and at which the land claimants are employed. Using state funding, the enterprise has purchased and owns most of the equipment required in the enterprise value chain.

There are four contract harvesting teams that identify and negotiate access to the IAP clearing sites and clear IAP. Partnerships have been established with eThekweni Municipality and the Kloof Conservancy to facilitate access to land. This has been a useful approach for increasing efficiencies in raw material supply. However, shortages have still been experienced, resulting in the need to supplement inputs with commercially produced timber.

Usable IAP material from harvesting operations is transported to the factory's wet mills for processing. Lumber is transported to a private kiln in Howick for drying and then transported to the dry mill. The dry mill produces the school desks, which are flat packed and shipped to a regional hub to be distributed to schools and assembled on site.

The school desks are produced to supply orders secured by the DEA NRM Programme from the South African Department of Basic Education. The DEA NRM Programme determines the wholesale price of the desks and SANParks must produce the desks cost effectively within this pre-determined price. The price-setting process is influenced by the desire to under-cut the price of cheap, poor quality imported school desks. The initiative is also intended to demonstrate the benefits of local production (including using IAP as a resource) and assist in ensuring that South African learners have decent school desks.

4.2.1.2 Farleigh Eco-furniture Factory

The Farleigh Eco-furniture Factory is also operated by SANParks as a service provider to the DEA NRM Programme and produces school desks from IAP wood (mainly *Eucalyptus*) to supply orders centrally secured by the DEA NRM Programme. The enterprise has a strong relationship with the MTO Group (formerly Cape Pine) and PG Bison, in which *Eucalyptus* can be accessed from Forestry Exit Areas¹ around George that these companies have been in the process of rehabilitating and handing over to SANParks. *Eucalyptus* is also collected from various SANParks-managed National Protected Areas between Knysna and George.

The enterprise is funded by the DEA NRM Programme, other DEA funding streams, and from the sale of the desks it produces. The dry and wet mills are located on state land at the Farleigh Forest Station. The operation also includes a small dry mill facility in Rheenendal that was originally set up to produce IAP coffins (i.e. eco-coffins). While there is a kiln at the wet mill, it is not operating efficiently and some of the lumber boards must be taken to private kilns in George and Knysna for drying. Using state funding, the enterprise has purchased and owns most the machines and equipment required in the value chain.

There are three harvesting teams which cut the timber, extract it to roadside, and transport it to the wet mill. The team also rehabilitates the cleared areas, which usually involves follow-up IAP removal and stabilisation of soil erosion. While the Farleigh Eco-furniture Factory has had a ready source of IAP timber inputs through clearing SANParks-managed areas and Forestry Exit Areas,

¹ Some 22,500 hectares of forestry plantation area in the Southern and Western Cape regions is in the process of being returned to conservation-related land uses in terms a Forestry Exit Strategy developed by the National Department of Agriculture, Forestry and Fisheries in 2001, and subsequently amended (Wood Southern Africa & Timber Times, 2015).

these sources are diminishing and will require the enterprise to invest in securing new source areas. These source areas are likely to be further from the factory, resulting in increased transport costs. At the time of the study, there were plans to move the main dry milling facility to George, which would be closer to future IAP source areas.

Both the Durban and Farleigh Eco-furniture Factories use a government-prescribed daily wage for all staff. This was said by both to have impacted on the efficiency of these factories' operations and may have limited their ability to scale-up production to meet increasing market demand.

4.2.1.3 Eco-coffins Factory

The Eco-coffins Factory was initiated in 2005 with a grant from the World Bank's Innovation Programme and produces quality, low cost solid wood coffins, church pews and other furniture made from IAP wood (mainly Pine and *Eucalyptus*). It was established as a social and environmental initiative, aiming to clear IAP and reduce the cost of burials for low income earners. This represents an important socio-economic benefit in a context where many South African families must take out loans to pay for the cost of funerals and burials. While the project has declined in scale and production levels over time, it has diversified its product line, resulting in improved resilience to market fluctuations.

The factory dry and wet mills are located at Cedara College in facilities owned by the state. There are two contracted harvesting teams which clear IAPs on private and state land in the KwaZulu-Natal midlands. Usable timber is extracted from cleared areas and transported to the wet mill at Cedara where the logs are processed and the lumber dried at a kiln on site. In some cases, the timber is processed at the place of harvest using a portable saw mill. The dry mill, which is located on the same site as the wet mill, processes the lumber into final products.

The factory does not intend to be profit-making, and is supported financially by the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA).

Through building partnerships with faith based organisations, municipalities and traditional leadership, the project has effectively addressed critical market barriers, established a network marketing system, and a distribution network.

4.2.1.4 Wood@Heart

Wood@Heart is a private enterprise that operates a woodworking factory in Pretoria, as well as an IAP clearing and wet milling operation in the Ficksburg area. Wood@Heart receives financial support from the DEA NRM Programme for these operations (primarily contributing towards the cost of labour), which are centred on the production of IAP school desks, mainly using Poplar,

and erosion control blankets from low grade, small-size branches that cannot be used for furniture manufacture.

The business controls its entire value chain from harvesting raw IAP materials, to primary processing of these materials at its Ficksburg wet mill, transport using its own trucks, and final manufacture at its Pretoria dry mill. At present the school desks and erosion control blankets are being produced to supply the DEA NRM Programme, but other market opportunities have also been identified.

Wood@Heart indicated that it uses government-prescribed daily wage rates as a minimum. However, it supplements these prescribed wage rates with additional performance-based remuneration to incentivise enhanced production efficiencies in key areas of its value chain. This was said to be an important management intervention underpinning the profitability of the enterprise, as well as its ability to rapidly scale-up production to take advantage of increasing market demand.

4.2.1.5 KwaMhlanga Baskets

KwaMhlanga Baskets is a private enterprise that was established with the support of the DEA NRM VAI Programme. The enterprise hand-makes baskets using sticks from Poplar trees (and for a while also used bark from Black Wattle trees) that were being cleared by the DEA NRM Programme in KwaMhlanga. The DEA NRM Programme support was offered for a two-year period, after which the enterprise was required to become self-sustaining. While receiving support, the enterprise employed 25 people who received a monthly stipend to make baskets. In addition, product development, training and marketing support was provided. Once the support from the DEA NRM Programme ended, the enterprise began to decline. Today, the enterprise comprises only five people and is struggling to be profitable.

The baskets are sold mainly to florists and nurseries in Johannesburg. The client base is small and the orders received are irregular. Since the DEA NRM Programme support ended, market development and marketing investment has been limited, and consequently the demand for the products has also declined significantly. The location of the enterprise some distance from its main market in Johannesburg, and declining local availability of raw materials were also reported as challenges.

4.2.1.6 Invader Crafts

Invader Crafts was one of the first enterprises that received support from the DEA NRM VAI Programme. The business is based in Haernertsburg and was founded by a farmer interested in finding a use for Black Wattle that had invaded her farm. The business, which involved 10 people at peak, produced hand-made furniture, window blinds, baskets and other home décor items from

Eucalyptus sticks, Black Wattle bark and wood. The DEA NRM Programme provided financial, product development and training support to the enterprise. Initially, the enterprise was solely owned by the farmer that started it, but the business later evolved into a co-operative with shared ownership by local community members involved in the business operations.

The business was reasonably successful for some time, but despite efforts to train co-operative members to take on the management role in the business, the dependency on the skills and energy of the founder entrepreneur was never overcome. Once the DEA NRM Programme support phase ended, the cost of product marketing and the level of energy required to manage the inter-personal dynamics within the co-operative led to the founder entrepreneur selling her share in the co-operative. After this, the enterprise began to decline and is now run on a limited basis by two remaining co-operative members.

4.2.1.7 Blaze Braai Products

Blaze Braai Products (Pty) Ltd is based in Cato Ridge and produces charcoal and briquettes. These are packaged and marketed in South Africa and overseas (mainly Australia). The enterprise contracted with the DEA NRM Programme in 2012, receiving Land User Incentive Scheme and Working on Fire funding to allow it to access IAP biomass in Umhlathuze River, Nqaleni Valley, and from various locations in the KwaZulu-Natal midlands. This has allowed the enterprise to establish a local raw material source and be less dependent on charcoal resources imported from Namibia. The enterprise also wanted to create more local jobs and support the local economy.

Blaze Braai Products still obtains the majority (90%) of its raw material inputs from Namibia, which may amount to up to 2,000 tonnes per month. When Blaze buys in charcoal from Namibia, its operations are largely confined to grading, packaging and marketing the products.

The remaining 10% of raw material inputs are sourced from IAP clearing (mainly Black Wattle, *Eucalyptus*, *Casuarina*, *Syringa* and Mopane), which takes place mostly on private farms, where Blaze Braai Products secures the landowner agreements required. The business has purchased its own loggers, trucks and other equipment required for the IAP clearing and charcoal production processes. Blaze Braai Products reports that the recovery rate of usable timber from IAP clearing operations is relatively low (at best 61% of cleared material can be recovered) when compared with timber plantation yields. The felled timber is left for two weeks to dry before it is transported to a site where retorts have been set up (usually within 50km of the clearing operations), then cut into pieces, put through the retort and carbonised. It is then transported to the Cato Ridge facility, where it is graded, packaged and distributed.

4.2.1.8 The Green Ticket

The Green Ticket is an Expanded Public Works Programme (EPWP) funded project in the Harkerville area (Western Cape) that has involved the local community in clearing of IAP from an agricultural property owned by the Bitou Local Municipality. The cleared property has since been developed to a plant nursery and a Honeybush Tea plantation in partnership with the community. Value-addition options are currently being investigated for the IAP biomass (mainly Black Wattle and *Eucalyptus*) that has been cleared.

The EPWP funding model is such that a Development Trust is still to be established to permit the community project to begin trading its products. The Trust will facilitate a partnership between the Bitou Municipality and the local community, with the aim of ensuring that the benefits from the initiative are invested appropriately into the local community. Going forward, the Bitou Municipality intends to engage The Green Ticket to clear other municipal properties of IAP and assist it to establish agri-villages and home food gardens.

4.2.1.9 Apex Wood World

Apex Wood World was an existing pine timber milling facility in George (Western Cape) that was bought in June 2015 by individuals working as project managers for IAP clearing in the Southern Cape. The facility currently sources IAP timber (Pine, *Eucalyptus* and Black Wattle) from the Waboomskraal area (25km away from the factory site) and manufactures wooden huts and affordable housing.

The IAP logs are collected and brought to the factory by crane truck, which are then processed, kiln dried, and put through a special shaping machine that creates half-round planks. These are used to manufacture the final products, which are sold in the southern Cape region. The business has employed a dedicated marketing resource that cold calls on potential bulk buyers (e.g. municipalities for low income housing). The existing client base of the former business has been retained.

The by-products from the manufacturing process are wood shavings, chips and offcuts. The factory currently sells the shavings to equestrian facilities, and is interested in using the chips and offcuts in a biomass-to-energy system that would power the kilns. They have also expressed interest in using biomass that cannot be processed for making charcoal.

The business is owned by entrepreneurs with a specific interest in making an IAP biomass based VAI work. The values of the business owners are, unusually, centred less on operating a profit-making enterprise than on being able to demonstrate that it is possible to use IAP biomass to create sustainable employment and produce goods which meet a social development need.

4.2.1.10 Skills Exchange Co-operative Efficient Wood Cook Stove Project

The Skills Exchange Co-operative was set up to promote nature-based tourism enterprises with the local communities in the Stanford area. There are currently five directors of the co-operative, each of whom operates a tourism-related business, and the Stanford community are co-operative members.

The directors of the Co-operative are part of the Agulhas Biodiversity Initiative (ABI) and have been engaged in / aware of the ABI IAP clearing work that has been taking place on private farms on the Agulhas plains. In recognising the issues associated with cut biomass being left on the farms and creating a fire risk, the Skills Exchange Co-operative was interested in finding uses for the biomass that would create jobs and address local social needs. The Co-operative therefore motivated for and received a R20,000 grant from ABI through its Small Grants Programme, and used this to buy 14 efficient wood cook stoves as a pilot project. The stoves were tested by representatives of the local community as a means of addressing local energy security and health, as a large majority of the local community use paraffin stoves or open fires that are hazardous and create poor indoor air quality.

It is anticipated through the future expansion of this initiative (for which funding has still to be found), opportunities would be created for people to collect, cut and sell IAP wood billets (*Eucalyptus*, Port Jackson Willow and Rooikrans) for use in the stoves. The project aims to address local household energy security, sustainable livelihoods (i.e. more sustainable and lower cost household energy sources), community health and safety, and potentially income generation for a limited number of individuals.

4.2.2 Enterprise Types and Ownership

The ten case studies comprised four different types of enterprises: (i) government-owned enterprises; (ii) private enterprises (i.e. closed corporations or proprietary limited companies); (iii) co-operatives and (iv) non-profit organisations (i.e. The Green Ticket, which is to be established as a Development Trust). Table 4 shows that the three case studies with high levels of government investment are government-owned enterprises (i.e. Durban and Farleigh Eco-furniture Factories, and Eco-coffins), while those with limited or no government investment are either private enterprises, co-operatives or non-profit organisations.

Table 4: Enterprise type per case study and level of government investment

Enterprise Type	High Government Investment			Limited Government Investment					No Government Investment	
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
Government owned	✓	✓	✓							
Private enterprise				✓	✓		✓		✓	
Co-operative						✓				✓
Non-profit organisation								✓		

Figure 4 shows that the two co-operatives and one non-profit organisation generally had higher levels of Black, women and youth ownership when compared with the private enterprises. KwaMhlanga Baskets, the only private enterprise case study with 100% Black / women / youth ownership, was originally established through the DEA NRM VAI Programme as a development initiative, while the others were established independently by entrepreneurs.

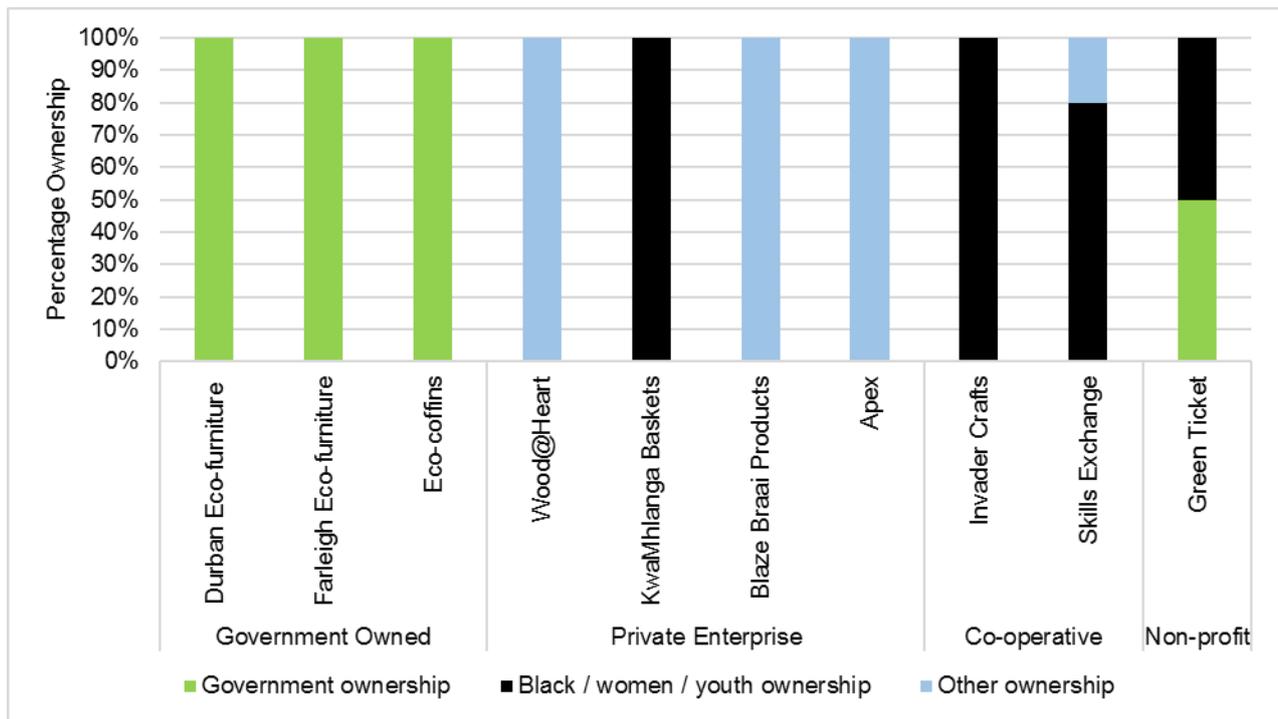


Figure 4: Percentage government, Black / women / youth or other ownership per case study and enterprise type

4.2.3 Employment

The ten case study enterprises differ in the number of jobs created, ranging from two employees (i.e. Invader Crafts) to five hundred employees (i.e. Blaze Braai Products). Figure 5 shows that Blaze Braai Products, Wood@Heart and the Durban Eco-furniture Factory generate the greatest numbers of jobs (300 jobs or more). Most employees in all case enterprises are Black people, women or youth (i.e. preferential groups). The three government-owned enterprises and enterprises set up as development initiatives (i.e. Green Ticket, Skills Exchange Co-operative, Invader Crafts and KwaMhlanga Baskets) tended to demonstrate a slightly greater proportion of employees from preferential groups when compared with the larger private enterprises such as Wood@Heart and Blaze Braai Products. The co-operatives and non-profit organisations tended to create relatively low numbers of jobs compared with the other types of enterprises.

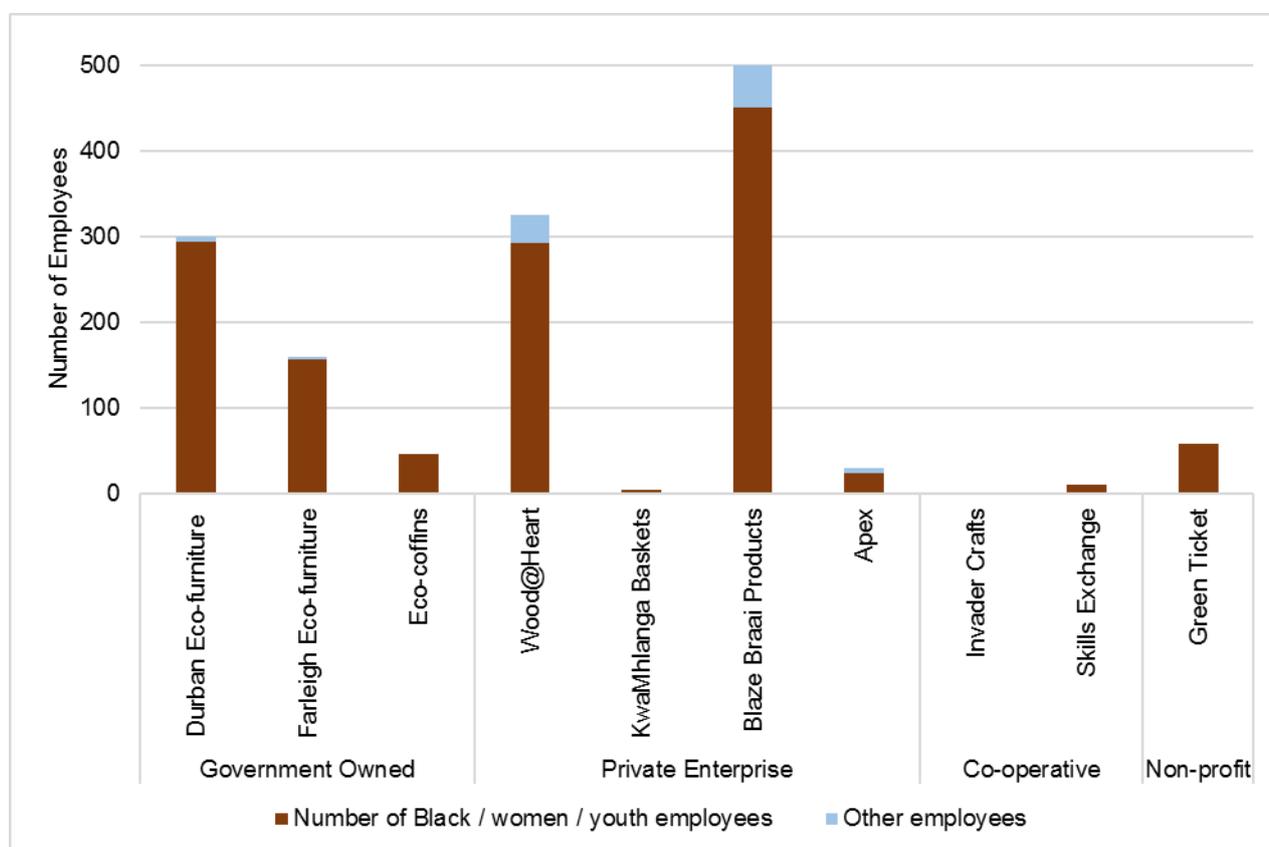


Figure 5: Employment per case study and enterprise type

4.2.4 Skills Development

The ten case study enterprises had invested to differing extents in training their employees. All the enterprises which had been established with state support, which includes the two Eco-furniture Factories, Eco-coffins, KwaMhlanga Baskets, Invader Crafts and Green Ticket, reported that most or all the employees had been trained as part of the enterprise operations. The three private enterprises which were established without any government support (i.e. Wood@Heart,

Blaze Braai Products and Apex Wood World) indicated that some of their staff, and particularly those involved in IAP clearing activities funded by the DEA NRM Programme, had been trained. Given the focus of the Skills Exchange Co-operative on community development, all community members involved in the initiative had been trained. Table 5 shows a summary of the skills development per enterprise and level of government investment.

Table 5: Skills development per enterprise and level of government investment

Skills Development Undertaken	High Government Investment			Limited Government Investment					No Government Investment	
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	KwaMhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
All / nearly all employees trained	✓	✓	✓		✓	✓		✓		✓
More than half but not all employees trained				✓			✓		✓	
No / very little training										

4.2.5 Sources of Finance

Table 6 presents a summary of the status of the case study enterprises in respect of financial capital and assets. All the enterprises studied, except for the Skills Exchange Co-operative, had managed to source sufficient finance / start-up capital to obtain the necessary equipment and capital assets needed to operate the business.

Several enterprises indicated that additional financial capital would be needed to address inefficiencies in the value-adding process or for expansion. Farleigh Eco-furniture Factory needed finance for a new kiln, the lack of which was creating significant additional transport and outsourcing costs. Apex Wood World indicated that, although it had enough capital to start the business, it needed additional finance for expansion.

The source of the financial capital differs between the enterprises. Table 7 shows that five of the enterprises used government funding for some or all the initial capital requirements of the business. This included two of the three government-owned enterprises (i.e. Durban and Farleigh Eco-furniture Factories), the two enterprises established with support from the DEA NRM VAI Programme (i.e. KwaMhlanga Baskets and Invader Crafts) and The Green Ticket (established using EPWP funding). Of these enterprises, only Invader Crafts indicated that part of the capital

requirement was self-financed by the entrepreneur, whereas in all other cases the start-up costs were covered through government grants.

Wood@Heart, Blaze Braai Products and Apex Wood World relied on loan finance and self-financing to establish their capital base. Skills Exchange Co-operative started its pilot efficient wood cook stove project with donor funding, and Eco-coffins used grants from the World Bank and the United Nations Industrial Development Organisation (UNIDO) to buy the required equipment and start the enterprise.

Table 6: Status of financial capital and capital assets requirements having been met per enterprise and level of government investment

Financial Capital & Capital Assets Status	High Government Investment			Limited Government Investment					No Government Investment	
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
All required finance and capital assets have been secured	✓		✓	✓	✓	✓	✓	✓		
Some or part of the financial capital and capital assets requirements has been secured		✓							✓	
Financial capital and required capital assets have not been secured										✓

Table 7: Source of initial financial capital

Source of Financial Capital	High Government Investment			Limited Government Investment					No Government Investment	
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
Government funding	✓	✓	✓		✓	✓		✓		
Loan finance				✓			✓			
Self-financed				✓		✓	✓		✓	
Donor funding			✓							✓

The three enterprises in the 'high government investment' category are funded by income from product sales and by government. This means that capital requirements and any operational cost subsidisation are met through government funding. All three enterprises raised concerns about their dependence on government for operational cost subsidisation. Shifts in government funding priorities were cited as a concern regarding the availability of such funding on an annual basis. For example, the Eco-coffins project reported that its annual funding from government has decreased from R5 million to R2 million, and that 'privatisation' of the enterprise is being considered as one of the measures to ensure it can continue operating.

Enterprises in the 'limited government investment' category receive limited funding from government for specific operational activities (for example the labour costs of clearing IAP), and all other costs must be covered by income from product sales, self-financing, loan finance, or donor funding. Where the government funding comes from the DEA NRM Programme, it is disbursed *via* 'Implementing Agent' contracts with the businesses. Several of the case study respondents cited difficulties with this arrangement, including delays in contracting, delays in payments being disbursed, poor level of cost-recovery that the funding provides for, and administratively heavy reporting requirements.

Enterprises in the 'no government investment' category do not receive any kind of government funding and rely entirely on self-funding, loan finance or donor funding.

4.2.6 Marketing

Investment in product marketing and proximity to markets were cited in the case study interviews as key factors impacting on enterprise profitability and sustainability. Investment in product marketing is intended to drive sales and expand the market for the products, and proximity to markets may affect product pricing and therefore competitiveness.

The two 'failed' enterprises studied (i.e. KwaMhlanga Baskets and Invader Crafts) indicated that lack of capacity and investment in product marketing once government financial support ended caused a decline in the enterprises' operations. Both enterprises were also located far from their markets, and considering that the volumes of product traded were relatively low, the high cost of transport was cited as a significant issue affecting competitiveness.

Blaze Braai Products and Apex Wood World employ marketing staff to drive product sales. The business owners actively invest in identifying new markets and in developing strategies for deepening penetration into existing markets. For these enterprises, proximity to markets appeared to be less of a concern. Of all the enterprises studied, only Blaze Braai Products was exporting its products. All others were producing for local markets.

The three enterprises producing school desks (i.e. Durban and Farleigh Eco-furniture Factories, and Wood@Heart), produce to supply sales orders centrally obtained by the DEA NRM Programme from the Department of Basic Education. The price of the school desks is fixed at a level intended to undercut the cost of imported desks, a market distortion which makes it difficult for some of the factories to recover the cost of manufacture from sales income alone. The Farleigh Eco-Furniture Factory has indicated its intention to address this problem through diversifying its product range and internalising the marketing of all products other than the school desks.

The Eco-coffins project relies on network marketing, using partnerships with municipalities, traditional leaders and faith-based organisations to drive product sales. The potential use of more conventional marketing channels and methods was considered inappropriate, as there was fear that the enterprise would be seen to be using state-subsidised operations to undercut other profit-making businesses.

4.2.7 Partnerships

All enterprises indicated that they had benefitted from partnerships in one or more component of their value chains. Table 8 shows that all enterprises use partnerships to assist in facilitating access to land for IAP harvesting. These partnerships are with government entities that own land needing to be cleared, large forestry companies with land needing to be restored in Forestry Exit Areas in the southern Cape, and private farmers.

KwaMahlanga Baskets and Invader Crafts reported beneficial partnerships with interior decorators, who assisted them developing products that could meet emerging market needs. Eco-coffins used partnerships to establish an effective network marketing system. Many of the enterprises also reported the benefits of establishing funding partnerships with the DEA NRM Programme, donor funders or other government departments.

Table 8: Beneficial partnerships

Value Chain component where partnerships were beneficial	High Government Investment			Limited Government Investment					No Government Investment	
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
Access to IAP for harvesting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Product development					✓	✓				
Marketing			✓							
Funding			✓	✓	✓	✓	✓	✓		✓

4.2.8 Production Efficiency

Given that the Durban Eco-furniture Factory, Farleigh Eco-furniture Factory and Wood@Heart were producing the same products (school desks) in response to orders obtained by the DEA NRM Programme, information on comparative production efficiencies of the three enterprises, and the key factors affecting this, was collected.

Wood@Heart reported being able to produce 24 school desks from 1m³ of IAP timber at a cost of R440 / desk. In contrast, the Farleigh and Durban Eco-furniture Factories could produce 9 to 10 desks per 1m³ of timber, at a cost of R781 and R1200 / desk respectively. The price was fixed at R650 per desk by the DEA NRM Programme, indicating that only Wood@Heart was producing these at a profit.

One of the key reasons cited for the differences in production efficiencies was the ability of Wood@Heart as a private enterprise to use performance-based pay structures. The two Eco-furniture Factories are required to comply with the Public Finance Management Act (Act No. 1 of 1999), which requires that government-prescribed daily wage rates be applied.

4.2.9 Profitability

Case study interviewees were asked whether their enterprises were operating profitably. Table 9 presents a summary of the answers received. Only two of the enterprises indicated that they were running profitably, i.e. Wood@Heart and Blaze Braai Products. Both are private enterprises established without government support by entrepreneurs, and have secured limited government support in the form of funding for IAP clearing activities.

Apex Wood World, a private enterprise not receiving any kind of state support, had only been operational for three months at the time of the interview. This enterprise indicated that, while it was not currently operating at a profit, it anticipated being able to do so within a reasonable timeframe.

KwaMhlanga Baskets and Invader crafts indicated that they are operating on the margin of profitability. Income from product sales covers the costs of labour, materials and transport, but is not enough to build up sufficient financial capital to invest in undertaking marketing or product development.

The three government-owned enterprises, Durban and Farleigh Eco-furniture Factories and Eco-coffins, are not making a profit. These enterprises require ongoing state-subsidisation to cover shortfalls in operating and capital finance requirements.

The Green Ticket and Skills Exchange Co-operative were not yet operational enterprises at the time of study. Both anticipated they would be able to generate sustainable livelihoods and / or income to the involved communities, but it was not clear whether either had the potential to become profit-making enterprises.

Table 9: Profitability of the enterprises

Enterprise Profitability	High Government Investment			Limited Government Investment					No Government Investment	
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
Running Profitably				✓			✓			
On the margin of Profitability					✓	✓			✓	
Not making a Profit	✓	✓	✓					✓		✓

4.2.10 Factors reported to affect Enterprise Sustainability

Key aspects cited in the case study interviews as either having affected, or potentially impacting on the success, profitability or sustainability of the enterprise are presented in Table 10 and Figure 6.

The three most common issues raised were: (i) the importance of the enterprise being driven by a passionate and skilled entrepreneur; (ii) increasing transport costs as IAP material sources become further away from the processing site over time; and (iii) the need for the enterprise to produce a diversity of products and so limit exposure to fluctuating market demands. Other issues raised were the importance of cost-efficiency in various aspects of the value chain, the need for effective business systems, and the right business management, marketing and other technical skills to be in place.

Table 10: Issues indicated as affecting enterprise sustainability in each case study

Issues Raised	High Government Investment			Limited Government Investment					No Government Investment		Total number of times issue raised
	Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange	
High cost of extraction of IAP materials relative to commercially produced / other sources of raw materials				✓			✓		✓	✓	4
Increasing cost of transport as sources of IAP become further from processing sites	✓	✓	✓		✓	✓	✓				6
Additional costs in outsourcing components of the value chain	✓	✓									2
High cost of marketing					✓	✓					2
Distance to markets					✓	✓					2
Inefficiencies in labour expenditure, where people are employed rather than paid for production	✓	✓			✓		✓				4
Lack of business / marketing or other technical skills			✓		✓	✓		✓		✓	5
Inefficient business systems	✓	✓	✓								3
Product diversity		✓	✓	✓	✓	✓			✓		6
High management costs associated with labour-intensive approach				✓			✓				2
Lack of a passionate and driven entrepreneur	✓	✓	✓		✓	✓		✓		✓	7

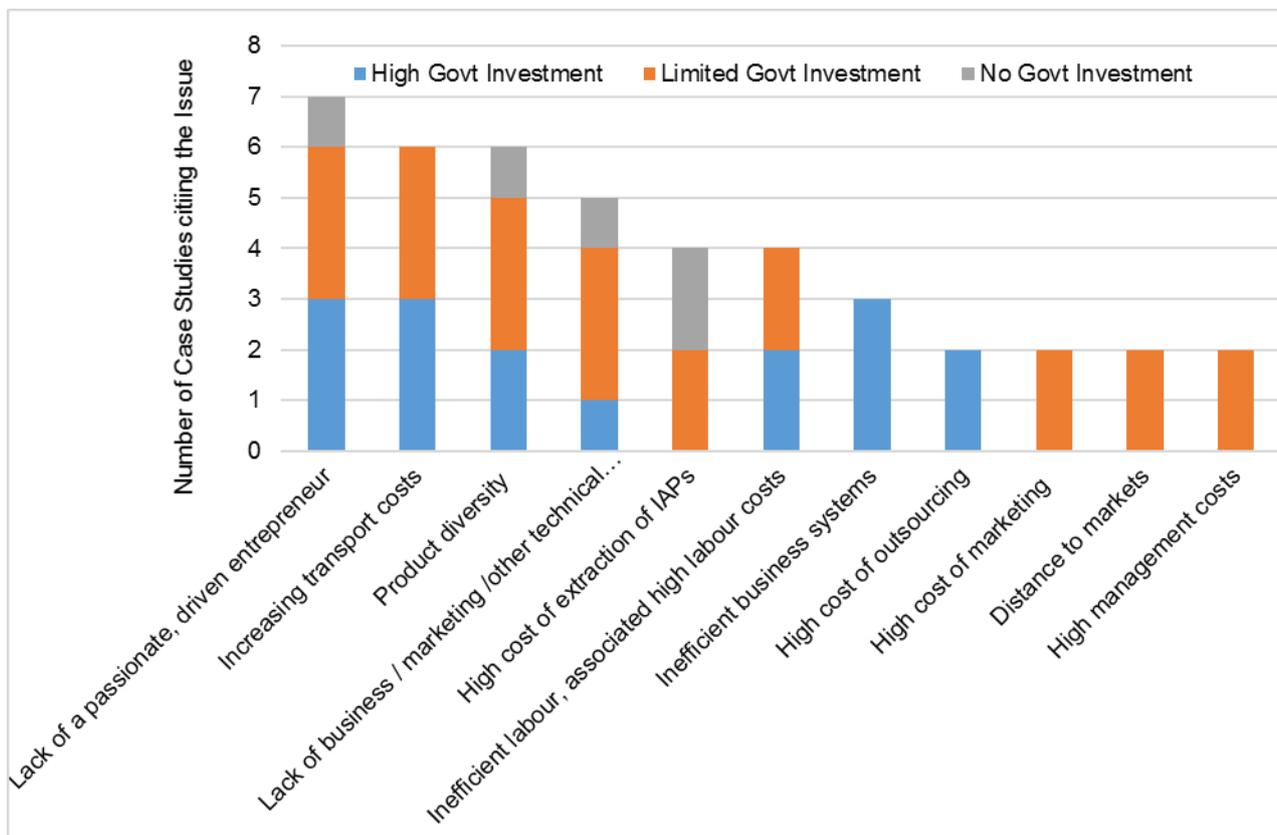


Figure 6: Bar chart showing number of case study enterprises that cited certain issues as affecting their sustainability, per category of government support

4.3 KEY INFORMANT INTERVIEWS

4.3.1 Financial Institutions

4.3.1.1 Industrial Development Corporation (IDC)

The IDC is a national development finance institution set up to promote economic growth and industrial development. It is owned by the South African government and falls under the supervision of the National Economic Development Department. The IDC funds existing or emerging businesses up to a maximum amount of R1 billion (minimum R1 million) that will benefit the South African economy, build industrial infrastructure, create jobs and alleviate poverty.

The funding can be structured in several ways: (i) debt; (ii) equity and quasi-equity (IDC retains a maximum 8% equity share); (iii) guarantees; (iv) trade finance; and (v) venture capital. The IDC indicates that it considers equity-related funding only for larger investments, and only when a project is perceived to be of strategic importance. In these cases, the funding limits are: maximum 50% equity funding, with a further 10% loan funding for start-ups; full funding for expansions, if the equity structure is 35% at peak. The maximum loan repayment term is usually 5 years, although this can be negotiated.

The IDC's primary goal is to expand the industrial base of the country and so create jobs. It specifically targets enterprises with a high level of Black, women and youth ownership. Energy generation and water security are key priorities in the green industries sector that IDC is supporting and funding, including biomass-to-energy. Its investment decisions are guided by a 'Responsible Investment Policy'. The IDC has developed a risk management system which it uses to assess risks prior to funding, as well as after the funds have been disbursed.

Enterprises that have received finance are required to report to the IDC regularly and share information about the businesses progress, profitability and challenges. Where there is emerging risk, either through this process or through non-payment, then the IDC will engage with the business to determine the causes and try to assist in rectifying these, even if this means injecting more finance into the business.

The IDC is particularly interested in avoiding loss of jobs through business failure. It is seldom that the IDC will pursue liquidation claims and will work with a struggling business for as much as three years before looking for recovery of capital. When the IDC holds an equity share in a business, a greater role is played in monitoring the business progress and in supporting executive decision-making.

4.3.1.2 Grovest Venture Capital

Grovest is a VCC that uses the Section 12J Venture Capital Structure of the Income Tax Act (Act No. 58 of 1962) to develop Venture Capital Funds (VCFs), which comprise share portfolios from a range of emerging companies into which investors can buy. Investors can claim the investment as a tax-free investment, receiving venture capital shares and investor certificates. All investments made by Grovest are equity share investments.

While the internal rate of return (IRR) varies among different VCFs, Grovest indicates to investors that on average the IRR should be between 20% and 35%. Grovest specifically seeks investments that allow them to exit within five years and achieve the above IRR.

Grovest provides investee companies with the capital and management support they need to optimise their potential and generate value through improved strategic, operational and human resource capabilities. The VCF's set up by Grovest are primarily used to finance enterprise expansion, but may also invest in start-ups. Key sectors that Grovest is most interested in financing are high growth sectors such as technology (i.e. information technology and software development, etc.) and energy.

The requirements for receiving financial support from Grovest include compliance with all national business-related legislation, the presence of a solid business plan demonstrating a clear understanding of the enterprise's market, a strong entrepreneur and management team that are invested in the enterprise, positive profitability, sound technology, and adherence to the restrictions set out in terms of Section 12J of the Income Tax Act.

Grovest's investment analysts investigate applications for venture capital finance. If the business model meets the Grovest criteria, the entrepreneur is invited to a series of investment screening meetings. Qualifying investment opportunities are selected for further due diligence and financial modelling. Such due diligence comprises a comprehensive review of management (i.e. capabilities, roles, history, shareholding etc.), the market in which the company operates, its competitive position within the market, and the opportunities and risks the business faces. Grovest may also appoint specialist professional advisers to assist with investigation if required.

Grovest will assist the entrepreneur from a hands-on perspective and include them in its network. They may attend weekly executive committee meetings and sit on the board of investee companies to add value and ensure that the business is driven in the right direction. Grovest requires monthly reporting from its investee companies and may require daily reporting of key metrics. This management of the business post-investment is key to the success of the investment.

4.3.1.3 Kgatelopele Venture Capital and Private Equity

Kgatelopele Venture Capital and Private Equity Pty (Ltd) is a 100% Black-owned VCC that seeks to invest in a variety of businesses. The firm focuses primarily on private equity and venture capital asset classes and targets mostly Black under-developed businesses that have potential for growth if supported. The firm provides management support, mentorship and strategy, with the aim of permanently strengthening the investee company and raising its value. The firm raises capital for these investments from retail and institutional investors. They also start, incubate, grow and continuously manage businesses to become profitable over time.

Kgatelopele mostly provides finance to start-ups, and will fund between R1 million and R10 million in seed capital. Its focus is on SMMEs, and it aims to build a portfolio of investments across a broad range of market sectors. In terms of its own projects, it has focused so far on solar photovoltaic installations. Kgatelopele requires between 20% and 50% IRR on its venture capital and equity investments.

4.3.2 Business Incubators

4.3.2.1 Shanduka Black Umbrellas

Shanduka Black Umbrellas is a business incubator funded by Transnet that focuses on promoting entrepreneurship as a desirable economic path, and nurturing 100% Black-owned SMMEs in the critical first three years of their existence. It has a national footprint of offices that offer a subsidised programme in which qualifying SMMEs are supported with expertise, office infrastructure and resources. The enterprises that qualify for this support need to fall within sectors that may allow them to become suppliers to Transnet in the future.

The incubation programme begins with a pre-incubation phase (three months), followed by full incubation (three years) through to graduation. Applicants are assessed for their credit risk and an advisory committee evaluates the weaknesses and strengths of their businesses. Ongoing support through the incubation centres and the office infrastructure linked to these include: (i) bookkeeping services at standard rates; (ii) access to networking and marketing events; (iii) ongoing business mentoring; (iv) assistance with accessing business finance; and (v) workshops aimed at business and personal development.

4.3.2.2 The Furniture Technology Centre Trust (Furntech)

Furntech is South Africa's only 'centre of excellence' for the furniture industry and focuses on business incubation and skills development in the furniture manufacturing sector. Furntech aims to improve skills, raise South Africa's of global competitiveness in the furniture sector, stimulate job and SMME creation, and transfer new technologies to industry partners. Furntech is an accredited Skills Education Training Authority (SETA), is funded through National Government's SETA programme, and bids for additional funding from various government departments.

There is a three-month pre-incubation period in which both Furntech and the applicant can decide whether the relationship is going to work. Only after that does the applicant go into the 24-month incubation period with full support. The Furntech business incubator model involves active and ongoing engagement with each business it supports. Specific training and support is provided to resolve skills gaps and to assist the business to develop capacity and systems that will allow it to become sustainable. In the 12th to 14th week of incubation, a bankable business plan should have been developed. Furntech uses this to facilitate access to finance for the business in the form of loan finance or a grant.

4.3.3 Venture Capital Company and Business Incubator Enterprise Evaluation / Selection Criteria

The evaluation or selection criteria applied by the VCCs and business incubators interviewed are numerous and varied. While some institutions may target enterprises operating in specific

economic sectors or particular business types, there are several selection criteria that were common across all VCCs and business incubators interviewed. These included: (i) the enterprise must be legal and associated individuals must pass credit and criminal checks; (ii) a strong but realistic business concept with clear prospects for growth and profitability; (iii) the presence of a strong and / or passionate entrepreneur in the enterprise; (iv) the ability of the VCC or business incubator to exit the relationship in the medium term (usually 2 to 5 years). Table 11 presents a summary of these and other selection criteria indicated as being used by the VCCs and business incubators interviewed.

Table 11: Enterprise evaluation / selection criteria used by VCCs and business incubators

Selection criteria	Venture Capital Companies			Business Incubators	
	IDC	Grovest VCC	Kgatelopele VCC	Shanduka Black Umbrellas	Furntech
Sector focus	Industrial expansion focus, mainly water and energy.	Mainly IT, energy; excludes any trades not qualifying under Section 12J of the Income Tax Act.	Mainly IT and energy.	Any sector, but enterprises should be able to become suppliers to Transnet.	Furniture and woodworking only.
Business ownership	Must demonstrate a high level of Black, women and / or youth ownership.	No specific requirements.	100% Black and / or youth owned businesses only.	100% Black owned businesses only.	Target the youth.
Business status	The enterprise must be a registered business and must be able to achieve at least a Level 4 or 5 BBBEE status.	The enterprise must be a registered business and carry out its main trade in South Africa. Its tax affairs must be in order.	Must be a registered Proprietary Limited Company with all tax and legal affairs in order.	Must be operational and have been in business for at least three years; must pass a credit check and a criminal check; and must have a valid BBBEE certificate.	Any business – start-up, emerging or existing. If existing must be legal and tax affairs must be in order.
Business plan	Business plan must address all aspects of the business's legal status, shareholding, the security of land, buildings and equipment.	A good and realistic business plan must be available.	A good and realistic business plan must be available.	Enterprise develops a bankable business plan during the incubation period.	Enterprise develops a bankable business plan during the incubation period.
Presence of entrepreneur	Strong leadership of the enterprise must be demonstrated – in small ventures this is the entrepreneur, in larger ventures this is the ownership / management team.	The business must be driven by a strong entrepreneur with a clear drive, passion and vision.	Seek out strong entrepreneurs with excellent business concepts and a high level of commitment to making these work. Honesty and integrity are also key traits that must be demonstrated.	Specifically look for people that have a passion for wood and woodworking. Must also show a desire to lead (and want to run their own business).	Look for enterprises that are driven by entrepreneurs with the right kind of personal traits.

Selection criteria	Venture Capital Companies			Business Incubators	
	IDC	Grovest VCC	Kgatelopele VCC	Shanduka Black Umbrellas	Furntech
Profitability	Businesses must be able to demonstrate profitability and therefore that it can repay its loan. For expansions, this would be at least two prior years of operating at a profit. The IDC does not re-finance fixed assets, since its aim is to expand the industrial base.	The business plan must demonstrate positive and realistic financial projections with good profit margins. Grovest seeks investment where the IRR is between 20% and 35%.	Look for businesses that have a high potential for growth through the provision of business mentorship and financial support. Kgatelopele requires between 20% and 50% IRR on its venture capital and equity investments.	Enterprises that show good potential for growth and to create jobs are prioritised.	Focus is on wealth creation and SMME development through assisting passionate individuals to start or grow their own businesses.
Risk-sharing	The IDC requires that businesses put up at least 40% of the required capital, and they do not usually offer 100% loans.	The management team should have an equity stake in the business.	The management team should have an equity stake in the business.	No specific requirements.	No specific requirements.
Credit worthiness	The management of the business must pass a credit check (and the business if it has already been operating for a while).	The management of the business must pass a credit check (and the business if it has already been operating for a while).	The management of the business must pass a credit check (and the business if it has already been operating for a while).	The management of the business must pass a credit check (and the business if it has already been operating for a while).	The management of the business must pass a credit check (and the business if it has already been operating for a while).
Management capability	The business must show skilled management in the business plan.	There must be good management skills in the business and the ability to execute these must be clearly demonstrated.	Where investees may be lacking in any specific type of business acumen, Kgatelopele provides management consulting support and retains a high level of involvement in the business.	Management capabilities must be demonstrated in the application, but gaps can be filled during incubation period.	No specific requirements.
Job creation	For every R500,000 loan given, at least one job must be created.	No specific requirements.	No specific requirements.	Must demonstrate the ability to grow the employee base to at least four people within the three-year incubation period.	No specific requirements.
Markets	For a start-up, the IDC looks for whether the applicant has secured contracts with its buyers.	The business plan must demonstrate a good understanding of the market.	The business plan must demonstrate a good understanding of the market.	No specific requirements.	No specific requirements.
Technology	The proposed technology must be sound.	The proposed technology must be sound.	The proposed technology must be sound.	No specific requirements.	No specific requirements.

Selection criteria	Venture Capital Companies			Business Incubators	
	IDC	Grovest VCC	Kgatelopele VCC	Shanduka Black Umbrellas	Furntech
Environmental Standards	Compliance with international environmental standards is non-negotiable.	No specific requirements.	No specific requirements.	No specific requirements.	No specific requirements.
Exit period for investor / incubation	Loan repayment terms are usually 5 years, but can be negotiated.	Must be able to exit investment within 3 – 5 years.	Must be able to exit investment within 3 – 5 years.	Three-year incubation support period only.	Two-year incubation support period only.

4.4 ENTERPRISE EVALUATION USING MULTI-CRITERIA DECISION ANALYSIS

4.4.1 Criteria and Indicators

The MCDA tool criteria and associated indicators were identified through the analysis of issues raised during case study interviews (see Table 10) and interviews undertaken with VCCs and business incubators (see Table 11). Additional criteria and indicators were identified through the ten other key informant interviews, including discussions regarding the DEA NRM Programme objectives of employment creation, skills development, and natural capital impact through its investment in IAP based VAI (Jacobs, 2015; Polonsky, 2015; Braack, 2016).

A value tree depicts the hierarchical ordering of criteria (Mabin & Beattie, 2006). Figure 7 presents the value tree constructed for the study. The identified MCDA criteria and associated indicators are categorised for evaluation of enterprise sustainability, development impact and natural capital impact. Thirteen enterprise sustainability criteria are identified in the value tree. These are generally concerned with enterprise financial status, availability of internal skills and effective business systems, efficacy of business planning, strength of networks, product diversity, and level of market penetration.

Eight development impact criteria are identified. These are generally concerned with internal empowerment factors (such as level of preferential ownership, numbers of employees and investment in skills development) and external contextual factors that may elevate the importance of internal empowerment factors (such as the poverty status of areas where the enterprise is creating jobs and whether the enterprise is likely to act as an economic multiplier).

Three natural capital impact criteria are identified. Like the development impact criteria, these cover both internal and external contextual elements. The internal factors deal with operational approaches and how these influence the level of natural capital restoration achieved, while the

external contextual factors deal with matters such as whether the harvesting areas are in important water resource areas.

Criteria and associated indicators were developed from the value tree and organised in a performance matrix, which is included in Addendum B.

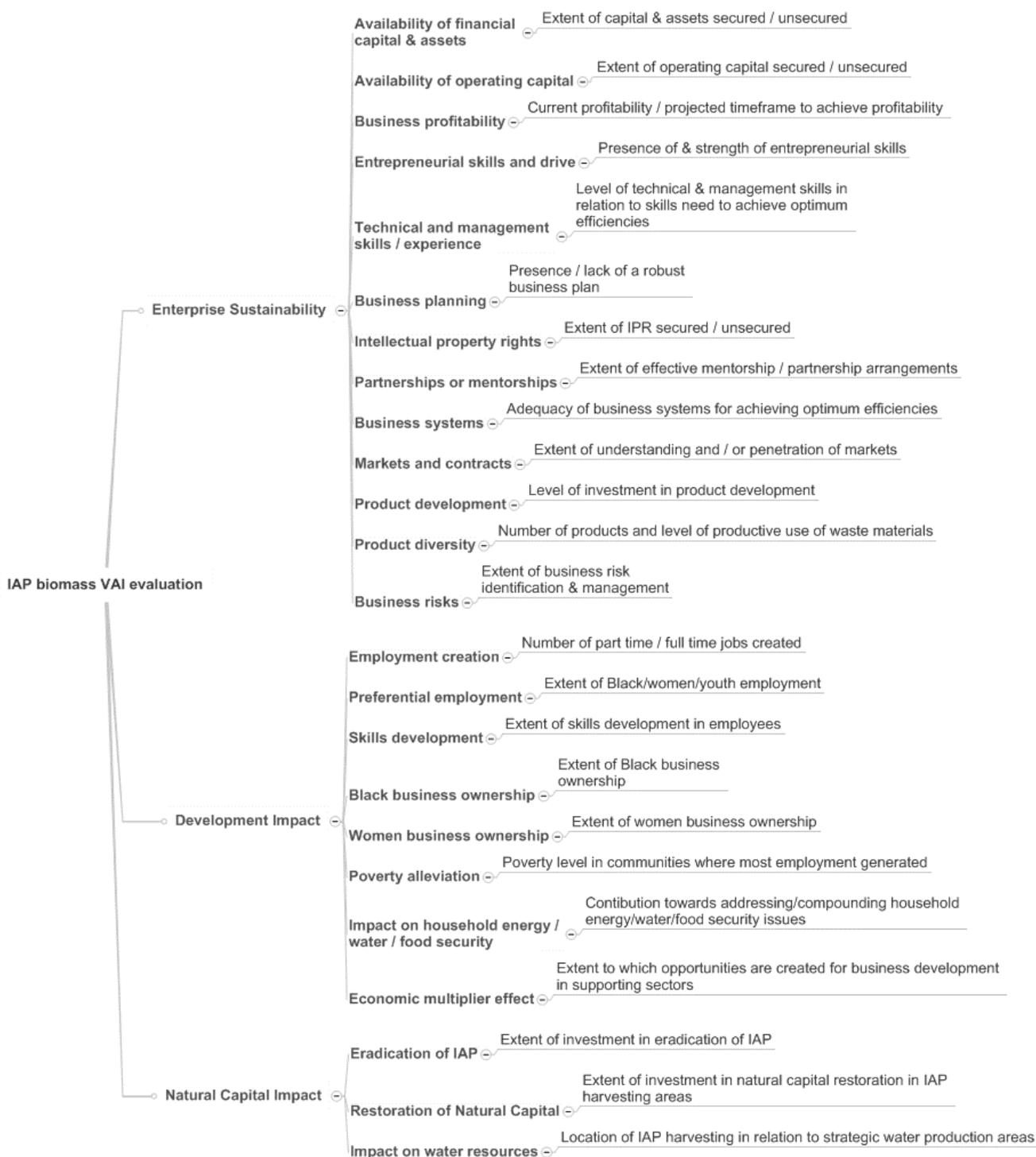


Figure 7: Value tree constructed for the MCDA.

4.4.2 Criteria Weightings

Table 12 presents the weightings assigned to each criterion (on a scale of 1 to 5, with 1 indicating lowest importance and 5 indicating highest importance), and the associated normalised weightings (where a total weighting of 1 for all criteria in each of the three categories was used). In the enterprise sustainability category, high weightings were assigned to criteria dealing with business profitability, presence of a capable entrepreneur, and level of market penetration (or secured contracts). Efficacy of business planning was weighted second most important, and all other criteria were weighted 3, except for identified business risks which was weighted 2. In the development impact category, criteria dealing with number of jobs and preferential employment were weighted highest. Preferential business ownership and skills development were weighted 3, and all others weighted 2 or 1. In the natural capital impact category, two of the three criteria were weighted 5, with only 'restoration of natural capital' given a lower order weighting of 3.

Table 12: Criteria weightings and normalised weightings per category

Criteria		Weighting	Normalised Weighting
Enterprise Sustainability	Availability of financial capital & assets	3	0.07
	Availability of operating capital	3	0.07
	Business profitability	5	0.11
	Entrepreneurial skills and drive	5	0.11
	Technical and management skills / experience	3	0.07
	Business planning	4	0.09
	Intellectual property rights	3	0.07
	Partnerships or mentorships	3	0.07
	Business systems	3	0.07
	Markets and contracts	5	0.11
	Product development	3	0.07
	Product diversity	3	0.07
	Business risks	2	0.04
Total – Enterprise Sustainability		45	1
Development Impact	Employment creation	5	0.22
	Preferential employment	5	0.22
	Skills development	3	0.13
	Black business ownership	3	0.13
	Women business ownership	3	0.13
	Poverty alleviation	2	0.09
	Impact on household energy / water / food security	1	0.04
	Economic multiplier effect	1	0.04
Total – Development Impact		23	1
Natural Capital Impact	Eradication of IAP	5	0.38
	Restoration of Natural Capital	3	0.23
	Impact on water resources	5	0.38
Total – Natural Capital Impact		13	1

4.4.3 Scoring the Case Study Enterprises

Table 13 presents the unweighted results of the MCDA scoring process. Blaze Braai Products scored the highest combined unweighted score for sustainability, development impact and natural

capital impact. Wood@Heart scored the second highest, followed by Apex Wood World. The lowest scoring enterprises were KwaMhlanga Baskets, Skills Exchange Co-operative and Invader Crafts.

The normalised criteria weightings presented in Table 12 were then applied to the scores, to produce the MCDA weighted scores shown in Table 14. The results of the MCDA evaluation (see Table 14 and Figure 8) show that Blaze Braai Products, a private enterprise in the 'limited government investment' category scored highest for the combined consideration of performance in enterprise sustainability, development impact and natural capital impact. A close second was Wood@Heart, also a private enterprise in the 'limited government investment' category. These two enterprises scored significantly higher than the other enterprises and so are grouped as the 'top ranked enterprises'.

A group of enterprises scored similar combined scores and are clustered as 'middle ranked enterprises' (i.e. Farleigh Eco-furniture, Eco-coffins, Durban Eco-furniture, Apex Wood World and Green Ticket) (Figure 8). The remaining three enterprises (i.e. Invader Crafts, Skills Exchange Co-operative and KwaMhlanga Baskets) scored lowest overall and are grouped as the 'lowest ranked enterprises'.

Figure 9 shows that the three enterprises in the 'high government investment' category scored highest of all enterprises for natural capital impact (i.e. Farleigh and Durban Eco-furniture Factories, and Eco-coffins). Two enterprises in the 'limited government investment' category scored highest overall for sustainability (i.e. Blaze Braai Products and Wood@Heart), with one enterprise in the 'no government investment' category also scoring notably high in this category (i.e. Apex Wood World). In terms of development impact performance, four enterprises in the 'limited government investment category' scored highest (i.e. Blaze Braai Products, Green Ticket, Invader Crafts and KwaMhlanga Baskets).

Table 13: Case study unweighted MCDA scores

Criteria		High Govt Investment			Limited Govt Investment					No Govt Investment	
		Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
Enterprise Sustainability Criteria	Availability of financial capital & assets	5	5	5	5	5	5	5	2	2	0
	Availability of operating capital	5	5	0	5	0	0	5	0	5	0
	Business profitability	0	0	0	5	0	0	5	2	3	2
	Entrepreneurial skills and drive	2	2	2	5	2	2	5	2	5	2
	Technical and management skills / experience	2	2	2	5	0	0	5	0	5	0
	Business planning	2	2	2	5	0	0	5	2	5	0
	Intellectual property rights	5	5	5	5	5	5	5	5	5	5
	Partnerships or mentorships	5	5	5	5	0	0	5	0	5	0
	Business systems	2	2	2	5	2	2	5	2	5	2
	Markets and contracts	5	5	5	5	0	0	5	2	5	0
	Product development	2	2	5	5	0	0	5	2	5	0
	Product diversity	0	0	5	5	2	2	5	2	5	0
	Business risks	1	1	5	5	1	1	5	5	5	0
Total		36	36	43	65	17	17	65	26	60	11
Development Impact	Employment creation	3	3	1	5	1	1	5	2	1	1
	Preferential employment	5	5	5	5	5	5	5	5	3	5
	Skills development	5	5	5	3	5	5	3	5	3	5
	Black business ownership	0	0	0	0	5	5	2	5	0	2
	Women business ownership	0	0	0	0	2	2	2	2	0	2
	Poverty alleviation	3	5	5	3	5	5	5	5	5	5
	Impact on household energy / water / food security	0	0	0	0	0	0	0	0	0	5
	Economic multiplier effect	5	5	5	0	0	0	0	0	0	0
Total		21	23	21	16	23	23	22	24	12	25
Natural Capital Impact	Eradication of IAP	5	5	5	5	0	0	5	5	5	0
	Restoration of Natural Capital	3	3	3	0	0	0	0	0	0	0
	Impact on water resources	5	5	5	5	0	5	5	5	5	5
Total		13	13	13	10	0	5	10	10	10	5
Overall Total		70	72	77	91	40	45	97	60	82	41

Table 14: Case study weighted MCDA scores

Criteria		Normalised Weightings	High Govt Investment			Limited Govt Investment					No Govt Investment	
			Durban Eco-furniture	Farleigh Eco-furniture	Eco-coffins	Wood@Heart	Kwa Mhlanga Baskets	Invader Crafts	Blaze Braai Products	Green Ticket	Apex	Skills Exchange
Enterprise Sustainability Criteria	Availability of financial capital & assets	0.07	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.13	0.13	0.00
	Availability of operating capital	0.07	0.33	0.33	0.00	0.33	0.00	0.00	0.33	0.00	0.33	0.00
	Business profitability	0.11	0.00	0.00	0.00	0.56	0.00	0.00	0.56	0.22	0.33	0.22
	Entrepreneurial skills and drive	0.11	0.22	0.22	0.22	0.56	0.22	0.22	0.56	0.22	0.56	0.22
	Technical and management skills / experience	0.07	0.13	0.13	0.13	0.33	0.00	0.00	0.33	0.00	0.33	0.00
	Business planning	0.09	0.18	0.18	0.18	0.44	0.00	0.00	0.44	0.18	0.44	0.00
	Intellectual property rights	0.07	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
	Partnerships /mentorships	0.07	0.33	0.33	0.33	0.33	0.00	0.00	0.33	0.00	0.33	0.00
	Business systems	0.07	0.13	0.13	0.13	0.33	0.13	0.13	0.33	0.13	0.33	0.13
	Markets & contracts	0.11	0.56	0.56	0.56	0.56	0.00	0.00	0.56	0.22	0.56	0.00
	Product development	0.07	0.13	0.13	0.33	0.33	0.00	0.00	0.33	0.13	0.33	0.00
	Product diversity	0.07	0.00	0.00	0.33	0.33	0.13	0.13	0.33	0.13	0.33	0.00
	Business risks	0.04	0.04	0.04	0.22	0.22	0.04	0.04	0.22	0.22	0.22	0.00
Total	1	2.73	2.73	3.11	5.00	1.20	1.20	5.00	1.93	4.58	0.91	
Development Impact	Employment creation	0.22	0.65	0.65	0.22	1.09	0.22	0.22	1.09	0.43	0.22	0.22
	Preferential employment	0.22	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	0.65	1.09
	Skills development	0.13	0.65	0.65	0.65	0.39	0.65	0.65	0.39	0.65	0.39	0.65
	Black business ownership	0.13	0.00	0.00	0.00	0.00	0.65	0.65	0.26	0.65	0.00	0.26
	Women business ownership	0.13	0.00	0.00	0.00	0.00	0.26	0.26	0.26	0.26	0.00	0.26
	Poverty alleviation	0.09	0.26	0.43	0.43	0.26	0.43	0.43	0.43	0.43	0.43	0.43
	Impact on household energy / water / food security	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22
	Economic multiplier effect	0.04	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1	2.87	3.04	2.61	2.83	3.30	3.30	3.52	3.52	1.70	3.13	
Natural Capital Impact	Eradication of IAP	0.38	1.92	1.92	1.92	1.92	0.00	0.00	1.92	1.92	1.92	0.00
	Restoration of Natural Capital	0.23	0.69	0.69	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Impact on water resources	0.38	1.92	1.92	1.92	1.92	0.00	1.92	1.92	1.92	1.92	1.92
Total	1	4.54	4.54	4.54	3.85	0.00	1.92	3.85	3.85	3.85	1.92	
Overall Total		10.14	10.32	10.26	11.67	4.50	6.43	12.37	9.30	10.12	5.96	

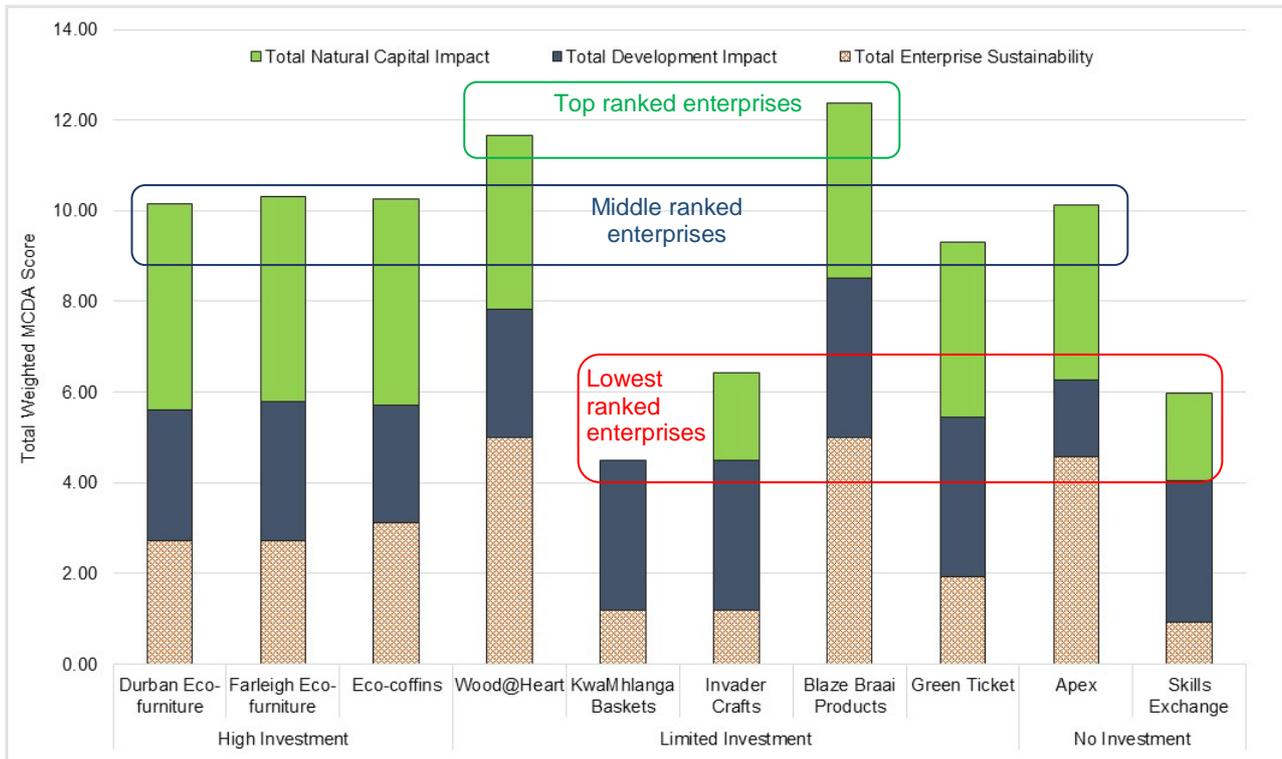


Figure 8: Comparison of total weighted MCDA scores between enterprises

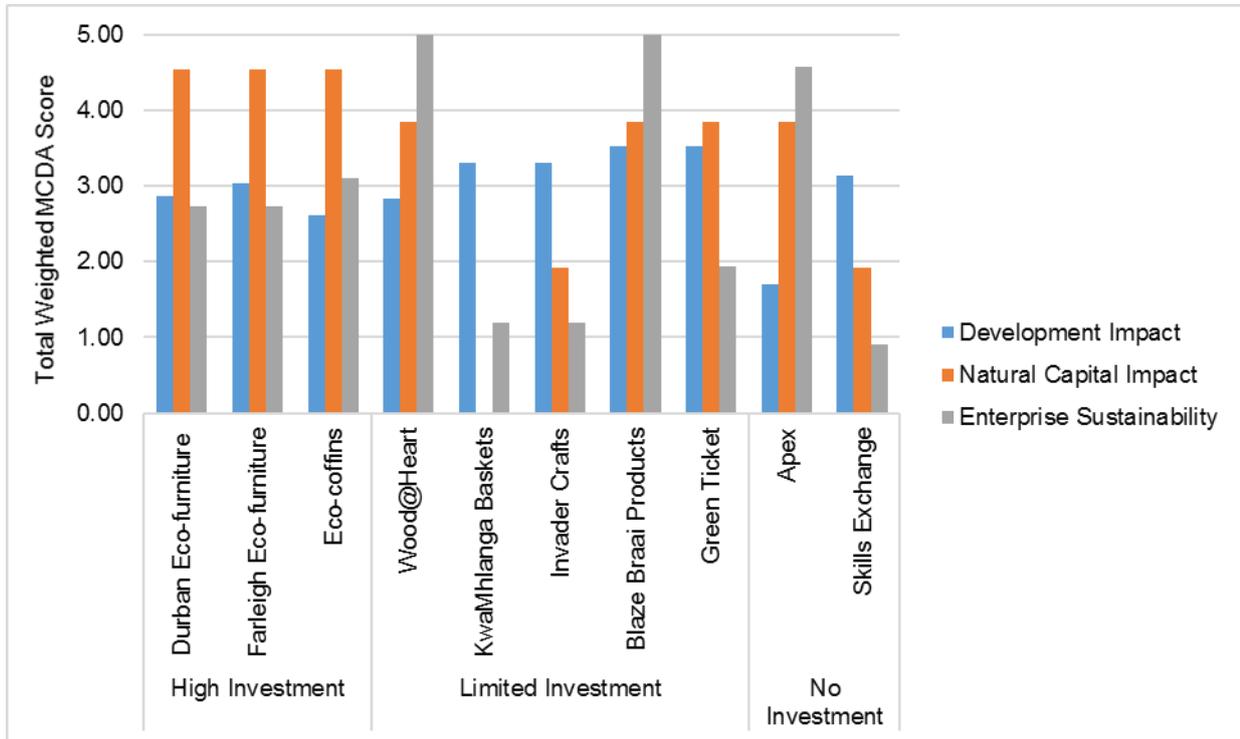


Figure 9: Comparison of enterprise performance in each category of evaluation criteria

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter discusses the results of the research as presented in Chapter 4. It includes a discussion on the ten case studies with regards to: (i) internal structural factors influencing their sustainability; (ii) factors affecting their development impact; and (iii) factors affecting their performance in natural capital restoration. These outcomes are used to discuss the role of the DEA NRM Programme / other government support in influencing the sustainability and performance of the IAP biomass based VAI.

5.2 INTERNAL STRUCTURAL FACTORS AFFECTING ENTERPRISE SUSTAINABILITY

5.2.1 Introduction

Blaze Braai Products and Wood@Heart, both being private enterprises falling within the 'limited government investment' category, were jointly the top scoring enterprises for sustainability performance (see Figure 9). Apex Wood World, a private enterprise in the 'no government investment' category, was ranked in second place for sustainability performance, despite falling within the 'middle ranked enterprises' in terms of the overall combined MCDA score (see Figure 8). These three enterprises achieved a significantly higher score for sustainability than all others, suggesting that they are associated with certain characteristics that advance their sustainability. By contrast, KwaMhlanga Baskets, Invader Crafts and Skills Exchange Co-operative scored low on sustainability, suggesting that they have certain characteristics that limit their sustainability.

It has been widely acknowledged that enterprise sustainability may be impacted by a range of external factors and internal structural issues (see for example: DTI, 2004; Von Broembsen *et al.*, 2005; Di-Masi, 2009; Ham *et al.*, 2010; Herrington *et al.*, 2011; Urban & Naidoo, 2012; Cant & Wiid, 2013; Dean, 2015). External factors such as government policy and markets cannot be controlled by an individual enterprise, however, its internal structure determines its effectiveness in dealing with external conditions and pressures (Bruwer & Coetzee, 2016). Lightelm & Cant (2002) report that deficiencies in the internal environment are the major cause of SMME failures.

Internal structural characteristics including enterprise ownership (Shirley & Walsh, 2000), entrepreneurial acumen (Lightelm, 2010), technical and business skills and systems (Urban & Naidoo, 2012; Cant & Wiid, 2013), access to finance (International Labour Office Geneva [ILO], 2007), access to markets (Abor & Quartey, 2010) and collaborative partnerships in the value chain (Bäckstrand & Säfsten, 2006) have been recognised as important requirements for enterprise sustainability. These characteristics are discussed in relation to the case study enterprises in the following sections.

5.2.2 Enterprise Ownership

Early research comparing publicly owned *versus* privately owned enterprises was inconclusive in proving there was any difference in efficiency or performance between the two types of enterprises (De Alessi, 1974; Borcherding, 1977; Millward & Parker, 1983; Savas, 1987; Vickers *et al.*, 1989; Picot & Kaulmann, 1989). However, increased opportunities for statistical research on the privatisation of state-owned companies in Europe and the United States in the 1990's produced greater evidence of private ownership being associated with greater profitability and operating efficiency than government ownership in competitive markets (D'Souza & Megginson, 1999; Shirley & Walsh, 2000). This assumption of private ownership supremacy over government ownership has nevertheless continued to be challenged, with the United Nations Development Programme (UNDP) Global Centre for Public Service Excellence recently concluding that "no model of ownership (public, private or mixed) is intrinsically more efficient than the others" (UNDP, 2015).

Of the four privately owned case study enterprises, three achieved significantly higher sustainability performance scores in the MCDA than all the other enterprises, which included government-owned, co-operative and non-profit enterprises. The only privately owned enterprise which received a low sustainability score was KwaMhlanga Baskets, with its key distinguishing features being that it was: (i) a substantially smaller enterprise than the other private enterprises; and (ii) it had been established with government support as a development initiative, rather than by an entrepreneur with a profit-making focus.

One of the key constraints cited in the debate around public *versus* private enterprise efficiency is the availability of options which the two ownership models can use to incentivise productivity (Ham *et al.*, 2010; UNDP, 2015). The case study research identified that production efficiency in the government-owned Eco-furniture Factories was constrained by the need to use a government-prescribed daily wage instead of payment on a performance basis. This was said to have impacted on the efficiency of the factory operations and may have limited the ability of these facilities to scale-up production to meet increasing market demand. In contrast, Wood@Heart, a private enterprise not constrained by the same financial management rules, could use

performance-based staff remuneration structures, which helped to optimise production efficiencies. However, these wage-related limitations are unlikely to have been the only factor affecting production efficiencies in the government-owned facilities. Other issues noted as negatively affecting production efficiencies included IAP input material supply constraints at the Durban Eco-furniture Factory, and difficulties with the Farleigh Eco-furniture Factory's kilns resulting in costly outsourcing of lumber drying processes.

While some researchers have concluded that enterprise type and associated ownership structures may affect the efficiency and performance of businesses (D'Souza & Megginson, 1999; Shirley & Walsh, 2000), the current study has not been able to conclusively show that these factors play a major role in IAP plant based VAI sustainability. Boone & Ozcan (2015) also support this finding through observing that there is no conclusive evidence indicating that new private enterprises such as closed corporations and companies have any greater chance of survival than other types, for instance co-operatives. Rather, issues such as whether the enterprise was established for profit-making or for developmental purposes appear to have had greater influence. This finding is supported by Ham *et al.* (2010) whose research into various southern African natural plant product ventures identified that the legal structure and ownership of an enterprise should be defined by its unique needs; and that enterprises established as developmental projects often fail due to the lack of a skilled entrepreneur in the enterprise.

5.2.3 Skills, Business Systems and Entrepreneurial Acumen

SMME research in South Africa has identified the crucial role of capable and committed entrepreneurs in small business survival (Berry *et al.*, 2002; Lightelm, 2010). Such entrepreneurs are seen to effectively manage the diverse risks and constraints that their businesses face (Abor & Quartey, 2010; Bruwer & Coetzee, 2016). Entrepreneurship is a composite term for the personal characteristics, attitudes, education and spontaneity of the entrepreneur (Berry *et al.*, 2002, Neneh & Van Zyl, 2012). Neneh (2011) identified creativity, self-reliance, ability to adapt, tolerance of ambiguity and uncertainty, opportunity obsession, commitment and determination to be the necessary entrepreneurial characteristics required for the long-term survival of SMMEs.

The picture emerging from this study resonates with the above findings. In the key informant process, all VCCs and business incubators interviewed stated that one of the main criteria they use for evaluation and / or selection of enterprises is the presence of a capable and committed entrepreneur. The case study research further highlighted this, where seven out of ten case study interviews identified 'the lack of a passionate and driven entrepreneur' as one of the main risks to enterprise sustainability. Furthermore, the two 'failed' enterprises studied (i.e. KwaMhlanga Baskets and Invader Crafts) were characterised by notably weak entrepreneurial acumen. In contrast, the only two case study enterprises that indicated they were operating at a profit (i.e.

Blaze Braai Products and Wood@Heart) were characterised by the presence of highly capable and committed entrepreneurs.

Other researchers have found that management, operational skills (Martin & Staines, 1994; Urban & Naidoo, 2012) and internal control systems (Bruwer & Coetzee, 2016) are important for the sustainability of South African SMMEs. SANParks, the state agency operating the national Eco-furniture Factories programme on behalf of the DEA NRM Programme, indicated difficulties with its administrative systems, saying that these are not suited to the needs of running a business enterprise and that this has impacted negatively on production efficiencies. In contrast, private enterprises such as Wood@Heart have flexible business systems that allow for immediate responses to be taken in respect of daily business challenges and needs.

Sound operational skills and an internal capacity for innovation also leads to enhanced product innovation and diversity (Herrington *et al.*, 2011), which in turn can support enterprise profitability and sustainability (Ham *et al.*, 2010). Wood@Heart and Blaze Braai Products had both developed a diversity of products, with the primary aim of market diversification, but also the productive use of 'waste' materials. In contrast, the two Eco-furniture Factories both pointed out the significant liability and lost opportunities posed by the large piles of wood shavings produced as 'waste products' from their operations, and for which they have no current use.

Marketing capacity is noted by several researchers as a key skill set that enterprises must have to be sustainable, but which SMMEs often lack (see for example: Brink *et al.*, 2003; Ham & Thomas, 2008; Cant & Wiid, 2013). Blaze Braai Products and Apex Wood World had established dedicated internal marketing capacity. Others, such as Eco-coffins, opted to partner with external marketing agencies and / or networks to fulfil this role. The two 'failed' enterprises (i.e. Invader Crafts and KwaMhlanga Baskets) both cited difficulties with accessing and growing their markets, and indicated that this was because their internal marketing skills and resources were inadequate. While both enjoyed some success during the period that the DEA NRM Programme assisted with the financial cost of marketing, neither of these enterprises continued to invest adequately in this once the support ended, leading to declining product sales and reduced profitability.

5.2.4 Access to Finance

All enterprises require finance to be productive and sustainable (ILO, 2007). Access to finance has been found to be one of the top three reasons for SMME failure in South Africa (Herrington *et al.*, 2011) and an entrepreneur's ability to overcome this constraint is therefore critical. The case study research has shown that the three enterprises which scored highest for sustainability performance in the MCDA used a combination of self-financing and loan finance for their capital

and operational requirements. The remaining seven enterprises used government or donor funding for some or all their initial capital requirements.

The three government-owned enterprises are set up to operate on a cost-recovery basis, with any shortfalls covered by government funding. For example, the Durban Eco-furniture Factory indicated that it could recover between 40% and 54% of its costs through product sales. This implies that the enterprise as currently structured would require substantial ongoing state subsidisation to continue operating. The financial dependence of the three government-owned enterprises on operational cost subsidisation exposes them to sustainability risks, particularly given the possibility that government funding priorities may shift over time.

A key constraint to sustainability identified by six out of ten case studies was the likelihood of increasing raw material transport costs as local sources of IAP biomass are exhausted. This points to a possible future increase in cost of production, and escalating requirements for subsidisation of operating costs. Similarly, Ham *et al.* (2010) found that raw material transport costs were a key issue affecting price competitiveness in southern African natural products enterprises.

5.2.5 Collaborative Partnerships

One way for business enterprises to improve their competitiveness is to optimise value chain efficiencies, and interacting with other companies or organisations can help to achieve this (Bäckstrand & Säfsten, 2006). Global research into collaborative partnerships in enterprise value chains has found that these can yield benefits such as revenue enhancements, cost reductions, and operational flexibility to cope with uncertainties (Simatupang & Sridharan, 2005). The size of an enterprise and the complexity of the value chain generally affect the type and level of collaboration that is useful to an individual enterprise (Bäckstrand & Säfsten, 2005).

The research has highlighted the value of well-structured collaborative partnerships to the sustainability of IAP biomass based VAI. These partnerships were primarily fashioned around access to raw material and to markets.

5.2.5.1 Access to raw material

All case study enterprises indicated that the net cost of IAP timber as source of input material is significantly higher than commercially produced timber. Mugido *et al.* (2014) drew the same conclusion when studying the feasibility of using IAP biomass to generate energy in the Nelson Mandela Bay Municipality.

One of the reasons cited for the high cost of IAP biomass as an input material for value-adding activities is the effort required to successfully negotiate access to multiple land units under different ownership to access the material. To address this issue, Wood@Heart, Blaze Braai Products and Apex Wood World established collaborative partnerships with farmers' associations in their preferred IAP source areas. Similarly, the two Eco-furniture Factories established collaborative partnerships with forestry companies, municipalities and conservancies to streamline access to IAP resources. These interactions were reported by case study respondents to have made an important contribution towards improving efficiencies in the respective raw material supply chains. This observation is supported by Mayers & Vermeulen (2002) whose case study research into forestry value chains in six countries, including South Africa, observed that partnerships between forestry companies and communities could result in significantly enhanced access to timber resources.

5.2.5.2 Access to markets

Marketing, access to markets and growing market share are all cited as constraints that SMMEs often find expensive and difficult to address (Abor & Quartey, 2010; Cant & Wiid, 2013). The Eco-coffins project addressed its need for market access through establishing partnerships with faith-based organisations and municipalities who were interested in promoting their products as a social initiative, leading to the establishment of an effective 'network marketing' system. Ham *et al.* (2010) similarly found that in natural products enterprises in South Africa, marketing efforts by trade organisations that established regional trade networks made a significant difference to the success of SMMEs in the sector.

5.3 DEVELOPMENT IMPACT PERFORMANCE

5.3.1 Introduction

The four top scores for development impact were associated with enterprises in the 'limited government investment' category (Figure 10), indicating that limited government support may play a role in enhancing the development impact of private enterprises / co-operatives / non-profit organisations; and that enterprises do not necessarily need to be government-owned to achieve a high level of development impact.

The three government-owned enterprises (Farleigh and Durban Eco-furniture Factories, and Eco-coffins) were ranked 6th, 7th and 9th out of the 10 case studies in the development impact category. This was a surprising result, considering that these enterprises have a specific developmental focus.

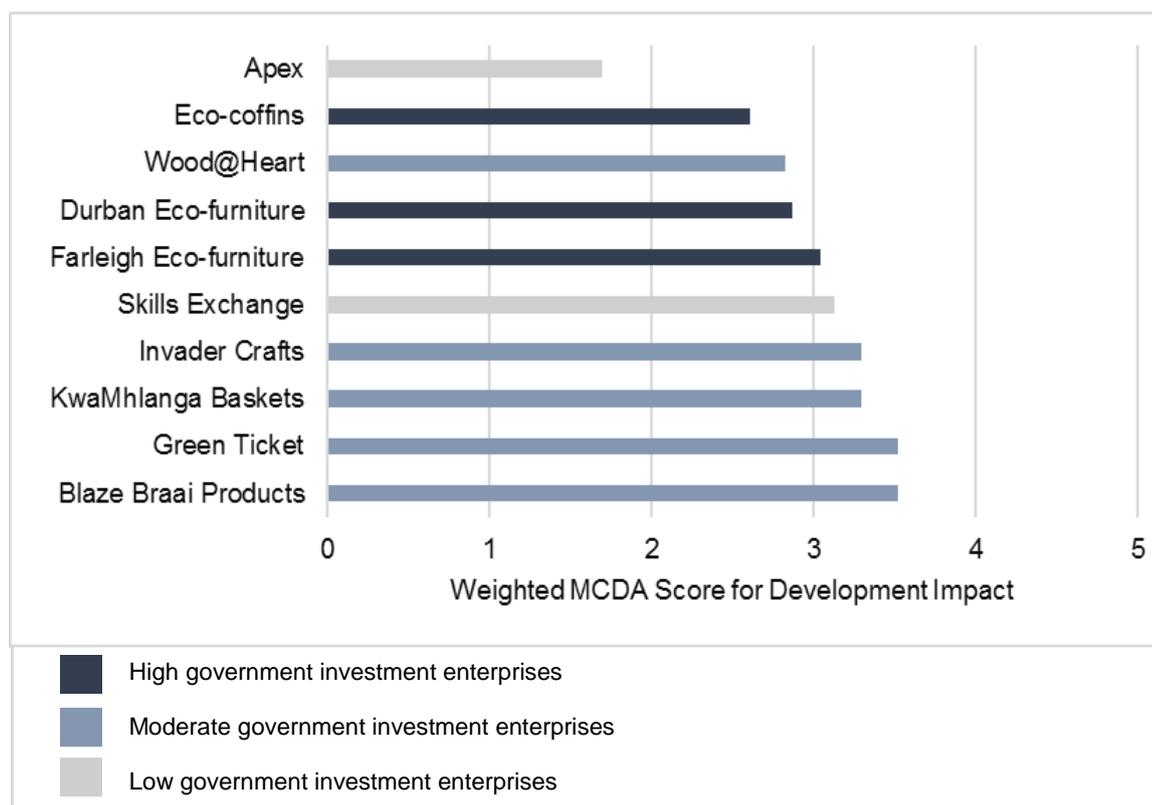


Figure 10: Ranked order of case study enterprises using MCDA weighted development impact performance scores

According to the ILO (2007), when investing in enterprise development, most governments seek to address the goals of poverty reduction and equitable development, often targeting economically or socially disadvantaged groups such as rural communities, Black people, women and the youth. In the South African context, job creation, BBBEE, skills development and rural livelihood creation are key developmental objectives (NPC, 2012). The case studies are evaluated against these developmental objectives in the following sections.

5.3.2 Broad-based Black Economic Empowerment

Despite being some of the lowest scoring enterprises overall in the MCDA evaluation and in terms of sustainability performance, KwaMhlanga Baskets, Invader Crafts, Skills Exchange Co-operative and The Green Ticket scored comparatively well on development impact. Figure 4 further shows that KwaMhlanga Baskets, Invader Crafts, Skills Exchange Co-operative and The Green Ticket were the only enterprises that had a high level of ownership by preferential groups (including Black people, women and youth). Apart from Skills Exchange Co-operative, these four enterprises were established as development initiatives with government support. The results of the MCDA evaluation therefore reflect that these are development-focused enterprises, but highlight that they may not be sustainable.

The above findings suggest that government support during the establishment phase of the IAP biomass based VAI may have leveraged enhanced BBBEE ownership outcomes. However, this

has not necessarily resulted in such enterprises being structured optimally for sustainability. Ham *et al.* (2010) similarly found that southern African natural products value-adding enterprises set up by government / donor funders as development projects often failed due to internal structural constraints. The ILO (2007) indicates that globally, government enterprise development support *foci* have been evolving as more becomes known about how different kinds of support influence enterprise sustainability. Through undertaking case study research on enterprise development models in South Africa, Ryan (2012) found that the support SMMEs receive is increasingly being shaped by the country's BBBEE policy environment, but that the effect of this on enterprise development is poorly studied and understood.

The need to marry suitable internal structuring and training with preferential ownership profiles therefore emerges as a potentially important recommendation for enterprise development support by government. Ryan (2012) makes a similar recommendation, stating that to achieve its BBBEE goals, government needs to focus greater effort on growing existing sustainable Black empowered businesses, in addition to supporting start-ups.

5.3.3 Job Creation

According to Kongolo (2010), SMMEs in South Africa represent about 91% of the formal businesses and provide almost 60% of the country's employment. However, the Finscope Small Business Survey (FinMark, 2010) found that 94% of South African SMMEs have less than five employees and up to 67% have no employees. Researchers worldwide have discovered that not all SMMEs can generate a significant number of jobs, and that it is usually only a small number of 'high growth, high quality' SMMEs that account for most of the jobs created (Autio *et al.*, 2000; Fritsch & Weyh, 2006). For example, in the United States, Birch *et al.* (1997) found that between 1992 and 1996, only 3% of SMMEs created 70% of the jobs in the SMME sector. Whereas in the United Kingdom, Autio (2005) found that 80% of total job creation was generated by less than 10% of the country's entrepreneurs. Consequently, the identification of 'high growth, high quality' SMMEs, which are likely to create the most jobs, has become a key policy measure in many countries (Ngek & Smit, 2013). Such 'high growth, high quality' SMMEs have been found to exhibit certain characteristics, such as: innovation, networking, market orientation, teamwork, investment in human capital, and strong entrepreneurial growth ambitions (Organisation for Economic Co-operation and Development [OECD], 2002; Wells & Hungerford, 2011; Ngek & Smit, 2013).

Blaze Braai Products, Wood@Heart and the two Eco-furniture Factories employed significantly higher numbers of people than the other enterprises studied (see Figure 5). Notably, the harvesting of IAP biomass was the major driver of employment numbers in these enterprises, with the DEA NRM Programme providing financial assistance for the associated labour costs.

Given the development focus of the government-owned Eco-furniture Factories, their use of a labour-intensive approach is not surprising. However, Blaze Braai Products and Wood@Heart reported that they would have been unlikely to have created as many jobs without government funding support. Notably, both these enterprises scored high on sustainability performance as well as development impact, and demonstrate many of the characteristics of 'high growth, high quality' SMMEs mentioned above.

These findings indicate that government financial support of IAP biomass based VAI, particularly those which have the characteristics of 'high growth, high quality' SMMEs, can potentially leverage increased job creation benefits. In studying several international agribusiness public-private partnerships, the Food and Agriculture Organisation of the United Nations (FAO) (2016) similarly observed that additional jobs could be created, especially in the production or harvesting of raw materials, through government investment in agri-business enterprises.

5.3.4 Skills development

The development of human capital is a key objective in South Africa's economic growth strategy (NPC, 2012). With an unemployment rate of around 25% and weak GDP growth since 2008, government has recognised an urgent need to address the country's poor skills profile (StatsSA, 2014).

Table 5 shows that the three government-owned enterprises and those which had been established with a development focus (i.e. KwaMhlanga Baskets, Invader Crafts, Green Ticket and Skills Exchange Co-operative) invested in training their workforce to a greater extent than the others (i.e. Wood@Heart, Blaze Braai Products and Apex Wood World). These latter enterprises were more selective in employing individuals that already had the necessary skills in place to minimise their training costs. However, Wood@Heart and Blaze Braai Products used a portion of the government funding received for IAP clearing to train the workers employed to do this work.

Government financial support to IAP biomass VAI can therefore leverage greater enterprise investment in employee training, which may not be affordable for these SMMEs otherwise. Padachi & Bhiwajee (2016) similarly observe that in Mauritius few SMMEs invest in training employees, citing unaffordability as one of the key reasons and indicating that government plays a key role in filling this gap.

5.3.5 Livelihood Creation

Due to their remoteness from established markets, rural communities in developing countries are often marginalised in terms of employment and income generation opportunities (Reardon & Vosti, 1995). However, these rural communities tend to have better access to natural resources

than urban communities, and can therefore use these to create natural products enterprises that generate a cash income and act as a 'safety net' in times of hardship (Ham & Thomas, 2008).

The KwaMhlanga Baskets, Invader Crafts and Skills Exchange Co-operative case studies have shown that value-addition to low value IAP biomass (such as sticks, branches and bark) can create important developmental opportunities for limited numbers of people from rural communities in areas where IAP clearing is taking place. However, the research has shown that these enterprises suffer significant skills, financial and logistical constraints, and would therefore need a high level of support for a lengthy period to improve their chances of survival.

These findings are supported by Howard *et al.* (2005), who found that small-scale timber production in South Africa plays a significant role in reducing poverty in the rural areas where it is practised. Furthermore, these benefits could be significantly expanded through additional supporting actions by government, including providing funding support, training and skills development, and strengthening grower associations. Ham & Thomas (2008) also found that natural plant products enterprises in southern Africa can create significant rural livelihood benefits. They indicate that supportive partnerships between the rural communities and private enterprises involved in the value chain are important for ensuring that these benefits are optimised and sustained.

5.4 NATURAL CAPITAL IMPACT PERFORMANCE

Figure 11 shows that the three government-owned enterprises scored joint first place for natural capital impact, indicating that high levels of government support may result in enhanced investment in natural capital restoration and management post-harvesting. The three smallest enterprises (i.e. KwaMhlanga Baskets, Skills Exchange Co-operative and Invader Crafts) scored lowest for natural capital impact, because they are not drivers of IAP eradication and rather focus on adding value to limited quantities of IAP bark, branches and sticks cleared by other initiatives / projects.

The cost of harvesting and extraction of IAP biomass for value-adding activities in South Africa has been found to be significantly higher than cost of commercial timber as an input material (Mugido *et al.*, 2014; Mander *et al.*, 2015; Mander & Blignaut, 2016). It has therefore been suggested that without government subsidisation (through the DEA NRM Programme for example) the use of IAP biomass as an input for VAI would be unlikely to be financially feasible (Mugido *et al.*, 2014).

Wood@Heart and Blaze Braai Products both indicated that without DEA NRM Programme funding they would be likely to minimise expenditure by selectively harvesting usable IAP biomass in accessible locations and not implementing follow-up treatments. The three government-owned enterprises, not being bound by a similar profit-making objective, were therefore able to focus more on the natural capital restoration benefits of their raw material supply chain.

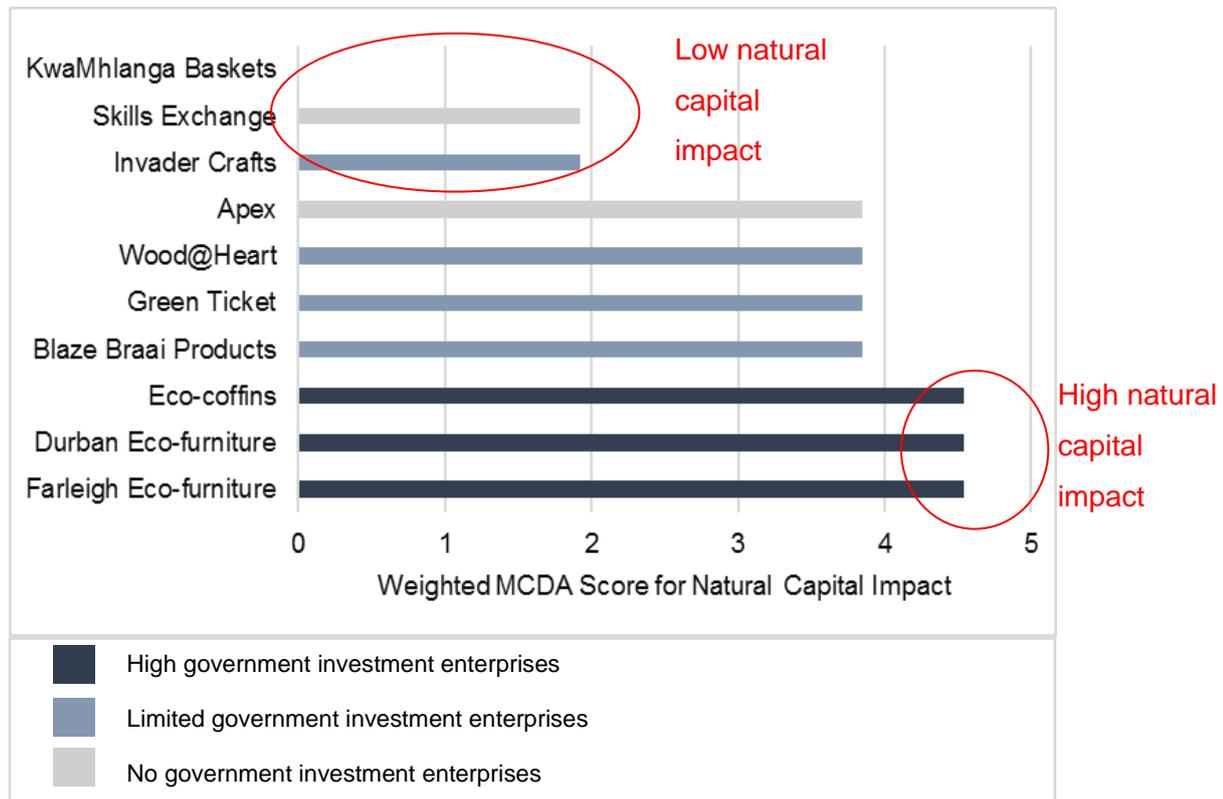


Figure 11: Ranked order of case study enterprises using MCDA weighted natural capital impact scores

5.5 GOVERNMENT SUPPORT TO IAP BIOMASS VAI

The study has shown that the private sector is prepared to contribute towards the cost of IAP clearing where this will generate access to IAP biomass that can be cost-effectively used in value-adding operations. This investment by the private sector is a potentially important mechanism for reducing government expenditure on IAP control nationally.

This is supported by De Lange *et al.* (2012), whose research on the potential for IAP biomass-to-energy projects on the Agulhas Plains observed that the financial burden to the state of clearing IAPs could be reduced by utilising IAP biomass for generating energy. However, Mugido *et al.* (2014) found that the feasibility of establishing an IAP biomass-to-energy enterprise near Port Elizabeth was dependent on DEA NRM Programme support to offset the high cost of IAP harvesting and extraction (i.e. relative to other potential sources of biomass).

Government financial support of IAP biomass based VAI remains critical to promote IAP harvesting methods that are labour intensive and result in effective control or complete eradication of IAPs from source areas (i.e. with associated natural capital benefits). De Lange *et al.* (2012) identified that the economic use of IAPs could increase financial dependency on these plants and create adverse incentives to illegally grow them. Similarly, profit-driven enterprises may only selectively harvest IAP biomass that they can use, and thereby not contribute towards IAP eradication goals. When structured appropriately, government financial support for IAP biomass VAI projects can address this risk and potentially also leverage enhanced developmental impacts in private enterprise partners, such as increased numbers of jobs created, increased training investment, and enhanced BBBEE outcomes.

The current model of DEA NRM Programme funding assists in contributing towards the cost of sourcing IAP biomass as a VAI input, however it also comes with a perceived cost / risk to business. Wood@Heart and Blaze Braai Products both indicated that they have had difficulties with DEA NRM Programme funding, including delays in contracting, delays in payments being disbursed, and difficulties with the level of cost-recovery that the funding provides for. Both have suggested that a partnership model could work better than the current 'Implementing Agent Contract' model, where a one-size fits all approach is applied and there is little room to accommodate or re-negotiate around the specific challenges or needs of each VAI and its value-chain complexities.

The above challenges are not uncommon in government-private sector relationships. The FAO (2016) studied 70 cases from 15 developing countries where public-private partnerships (PPPs) had been used to promote agri-business development and found that while PPPs could offer important benefits to government and the private sector, limitations such as unequal sharing of risk and problems with government funding flows were commonly experienced.

Given the potential developmental and natural capital restoration benefits associated with increasing the number and activities of IAP biomass VAI, the role of government in supporting the growth of the IAP biomass sector is potentially important. According to Spencer *et al.* (2005), governments can encourage and foster industry creation as well as entrepreneurship by putting appropriate institutional structures in place. Howard *et al.* (2005) also supports this observation in stating that government's role is to provide the enabling environment for the growth of South Africa's forestry sector in a manner that expands its poverty alleviation benefits. Cao (undated) also found that government in China could act as a driver of innovations in the private sector through creating appropriate support structures and regional 'spaces' for new industries.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

6.1.1 IAP biomass use for Value-adding Activities

The use of IAP biomass as an input material for value-adding activities is expensive when compared to commercially produced alternatives (Mugido *et al.*, 2014). This is because IAP biomass must be extracted from 'IAP jungles' comprising a variety of invasive and indigenous plant species of different sizes and densities, in locations with poor accessibility, and on multiple land parcels requiring numerous landowner agreements to have been secured beforehand. The yield per hectare of usable IAP biomass is highly variable, usually considerably less than from commercial plantations (Mugido *et al.*, 2014; Mander & Blignaut, 2016), and more damaging to machinery and equipment. Despite these challenges, the private sector has demonstrated an interest in using IAP biomass for value-adding activities, if government is prepared to assist with offsetting a fair proportion of the additional costs. This presents an important opportunity for government to leverage private sector investment into IAP eradication and so reduce its cost burden and increase the rate of IAP clearing.

The larger the scale of the VAI operation, the more IAP biomass will be demanded, resulting in a greater investment in IAP harvesting / eradication. Smaller VAI using IAP biomass as inputs can, however, create important socio-economic benefits in rural or impoverished communities through income generation and reduced household energy costs.

6.1.2 Enterprise Sustainability, Development Impact & Natural Capital Impact

An evaluation of the ten case study enterprises has allowed the identification of key internal structural factors that are required for IAP biomass VAI to be sustainable. A major theme emerging is the important role that a capable entrepreneur plays in the sustainability of an enterprise through securing finance for the enterprise, optimising production and financial efficiencies, creating effective business systems, addressing and overcoming external and internal risks and challenges, filling internal skills gaps, establishing partnerships in the value chain, and in driving well-directed product development and marketing. Such entrepreneurs have, in this study, been identified in the three private enterprises that ranked highest for sustainability in the MCDA scoring. However, while there is no reason why such entrepreneurs could not also

be present within government-owned enterprises (UNDP, 2015), the bureaucratic and inflexible business systems of the government-owned enterprises studied remain a limiting factor.

Counter-intuitively, the government-owned enterprises studied were not necessarily structured more optimally for sustainability and did not achieve a greater developmental impact than other enterprises. They did, however, perform better than others in respect of natural capital impact. The key sustainability risk associated with the government-owned enterprises was their dependence on government subsidisation of operating costs, a situation which is thought to leave them exposed to shifting funding priorities in both short and long term government budgeting cycles.

6.1.3 Government Support

The study has found that government support is required for individual IAP biomass VAI to offset the high costs of IAP harvesting, and in creating an enabling environment for the development of the IAP biomass sector. Government needs to be selective about which enterprises it supports, to ensure that the desired job creation, IAP eradication and human capital development outcomes are optimised through its investment. In this regard, it needs to choose enterprises to partner with that demonstrate the typical characteristics of 'high growth, high quality' SMMEs, which contain capable and passionate entrepreneurs. The MCDA that has been developed through the study offers a framework which can be used to support government evaluations of enterprises in such a selection process.

A limited level of government support provided to private enterprises was found to leverage increased job creation, investment in training of employees, and more responsible approaches to IAP control / eradication in the raw material supply chain. 'High growth, high quality' enterprises, which demonstrated a range of characteristics associated with high performance, profitability and sustainability, appeared to achieve the best job creation, human capital development and natural capital restoration outcomes with the funds provided by government.

Government support provided during the establishment phase of enterprises was found to positively influence their BBBEE ownership profile. The potential exists for government funding of IAP biomass VAI to leverage such positive BBBEE outcomes in both new and established enterprises that it supports.

6.1.4 Using MCDA as an Enterprise Selection Tool

Given that government needs to be selective about which IAP biomass VAI it supports, the MCDA developed through this study potentially offers a useful framework for government to use in selecting enterprise partners. While MCDA has not been extensively used for such purposes,

Ahmed *et al.* (2012) found that MCDA offers good potential for use in investment decision-making, given its ability to accommodate multiple and sometimes conflicting criteria, and rank the opportunities per user-defined weightings. This is particularly relevant in the case of the IAP biomass VAI evaluation, where government may seek to understand not only the sustainability profile of an enterprise, but also to what extent its operations are likely to generate the developmental and natural capital benefits that it aims to leverage.

The MCDA may also be used by private sector enterprises seeking to understand the criteria that they must meet to qualify for government support. In this regard, the MCDA may be used as a framework for self-evaluation by private enterprises prior to approaching government for support, in so doing they may also optimise their business plans to maximise their MCDA scores.

6.2 RECOMMENDATIONS

6.2.1 DEA NRM Programme Support to IAP biomass based VAI

The study findings suggest that government and private enterprise need to work together in establishing IAP biomass VAI, with the aim of: (i) creating feasible and financially viable IAP biomass based businesses; (ii) incentivising private sector investment into IAP eradication, resulting in reduced cost to the state; and (iii) optimised developmental outcomes from the eradication of and productive use of IAP. However, appropriate structuring of such relationships is important, and needs to ensure sufficient value and fair sharing of risk between government and private sector partners.

Given that each IAP biomass VAI is likely to have a unique set of opportunities and constraints in its value chain, a nuanced approach to government partnerships with VAI is required, rather than a 'one-size-fits-all' approach. These partnerships need to be structured around offsetting the additional costs of using IAP biomass as an input material (instead of other available alternatives), a fair proportion of the additional costs of adopting a labour-intensive approach, and of maximising training of the labour force. The partnership also needs to be dependent on the private sector partner implementing appropriate IAP harvesting methodologies that result in effective IAP control in the source area. It is further suggested that government should seek to leverage enhanced BBBEE outcomes through these partnerships, which may include encouraging employee ownership models or other mechanisms for preferential group ownership, as well as increasing the proportion of manager-level posts filled by people from preferential groups.

6.2.2 Promoting the IAP Biomass Sector

South Africa's Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises (2004) identifies "creating demand for SMME products and services" as one of three tiers of intervention intended to support small businesses. This implies measures to grow small businesses through increasing their markets.

South Africa's government could therefore play a key role in creating an enabling environment that supports increased private sector investment in establishing or expanding IAP biomass based VAI. This may include: (i) investment in market development and education, IAP product and value-adding technology development; (ii) facilitating greater efficiencies in the value chain, for example through pooling of IAP biomass to allow more VAI to access it as an input resource; and (iii) improving access to finance and business support, for example through establishing business incubation programmes and a VCF for IAP biomass VAI.

Such interventions could be designed to increase demand for IAP biomass as an input for a variety of value-adding activities and promote greater private sector investment into IAP clearing, as well as the creation of more jobs and training opportunities. Government could also play an important role in supporting the piloting of untested business models that offer high potential for driving major IAP biomass demand (for example IAP biomass-to-energy), which are too expensive for the private sector to tackle on their own.

6.2.3 Further development of the Multi-Criteria Decision Analysis Tool

The MCDA that has been developed focuses on evaluating the internal structural characteristics of an enterprise with regards to its likely sustainability, and an evaluation of the extent to which its business plan (or established business operations) will generate the developmental and natural capital impacts desired by the DEA NRM Programme. The MCDA therefore pre-supposes that the value chain and business plan is technically feasible. Given the potential complexities and challenges involved in most IAP biomass VAI value chains, the MCDA could be further developed to encompass a range of criteria for evaluating the technical feasibility of the enterprise value chain.

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ADDENDUM A

CASE STUDY AND KEY INFORMANT QUESTIONNAIRES

Table 15: Case study questionnaire used for enterprises in business

Number	Case study item	Answer
	General description of the enterprise & business structure	
1	What is the name of business?	
2	How many years has the business been operating?	
3	Who is involved?	
4	Type of business? (cc, co-op, Pty Ltd etc.)	
5	Describe the shareholding	
6	Are there any other partners or mentors involved?	
7	What is the company organogram and how many people are employed in / earning an income from the business?	
(i)	Management level (explain management structure & skills)	
(ii)	Skilled labour (explain types of skills)	
(iii)	Unskilled labour	
(iv)	Indirect beneficiaries (explain)	
(v)	Gender representation (number of women and men)	
(vi)	Disabled persons	
8	Where do the employees live?	
9	Have there been opportunities to upskill people in the business?	
10	What is the business's approach to employment vs. mechanisation?	
11	Is the business growing / stable / decreasing? Why?	
	Business idea and initialisation	
12	How did you come up with the business idea?	
13	How did you turn the business idea into a working business?	
	Overview of the enterprise value chain	
14	How does the business work - general overview of the business value chain:	
(i)	What are the raw materials?	
(ii)	Where do the raw materials come from?	
(iii)	How does the business access the raw materials (i.e. own production, buy from supplier, are supply contracts in place)?	
(iv)	What infrastructure is used to access the raw materials?	
(v)	What products are made?	
(vi)	What volume of raw material is needed to meet production demand?	
(vii)	What is the manufacturing (value-adding) process?	
(viii)	What manufacturing / processing technologies and infrastructure / equipment are used?	
(ix)	Who owns the intellectual property for these products (if relevant)?	
(x)	Does the business actively invest in product development?	
(xi)	How are the products marketed?	
(xii)	Who are the current clients?	
(xii)	Have you identified opportunities to expand your client base?	
(xiii)	If so, do you have a strategy for expanding your market? Explain.	
15	Who are the business's main competitors?	
16	Are there similar businesses in the area?	
	Involvement of Working for Water	
17	How did you become involved with Working for Water?	
18	What kinds of support does Working for Water provide to your business?	
(i)	Raw material supply chain	
(ii)	Processing technologies / systems / equipment	

(iii)	Product development	
(iv)	Market access / marketing	
(v)	Logistics	
(vi)	Financial	
(vii)	Mentorship / technical support	
19	Is the support you receive subject to any terms and conditions?	
20	Is there an agreement / contract in place between your business and Working for Water?	
21	How do you engage / liaise with / report to Working for Water?	
22	Do you think there are other things that Working for Water could also be assisting you with? Explain.	
	Business finance	
23	Did you obtain start-up funding, or do you receive a subsidy, and from where?	
24	How much capital did the shareholders invest?	
25	Are you operating profitably?	
26	How do you determine costs, prices and profits?	
27	Do you have issues with cashflow?	
	Costs and risks in the enterprise value chain	
28	What (approximate) percentage of the final product wholesale price is the cost of raw material inputs?	
29	Are there any constraints or risks associated with the raw material supply chain?	
(i)	Security of supply / access / sufficient volume?	
(ii)	Escalating costs?	
(iii)	Permits / licenses needed?	
30	Are there alternative raw materials that you could substitute with?	
31	Would use of alternative input materials affect the cost of production or marketability of the products?	
32	What (approximate) percentage of the final product wholesale price is the cost of manufacturing / processing?	
33	Are there any constraints or risks associated with the manufacturing / processing operation?	
(i)	Cost / availability of equipment: maintenance & replacement?	
(ii)	Special skills needed?	
(iii)	Water / electricity availability?	
(iv)	Spatial location?	
(v)	Permits / licenses needed?	
34	What (approximate) percentage of the final product wholesale price is the cost of marketing?	
35	What are your main market risks?	
36	Are there any other risks that you recognise in the business?	
(i)	Organisational	
(ii)	Regulatory compliance	
(iii)	Staff / labour issues	
(iv)	etc.	
37	How do you plan for and manage all the above costs and risks in the business?	
38	Do you think any of the costs or risks would ever be likely to lead to business failure?	
39	What could be done to address these key costs or risks?	

Table 16: Case study questionnaire used for the two 'failed' enterprises

Number	Case study item	Answer
	General description of the enterprise & business structure	
1	What was the name of business?	
2	How many years did the business operate for?	
3	Who was involved?	
4	Type of business? (cc, co-op, Pty Ltd etc.)	
5	Describe the shareholding	
6	Were there any other partners or mentors involved?	
7	How many people were employed in / earning an income from the business?	
(i)	Management level	
(ii)	Skilled labour	
(iii)	Unskilled labour	
(iv)	Indirect beneficiaries	
(v)	Gender representation (number of women and men)	
(vi)	Disabled persons	
8	Where did the employees live?	
9	Were people trained in the business?	
	Business idea and initialisation	
10	How did you come up with the business idea?	
11	How did you turn the business idea into a working business?	
12	On reflection, would you have done anything differently?	
	Overview of the enterprise value chain	
13	How did the business work - general overview of the business value chain:	
(i)	What were the raw materials?	
(ii)	Where did the raw materials come from?	
(iii)	How did the business access the raw materials (i.e. own production, buy from supplier, are supply contracts in place)?	
(iv)	What infrastructure was used to access the raw materials?	
(v)	What products were made?	
(vi)	What volume of raw material was needed to meet production demand?	
(vii)	What is the manufacturing (value-adding) process?	
(viii)	What manufacturing / processing technologies and infrastructure / equipment were used?	
(ix)	Who own(ed) the intellectual property for these products (if relevant)?	
(x)	Did the business actively invest in product development?	
(xi)	How were the products marketed?	
(xii)	Who were the clients?	
14	Did the business have competitors?	
	Involvement of Working for Water	
15	How did you become involved with Working for Water?	
16	What kinds of support did Working for Water provide to your business?	
(i)	Raw material supply chain	
(ii)	Processing technologies / systems / equipment	
(iii)	Product development	
(iv)	Market access / marketing	
(v)	Logistics	
(vi)	Financial	
(vii)	Mentorship / technical support	
17	Was the support you received subject to any terms and conditions?	
18	Was there an agreement / contract in place between your business and Working for Water?	
19	How did you engage / liaise with / report to Working for Water?	
20	Were there things that Working for Water could have assisted you with that may have helped to avoid the business failing?	

Business finance		
21	Did you obtain start-up funding, or receive a subsidy, and from where?	
22	How much capital did the shareholders invest?	
23	How did you determine costs, prices and profits?	
24	Did you have issues with cashflow?	
Reasons for failure of the enterprise		
25	What were the primary reasons for failure of the enterprise?	
(i)	Finance related?	
(ii)	Spatial location related?	
(iii)	Raw material supply chain related?	
(iv)	Manufacturing / processing related?	
(v)	Technology related?	
(vi)	Product related?	
(vii)	Market related?	
(viii)	Staff / labour related?	
(ix)	Regulatory compliance related?	
(x)	Business organisation / management related?	
(xi)	Other?	
26	Why did these problems arise?	
27	Could anything have been done to address these problems and save the business (i.e. were these fatal flaws in the business model or not)?	
28	Did the people that lost their jobs find alternative employment?	
29	What would you advise for a person looking to start a similar business?	

Table 17: Business incubator and VCC questionnaire

Number	Key Informant Questionnaire	Answers
Types and scales of enterprise financing		
1	Describe your enterprise investment / financing focus and objectives	
2	Do you finance start-ups as well as enterprise expansion?	
3	Are there any economic sectors that you have a specific interest in financing enterprises in, and why?	
4	Are there any sectors you would avoid?	
5	Are there any constraints on the scale of enterprise that would you finance?	
6	Are there any spatial constraints in respect of enterprises that you would finance (e.g. country-wide, only in urban areas etc.)?	
7	How do you provide finance - loan, equity share, etc.?	
8	How do you raise the capital for these loans / investments?	
9	What is the normal loan repayment term (period) for a small enterprise?	
10	What are the key elements that you look for in a new business enterprise when considering whether to finance it?	
11	Describe the enterprise business structure and ownership requirements that you prefer:	
(i)	Business type (cc, Pty Ltd, sole prop, co-operative).	
(ii)	Shareholding arrangements	
(iii)	Black ownership	
(iv)	Women ownership	
(v)	Etc.?	
VAIs experience and potentials		
12	Have you financed any enterprises that work with invasive alien plants as an input material?	
13	If so, can you say more about the business(es) and its(their) current status?	
14	Do you think there is current or future potential for product and market development in this sector?	
15	What kinds of enterprises (producing what kinds of products) would you be most likely to consider financing in this sector?	

16	Do you think there is a role for government to play in supporting these kinds of businesses (i.e. Working for Water)? Explain.	
	Finance applications	
17	Describe the process that an enterprise must follow to apply for finance from you?	
18	What are the minimum requirements that must be met in the application submission and process?	
19	How do you evaluate your credit, legal and reputational risk through the application appraisal process?	
20	How do you evaluate the applicant's:	
(i)	Market risks	
(ii)	Supply chain risks	
(iii)	Labour risks	
(iv)	Skills and technology risks	
(v)	Spatial / locational risks	
(vi)	Logistics risks	
(vii)	Financial cashflow risks	
21	Do you have any specific requirements that must be met in terms of labour sourcing, training, gender equality?	
	Loan terms and conditions	
22	How do you provide finance - loan, equity share, etc.?	
23	What factors do you consider when deciding to finance through an equity share rather than a loan?	
24	How do you raise the capital for these loans / investments?	
25	What is the normal loan repayment term (period) for a small enterprise?	
26	What kind of return on investment must the loan / investment offer for it be a viable proposition for you to finance?	
27	What kinds of conditions do you include in finance / loan agreements that small enterprises must comply with?	
	Enterprise risk management	
28	How do you manage your credit, legal and reputational risk in enterprises you have financed?	
29	Do you ever play a mentoring role in enterprises that you finance?	
30	What is your response if enterprises you have financed fail to comply with the loan conditions?	
31	What is your response if enterprises you have financed show a decline in profitability, or seem to be on the road to business failure?	

ADDENDUM B

MCDA PERFORMANCE MATRIX

	Performance Criteria	Indicators					
		Score - 2	Score 0	Score 1	Score 2	Score 3	Score 5
Development Impact	Employment creation			Less than 50 people employed per annum	50 - 100 people employed in full time positions or labour mostly part time / short term	100 to 300 people employed in full time positions per annum	More than 300 people employed in full time positions per annum
	Preferential employment		<10% of employees are Black people, women and youth	10 - 30% of employees are Black people, women and youth	31 - 60% of employees are Black people, women and youth	61 - 90% of employees are Black people, women and youth	>90% of employees are Black people, women and youth
	Skills development		No training / training undertaken		Up to half of the employees are trained / receive training	More than half but not all employees are trained / received training	All employees are trained / receive training
	Black business ownership		Less than 10% Black ownership, all other BBBEE levels		10 -50% Black ownership, or Level 3 / 4 BBBEE	51% or more Black ownership, or Level 2 BBBEE	100% Black ownership, or Level 1 BBBEE
	Women business ownership		Less than 10% Women ownership		10 -50% Women ownership		At least 51% Women ownership
	Poverty alleviation			Employment created in an area where poverty levels are low		Employment created in an area where poverty levels are moderate	Employment created in an area where poverty levels are high
	Impact on household energy / water / food security	May impact negatively on household-level energy, water or food security in poor or impoverished communities	Does not impact on household-level energy, water or food security				Improves security of household energy, water or food supplies in poor or impoverished communities
	Economic multiplier effect		No economic multiplier effect				Business creates opportunities for value-add or businesses in other / supporting sectors

Natural Capital Impact	Eradication of IAP		Harvesting of IAP biomass done selectively and with no follow up treatment	Selective harvesting, or total harvesting but with no follow up treatment			All IAP in harvesting areas are cleared, follow up treatments are done
	Restoration of Natural Capital		No active restoration is undertaken			Rehabilitation / restoration is undertaken for a limited period	Cleared areas are rehabilitated / restored and managed on an ongoing basis
	Impact on water resources		IAP eradication taking place outside of a National Freshwater Ecosystem Priority Area (NFEPA) Strategic Water Source Area / Working for Water High Priority Area				IAP eradication taking place in a NFEPA Strategic Water Source Area / Working for Water High Priority Area
Enterprise Sustainability Criteria	Availability of financial capital & assets		Financial capital and required capital assets have not been secured		Some or part of the financial capital and capital assets requirements has been secured		All required financial capital and capital assets have been secured
	Availability of operating capital		Availability and source of operating capital inadequate or not clear				Availability and source of operating capital is adequate and clearly defined
	Business profitability		Business is not running profitably / is projected to run profitably after more than 5 years from start		Business is projected to run profitably within 5 years from start	Business is projected to run profitably within 3 years from start	Business is running profitably
	Entrepreneurial skills and drive		No entrepreneurial skills or drive evident in the business		Entrepreneur(s) in the business that have some skills and still developing the ability to manage business efficiencies and find new opportunities for business expansion		Strong entrepreneur(s) in the business that are actively managing business efficiencies and constantly seeking new opportunities for business expansion

Technical and management skills / experience		No / few skilled and experienced individuals in the business that can ensure efficiencies in each part of the value chain		Skilled / experienced individuals in the business ensuring efficiencies in some parts of the value chain only		Skilled and experienced individuals in the business that can ensure efficiencies in all parts of the value chain
Business planning		No business plan in place		Business plan in place but not adequate or requires updating		Business plan in place with clear budgets, cashflows and targets
Intellectual property rights		IP in products or processes owned by another entity and no rights agreements in place				IP in products and processes owned by the business / or rights agreements in place
Partnerships or mentorships		Effective mentorships or partnerships not established				Partnerships or mentorships have been established that have made a significant positive impact in enhancing efficiencies, profitability and sustainability in the entire value chain
Business systems		Business systems are not effective or appropriate, and impact negatively on business efficiency / sustainability		Business systems are still being developed and efficiencies improved		Effective business systems in place that allow the business to operate effectively and resiliently, and adapt/respond quickly to challenges that arise
Markets and contracts		Markets are poorly understood / defined		Markets have been understood / identified but no supply contracts in place		Markets have been understood / identified and supply contracts are in place
Product development		No investment in product development		Limited investment in product development		Significant investment in product development
Product diversity		Single product, no productive use of waste materials		More than one product, some productive use of waste materials		Multiple products, maximum value added from available materials and minimised waste product
Business risks		Business risks have not been identified	Business risks have been identified but not being proactively managed			Business risks have been identified and are proactively and effectively managed