

Community Development through Invasive Plant Species Management in Gibeon, Namibia



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ABSTRACT

This project helped the Desert Research Foundation of Namibia establish a firewood business to create income generating job opportunities in the village of Gibeon. Through Integrated Water Resource Management, a community group harvested the invasive plant species *Prosopis* in an effort to decrease detrimental environmental impacts and improve local livelihoods. Exploring the feasibility of the initiative and the market potential for firewood in and around Gibeon led to production optimization strategies and the identification of two major market possibilities. With proper training, employee distribution, and marketing, the business could be viable, but many variable costs and necessary resources require further examination to determine long-term sustainability.

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EXECUTIVE SUMMARY

Globally, poverty and unemployment jeopardize environmental, economic, and social sustainability. Particularly present in rural African communities, these problems prevent community members from securing sustainable livelihoods. One such community is Gibeon, located in southern Namibia (Gibeon Village Council, 2012). Gibeon's arid climate, rocky terrain, and scarce water supply reduce available employment opportunities: the village suffers from 80% unemployment.

This project assisted the Prosopis Firewood business, a Gibeon community group, in collaboration with the Desert Research Foundation of Namibia, achieve sustainable livelihoods through harvesting and selling the invasive plant species, Prosopis, which depletes the available groundwater and degrades the biodiversity of the region. The project empowered community members to take ownership of the business and use the harvested product to improve the region's economy. If the community group sustains the business, it will prosper, thus enabling the employees to enhance their livelihoods.

Home to over fourteen million people, with an additional five million people dependent on its water, the Orange-Senqu River Basin is located within four different countries: Namibia, South Africa, Lesotho, and Botswana. The basin's water scarcity elicited international concern and involvement. A three year project called "A Water Secure Future for Southern Africa: Applying the Ecosystem Approach in the Orange-Senqu Basin" began in 2012, developed by the International Union for Conservation of Nature (IUCN) with funding from the US Agency for International Development (USAID)/Southern Africa (USAID, 2013). The project works with local non-governmental organizations (NGOs) from each country that comprises the basin countries to "pilot programs that balance ecosystem requirements with human development needs to ensure efficient and lasting water provisioning services in priority areas in the basin" (USAID, 2012).

For Namibia's role in "A Water Secure Future for Southern Africa," the Desert Research Foundation of Namibia (DRFN) is implementing a program to clear a predetermined quantity of Prosopis from the Fish River at a pilot site in Gibeon. There, Prosopis depletes the underground aquifer and outcompetes surrounding indigenous plants, degrading biodiversity in the region.

Although Prosopis harms ecological sustainability, it can be utilized commercially as biofuel, firewood, charcoal, timber, and fodder (Shackleton, Le Maitre, Pasiecznik & Richardson, 2014). Gibeon community members can harvest Prosopis to create new income sources and address high unemployment rates by marketing and selling the plant as firewood.

METHODS

To accomplish our goal, our team established four objectives:

1. Determined the Prosopis Firewood employees' business skills, agricultural knowledge, and employment status, as well as identified available infrastructure and resources in Gibeon to support the business
2. Applied criteria for best practices in developing small businesses in Namibia to create an efficient operations structure for the Prosopis Firewood business in Gibeon
3. Explored the market potential of Prosopis firewood in and around Gibeon
4. Identified criteria for measuring how harvesting Prosopis influences livelihoods and impacts the environment

We utilized Community Based Participatory Research (CBPR) (Proctor, 2009) to guide these objectives. By including the employees in the business creation and market development processes, we felt that the business was more likely to succeed because the employees would take personal responsibility to create a viable project. Furthermore, including the employees in the planning process enhanced our understanding of community dynamics and business concerns.

The methods we used to accomplish our four objectives were:

1. Interviewed business experts from both the Polytechnic of Namibia (Poly) and Worcester Polytechnic Institute (WPI) to establish the necessary criteria to create a sustainable business in a developing community
2. Surveyed the Prosopis Firewood employees to determine their background information, such as work experience and financial management skills
3. Visited the harvesting site in Gibeon to observe the current Prosopis Firewood business practices
4. Contacted two tourism resorts and a representative from the Namibia Wildlife Resorts to assess the Prosopis Firewood market potential
5. Interviewed the two directors from SMEs Compete, a business which specializes in training developing SMEs, to determine the extent to which their services could help the Prosopis Firewood business
6. Conducted literature reviews and interviews to create guidelines to monitor Prosopis livelihood and environmental impacts

FINDINGS & RECOMMENDATIONS

Our findings and recommendations fall into four categories:

1. Employee Skills and Gibeon Resources

Findings:

1. Lack of transportation, storage space, and employee business knowledge threaten the Prosopis Firewood business's viability, but the Gibeon Village Council's (GVC) support will alleviate some of these problems.
2. Agencies in Namibia, through training and funding opportunities, offer support for SME development by helping new businesses overcome the common challenges of insufficient management skills, limited resources, and a lack of financial support.

Recommendations:

1. We recommend that there should be 12 harvesters and 18 packagers. In addition, if the Prosopis Firewood business decides to sell to Mr. Sakkie Engelbrecht (a bulk purchaser), all employees should be present to load his truck twice a month.
2. We recommend that the Prosopis Firewood business use future profit to invest in more equipment to increase production.
3. We recommend that the Prosopis Firewood business employees receive pay based on production output rather than time.

2. Small Business Development and Operations

Findings:

1. The current operation structure and lack of leadership of the Prosopis Firewood business results in minimal motivation for the employees, reducing productivity.
2. Because too many employees were harvesting and not enough were packaging, the production line was inefficient.
3. It is difficult to determine the economic viability of Prosopis Firewood because the anticipated costs of the business are based on assumptions and limited data.

Recommendations:

1. We recommend that the DRFN and Prosopis Firewood employees confirm the roles and services the GVC will provide through a finalized legal contract.
2. We recommend that the Prosopis Firewood employees reach out to community members to explore additional transportation and storage options.
3. We recommend that the Prosopis Firewood business be registered as a close corporation and apply for SME certification to enhance its reputation.
4. We recommend that the Prosopis Firewood business utilize a business plan to ensure market, operational, and financial success.

5. We recommend that the Prosopis Firewood business apply for training and services from SMEs Compete.

3. Market Potential

Findings:

1. Because retail markets in Mariental, the city nearest to Gibeon, will not likely be profitable, tourism resorts and a bulk purchaser represent the most lucrative markets for the Prosopis Firewood business. The bulk purchaser requires a large supply of firewood and will provide transportation, while the tourism resorts require variable supply and transportation.

Recommendations:

1. We recommend that the Prosopis Firewood business focus on supplying Mr. Sakkie Engelbrecht with firewood because of the demand frequency and low production costs.
2. We recommend that the DRFN continue to assess market potential of tourism resorts.

4. Sustainable Livelihoods and Environmental Impact

Findings:

1. The Prosopis Firewood business' failure to implement the recommended eradication techniques during Prosopis harvesting has led to regrowth.

Recommendations:

1. We recommend that the stumps of harvested Prosopis trees be burnt to inhibit regrowth.
2. We recommend the Prosopis Firewood employees clear Prosopis from the appropriate areas, as outlined in the Baseline Assessment Report. The report contains a management plan designed to prevent rapid depletion of Prosopis, contribute to the water security efforts, and avoid legal infractions.
3. We recommend that the DRFN work with Dr. Ben Strohbach to create a means to monitor the environmental impact of Prosopis harvesting.
4. We recommend the DRFN ensure that USAID monitors the Prosopis Firewood business in terms of livelihood improvement and environmental impact.

Overall, we anticipate that if the Prosopis Firewood business adheres to our recommendations, the community members will execute and sustain an income generating business to enhance the capacity to develop and maintain sustainable livelihoods.

AUTHORSHIP

Abstract.....	ALL
Acknowledgements	JC, KB
Executive Summary	ALL
Authorship.....	JC
Table of Figures	JC
Table of Tables.....	JC
List of Abbreviations	KB
1.0 Introduction	ALL
2.0 Background.....	RC
2.1 A Water Secure Future for Southern Africa.....	KB
2.2 Orange-Fish River Basin and Gibeon.....	RC
2.3 Invasive Species Around the World and in Gibeon, Namibia.....	RMC
2.4 Principles of Sustainable Development	JC
2.5 Business Development in Namibia	RMC, KB, JC
2.6 Summary of Background	RC
3.0 Methodology	RC
Community Based Participatory Research	JC
3.1 Employee Skills and Gibeon Resources	KB
3.2 Small Business Development and Operations	RC
3.3 Market Potential.....	RMC
3.4 Sustainable Livelihoods and Environmental Impact.....	RC
3.5 Summary of Methods	JC, KB
4.0 Findings	ALL
5.0 Conclusion and Recommendations	ALL
6.0 A Global Perspective	ALL
Bibliography.....	RC
8.0 Appendices	
Appendix A – DRFN Conversations with Lucky and Mandy.....	KB
Appendix B – Template for Proposed Meeting with GVC	JC
Appendix C – Information from Gibeon Trip.....	RC, KB
Appendix D - Interview Templates and Summaries for Business and Marketing Experts....	RMC
Appendix E - Interview Templates and Summaries for Market Analysis	RMC
Appendix F –Template and Summary for Prosopis Expert Interview	KB
Appendix G –Prosopis Firewood Business Plan.....	ALL
Appendix H – Prosopis Business SWOT Market Analysis	KB, RMC
Appendix I– Assumptions for Determining Business and Marketing Costs.....	KB
Appendix J– Livelihood Criteria Survey.....	RMC

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TABLE OF CONTENTS

Abstract.....	i
Acknowledgements.....	ii
Executive Summary	iii
Authorship.....	vii
Table of Figures	ix
Table of Tables.....	ix
List of Abbreviations	x
1.0 Introduction	1
2.0 Background.....	3
2.1 A Water Secure Future for Southern Africa.....	3
2.2 Orange-Fish River Basin and Gibeon.....	4
2.3 Invasive Species Around the World and in Gibeon, Namibia.....	8
2.4 Principles of Sustainable Development	10
2.5 Business Development in Namibia	11
2.6 Summary of Background	14
3.0 Methodology	15
Community Based Participatory Research	15
3.1 Employee Skills and Gibeon Resources	16
3.2 Small Business Development and Operations	17
3.3 Market Potential.....	20
3.4 Sustainable Livelihoods and Environmental Impact.....	22
3.5 Summary of Methods	24
4.0 Findings	25
5.0 Conclusion and Recommendations	38
6.0 A Global Perspective	45
Bibliography.....	48
8.0 Appendices	53
Appendix A – DRFN Conversations with Lucky and Mandy.....	53
Appendix B – Template for Proposed Meeting with GVC	58
Appendix C – Information from Gibeon Trip.....	61
Appendix D - Interview Templates and Summaries for Business and Marketing Experts.....	75
Appendix E - Interview Templates and Summaries for Market Analysis	85
Appendix F –Template and Summary for Prosopis Expert Interview	90
Appendix G –Prosopis Firewood Business Plan.....	93
Appendix H – Prosopis Business SWOT Market Analysis	129
Appendix I – Assumptions for Determining Business and Marketing Costs	130
Appendix J– Livelihood Criteria Survey	135

TABLE OF FIGURES

Figure 1: Location of Gibeon in the Orange-Fish River Basin	5
Figure 2: High Risk Farming Areas in Namibia.....	6
Figure 3: Low Grazing Availability in Namibia.....	7
Figure 4: SWOT Analysis for Marketing Plans.....	22
Figure 5: Each Team Worked Independently of Each Other while Packaging Wood	29
Figure 6: Each Team Stacked and Counted Firewood Separately.....	30
Figure 7: Firewood Purchasing Intervals for Retail Stores in Mariental.....	34
Figure 8: Post-Harvesting Prosopis Regrowth	36
Figure 9: Leftover Brush from Harvested Tree.....	36

TABLE OF TABLES

Table 1: Percentages of Hardap Population Deprived of Certain Opportunities	11
Table 2: Elements of a Business Plan	13
Table 3: The Four "Ps" of Marketing.....	14
Table 4: Interviewees for Business Logistics and Support Information.....	18
Table 5: Threats Facing Prosopis Firewood Business and Available GVC support.....	25
Table 6: Challenges Facing Developing SMEs in Namibia	27
Table 7: Agencies that Offer Support to Developing SMEs in Namibia.....	27
Table 8: Observations of Prosopis Firewood Employee Motivation and Leadership	28
Table 9: Cost Scenarios for Packaging.....	31
Table 10: Cost Scenarios for Transportation within Gibeon.....	31
Table 11: Cost Scenarios for Delivery of Firewood.....	31

LIST OF ABBREVIATIONS

CBD - Convention of Biological Diversity
CBPR - Community Based Participatory Research
DRFN - Desert Research Foundation of Namibia
EA - Ecosystem Approach
GVC - Gibeon Village Council
IUCN - International Union for Conservation of Nature
IWRM - Integrated Water Resource Management
OFRB - Orange-Fish River Basin
OSRB - Orange-Senqu River Basin
Poly – Polytechnic of Namibia
SME - Small or Medium-sized Enterprises
SWOT - Strengths, Weaknesses, Opportunities, Threats
USAID - United States Agency for International Development
WPI – Worcester Polytechnic Institute

1.0 INTRODUCTION

Poverty and unemployment are global issues that affect environmental, economic, and social sustainability. Particularly present in rural communities within developing nations, these challenges inhibit impoverished community members from achieving sustainable livelihoods (Krantz, 2001). Without secure access to resources or consistent income opportunities, these communities rely on outside aid to sustain themselves. For these individuals, it is nearly impossible to independently develop sustainable livelihoods (MSD, 1991).

Though one of the more developed countries of Africa, Namibia is also one of the world's most economically unequal nations, with an estimated fifty percent of the population living below the poverty line of \$1 USD per day (Sahlén, 2012). Gibeon, a rural village located in the Hardap region in the south central part of Namibia, faces an especially challenging situation because of its unstable economy and harsh environmental. The Gibeon Village Council (GVC) estimates an eighty percent unemployment rate, which has been recently increasing (Gibeon Village Council, 2012). In addition, Gibeon's arid climate, rocky terrain, and scarce water supply limit the development of sustainable employment opportunities.

Prosopis is an invasive plant species that exacerbates the detrimental effects of Gibeon's climate, terrain, and water supply. A mature Prosopis tree consumes up to fifty liters of water per day, depleting the underground water aquifers and outcompeting surrounding indigenous plants. This is alarming because the density of Prosopis in Gibeon increases approximately eighteen percent each year (Ntesa, Kabajani, & Strohbach, 2014). "A Water Secure Future for Southern Africa" is a project funded by the United States Agency for International Development (USAID) and led by the International Union for Conservation of Nature (IUCN). The main goal of the project is to empower communities that rely on the Orange Senqu River Basin (OSRB) in southern Namibia and neighboring countries to manage water resources properly. The DRFN is responsible for managing the allocated funds for Namibia; Gibeon, a community in the Hardap region, is the pilot site. Water resources in this region are threatened by the presence of Prosopis.

Although Prosopis is detrimental to the environment, countries around the world have productively utilized it in various commercial products such as biofuel, firewood, charcoal, timber, and fodder (Shackleton, Le Maitre, Pasiecznik & Richardson, 2014). By harvesting and marketing products made from the plant, several impoverished communities have created new sources of income and addressed high unemployment rates. This also frees land and water resources while restoring biodiversity of surrounding environments (Kurt, 2014).

Through an Integrated Water Resource Management (IWRM) approach, the DRFN is working to help Gibeon achieve similar successes. IWRM includes community members in the management of water-related resources, empowering them to "understand the threats, prescribe mitigation

measures, and predict changes” of their surrounding environments (GIZ and Ministry of Agriculture Water and Forestry, n.d). Thirty members from the Gibeon community have been trained in Prosopis harvesting techniques suited for producing firewood. Two major obstacles remain: developing an effective market and a sustainable business to sell Prosopis. Ensuring economic and business viability is difficult due to the lack of education among the employees and the limited technical resources available.

This project assisted the Prosopis Firewood business, a Gibeon community group, in collaboration with the Desert Research Foundation of Namibia, achieve sustainable livelihoods through harvesting and selling the invasive plant species, Prosopis, which depletes the available groundwater and degrades the biodiversity of the region. To do so, we completed the following objectives:

1. Determined the Prosopis Firewood employees’ business skills, agricultural knowledge, and employment status, as well as identified available infrastructure and resources in Gibeon to support the business
2. Applied criteria for best practices in developing small businesses in Namibia to create an efficient operations structure for the Prosopis Firewood business in Gibeon
3. Explored the market potential of Prosopis firewood in and around Gibeon
4. Identified criteria for measuring how harvesting Prosopis influences livelihoods and impacts the environment

We intend for IWRM to empower community members to take ownership of Prosopis and use its harvested products to develop sustainable livelihoods and grow the business. Our team believes that if the community sustains the business, it will prosper, thus improving the livelihoods of those involved.

2.0 BACKGROUND

Gibeon, the pilot site for water resource management in Namibia, exhibits both a need and opportunity for the development of sustainable livelihoods through the management of the invasive plant species, Prosopis. This chapter does the following:

- Introduces the USAID water management project
- Illustrates the need for water management and job creation in and around Gibeon
- Identifies the threats Prosopis imposes on the community
- Demonstrates the potential for Prosopis to be used as an income generating resource
- Explores sustainable development
- Explains various business and marketing considerations relevant to starting a business in Namibia

2.1 A WATER SECURE FUTURE FOR SOUTHERN AFRICA

Home to over fourteen million people with an additional five million people dependent on its water supply, the Orange-Senqu River Basin is located within four different countries - Namibia, South Africa, Lesotho, and Botswana (USAID, 2013). In 2007, approximately ninety nine percent of the available natural runoff from the basin was in use, meaning that the basin was "approaching closure" and would soon have no more water to allocate and use (ORASECOM, 2011). This depletion of water, among other environmental challenges the basin faces, has elicited international concern and involvement. In 2012, a three year project developed by the International Union for Conservation of Nature (IUCN) with funding from the US Agency for International Development (USAID), southern Africa began to promote Integrated Water Resource Management (IWRM) that would help to meet the short and long-term needs of communities and economies that rely upon the basin ecosystems (USAID, 2013). Called "A Water Secure Future for Southern Africa: Applying the Ecosystem Approach in the Orange-Senqu Basin," the project works with local NGOs from each of the basin countries to "support scientific analysis and pilot programs that balance ecosystem requirements with human development needs to ensure efficient and lasting water provisioning services in priority areas in the basin" (USAID, 2012).

As defined by the Convention on Biological Diversity, an Ecosystem Approach (EA) is, "a strategy for integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" (CBD, 2010). This approach encourages the development of strategies for addressing environmental concerns that consider social, ecological, and economic objectives (Waltner-Toews, Kay & Lister, 2008). It emphasizes that humans play an integral role in the well-being, development, and management of environments,

and can help empower institutions to govern natural resources in such a way that stakeholders have ownership of the project (CDB, 2010).

Integrated Water Resource Management (IWRM) is widely utilized in Namibia (GIZ and Ministry of Agriculture Water and Forestry, n.d.). IWRM is defined as “a process which promotes the...development and management of water, land and related resources...without compromising the sustainability of vital ecosystems” (Nations, 2015). IWRM encourages participatory involvement with stakeholders to enable an understanding of imminent environmental threats and develops plans to appropriately manage water resources. In Namibia, IWRM is implemented at the basin level to give a wide range of Namibians an understanding of how to manage and conserve a resource, and the economic value associated with its management (GIZ and Ministry of Agriculture Water and Forestry, n.d.). IWRM can be further used to address the following concerns in Namibia:

- Poor water management
- Population growth, poor economy, and low standards of living
- Overexploitation of water and other natural resources by those in poverty
- Climate change (GIZ and Ministry of Agriculture Water and Forestry, n.d.)

Executing the EA and IWRM approaches are the main objectives of the USAID/IUCN project and will be integrated in our efforts to create sustainable livelihoods in Gibeon.

2.2 ORANGE-FISH RIVER BASIN AND GIBEON

The Orange-Fish River Basin (OFRB) lies within the OSRB. It is a primary target for water resource management as it encompasses nearly 120,000 km² of land in southern Namibia, including portions of the Hardap region (Seely, 2009). In Figure 1, the OFRB is distinguished by the dark brown shading; Gibeon, marked by the red star, is located near the major B1 highway south of Mariental.



FIGURE 1: LOCATION OF GIBEON IN THE ORANGE-FISH RIVER BASIN
(ADAPTED FROM SEELY, 2009)

The majority of the 77,000 people living in the OFRB rely on it for their livelihoods - a real problem because of the arid climate and decreasing water supply. Land is primarily used for livestock rangeland and wildlife farming, although some areas are irrigated for intensive crop production (Desert Research Foundation of Namibia, 2012). The aridity of the land, coupled with livestock farming and crop production, limit the availability of necessary natural resources like water and land (Seely, 2009). The basin's limited water resources make farming a high risk occupation and contribute to the area's low grazing availability, as seen in Figures 2 and 3. Overgrazing and wasteful irrigation practices make the most common occupations unsustainable. Combined with inherent environmental constraints, these occupations are threatening the limited water capacity of the OFRB (Desert Research Foundation of Namibia, 2012). People of the OFRB face other pressing challenges:

- Limited water availability
- Poor quality and low-yielding ground-water sources
- Lack of infrastructure for delivery of water and sanitation services
- Invasive plants choking river channels

- Threats of reduced runoff and changed flow patterns in both the Orange and Fish Rivers as a result of dams and the upstream diversion of water
- Flooding (DRFN, 2009)

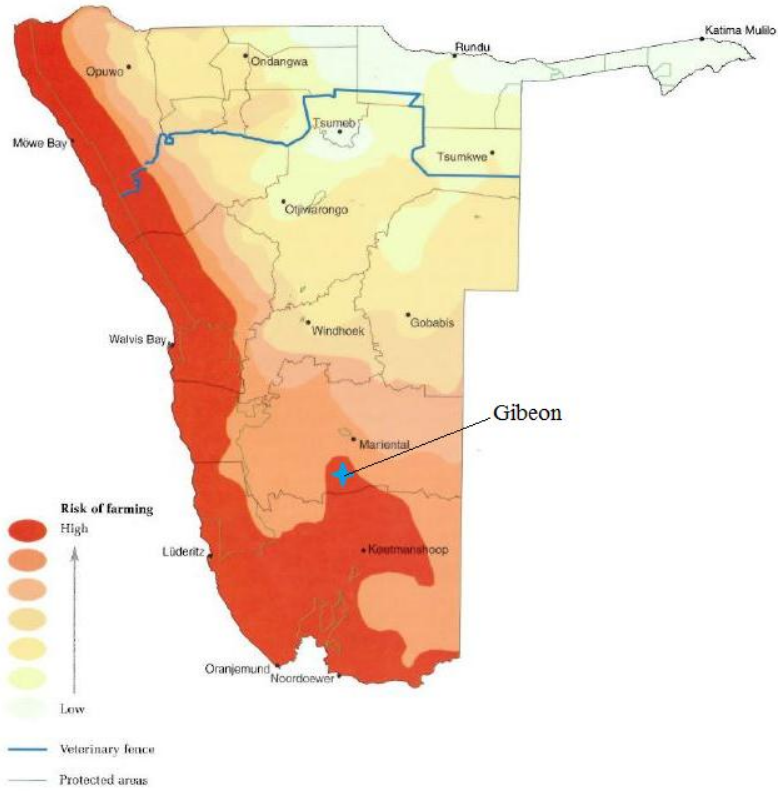


FIGURE 2: HIGH RISK FARMING AREAS IN NAMIBIA (ADAPTED FROM MENDELSON, 2002)

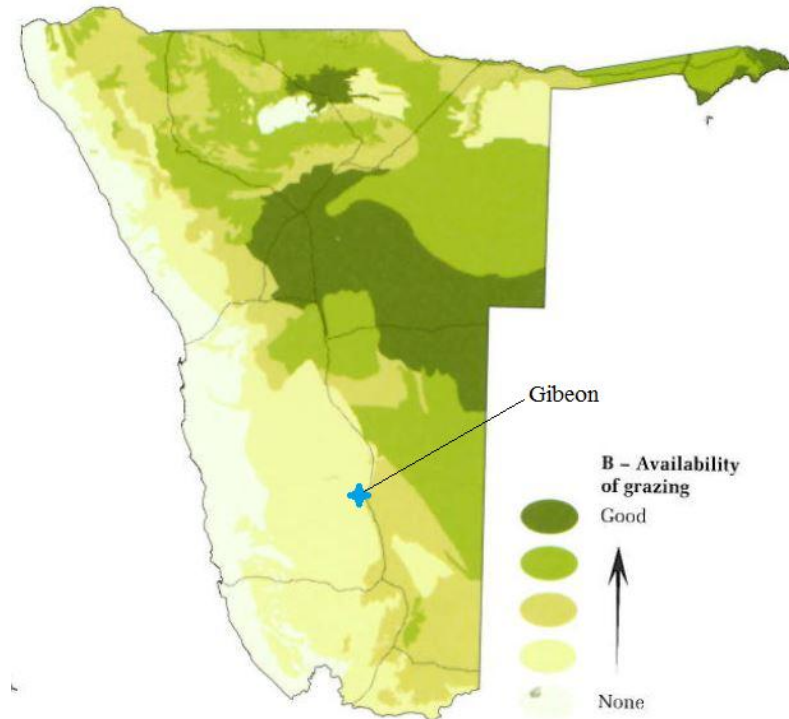


FIGURE 3: LOW GRAZING AVAILABILITY IN NAMIBIA (ADAPTED FROM MENDELSON, 2002)

Gibeon is located in the southern portion of the Hardap region, approximately 340 km south of Windhoek. Situated within the OFRB, the village is one of many that depend on the basin's water. Gibeon is part of a desert and steppe climate region which experiences conditions ranging from dry savanna to semi-desert, where rocky ground limits the development of agriculture and infrastructure (Franzius, Kohima & Rodriguez, 2004). According to the GVC, "the geographic and economic isolation of Gibeon, pose tremendous challenges to local rejuvenation and growth" (GVC, 2012).

Approximately sixty km northeast of Gibeon is Mariental, the nearest city that is also situated along the national road that leads to South Africa. Mariental is a major commercial asset as it has employment options and resources that are otherwise unavailable within the Gibeon community. However, without reliable means of transportation, community members cannot use the road to travel to Mariental and access these opportunities.

In addition to the geographical challenges facing the Gibeon community, there is a concerning lack of education and employment opportunities. In Gibeon, there are two primary schools and one secondary school, yet less than one-fourth of the Hardap region's population above fifteen years of age has received an education beyond the primary level (Namibia Statistics Agency, 2014). As a result of the lack of education, most villagers rely on farming, irregular, or informal

work for their main source of income (Franzius et al., 2004). The few federally staffed institutions and government positions in Gibeon account for a handful of the employment opportunities in the area (Gibeon Village Council, 2012) but are generally reserved for those with higher education. The GVC estimates an eighty percent unemployment rate, which has been recently increasing (Gibeon Village Council, 2012).

The Gibeon community must stimulate its economy in order to generate new avenues for sustainable livelihoods. One way of achieving economic growth, specifically in this region, is to explore how natural resources can be properly maintained to better support livelihoods. *Prosopis*, an invasive plant species in Namibia, is a plentiful and underutilized resource that can bridge the gap between unemployment and economic growth. For this reason, the DRFN chose Gibeon as pilot site for implementing water and resource management to aid the community in developing sustainable livelihoods.

2.3 INVASIVE SPECIES AROUND THE WORLD AND IN GIBEON, NAMIBIA

Invasive species are prevalent around the world, causing environmental damage and threats to the places where they spread. *Prosopis*, an invasive species in Namibia, consumes water resources and degrades biodiversity. Communities must manage the spread of the plant to prevent its harmful effects. In Gibeon, *Prosopis* can be harvested and sold as firewood, thus promoting sustainable livelihoods and securing water.

Invasive Species Around the World: According to the National Invasive Species Information Center (NISIC), “Invasive species are plants, animals, or pathogens that are nonnative (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause harm” (NISIC, 2015). Australia and Thailand introduced the shrub *Mimosa pellita*, native to parts of tropical America, for ornamental decorations and reduction of soil erosion. The introduction resulted in dense thickets that threatened flood plains, reduced the biodiversity of the ecosystems, and consumed water once available for agriculture (NISIC, 2015). These two cases emphasize the need to manage invasive plants for minimizing the various threats associated with their aggressive nature.

Characteristics of *Prosopis*: Indigenous to South America, *Prosopis* is a one to three meter shrub or a three to eight meter multi-stemmed tree with a spreading canopy (Curtis & Mannheimer, 2005). The plants have highly adaptable root systems that absorb both surface and groundwater (Smit, 2005). Furthermore, they can fix atmospheric nitrogen in their root nodules, negating the need for nutrient-rich soils (Smit, 2005). Studies from Kenya and Botswana show that *Prosopis* secretes allelochemicals that prevent the growth of surrounding plants, enabling it to outcompete nearby native vegetation and reduce regional biodiversity (Masweu et al., 2013; Mwangi & Swallow, 2005).

Prosopis in Namibia: It is believed that a German settler introduced Prosopis in Okahandja in 1897 for shade and fodder because the arid climate of Namibia is similar to that of South America (Ntesa, Kabajani, & Strohbach, 2014). The most prevalent species of Prosopis in Namibia today are: *P. juliflora*, *P. glandulosa var. torreyana*, *P. chilensis*, and *P. velutina*, as well as their hybrid combinations (Smit, 2005). Prosopis's drought resistance and tolerance to fluctuating temperature extremes allow it to flourish in Hardap, a region that receives an annual rainfall of approximately 100 mm (IECN, 2011).

Negative Impacts of Prosopis: In Namibia, Prosopis has caused the following problems:

- Loss of grazing area
- Reduced surface water availability
- Overgrowth, blocking access to pasture
- Loss of soil fertility (Smit, 2005)

The loss of grazing area and consumption of water are particularly concerning for Gibeon because of the community's dependency on farming as a sustainable livelihood.

Management of Prosopis: Although eradication is a potential way to manage the spread of Prosopis, methods are costly and generally ineffective (Spate Irrigation Network, 2014). Eradication can be conducted mechanically, chemically, or biologically, and there have been several attempts around the world to eradicate Prosopis. None of these efforts were completely successful and often resulted in additional environmental damage or recurring invasions. After an attempt to eradicate *P. juliflora* in Ethiopia, the species returned as a result of insufficient land use and poor land management protocols, stemming from the lack of participation from the community (Spate Irrigation Network, 2014). This case demonstrates some of the common challenges associated with eradication, as well as the need for clear policies and procedures to maintain the land.

An alternative to eradication is harvesting Prosopis. Not only can this method reduce the need for costly eradication measures, it also creates new livelihood opportunities. The plant can be made into charcoal, which increases its economic value as a fuel source (Shackleton et al., 2014). Harvested timber is strong, hard, and structurally stable, making it useful for fence posts, furniture, and railroad ties (Geesingis et al., 2004). Prosopis is often used as firewood because it burns evenly without excessive smoke (Pasiiecznik et al., 2001). Additionally, Prosopis pods are commonly used as animal fodder due to their relatively high protein content and general nutritional benefits (Shackleton et al., 2014). However, it is important to note that Prosopis spreads from cattle distributing the seeds through manure.

In October of 2014, three researchers from the Polytechnic of Namibia, in conjunction with the

DRFN, conducted a baseline assessment in Gibeon that recommended harvesting *Prosopis* and monitoring the areas after harvesting (Ntesa, Kabajani, & Strohbach, 2014). They developed a management plan for the next five years based on the current harvestable plants in the area and projected that *Prosopis* wood can generate approximately \$400,000 USD (Mazambani-Ntesa & Strohbach, 2014). Within the baseline assessment, the researchers concluded that firewood is the most suitable product to be derived from the *Prosopis* because of the specific species and size of the trees (Ntesa, Kabajani, & Strohbach, 2014). If marketed correctly, firewood can generate revenue through a sustainable business venture.

2.4 PRINCIPLES OF SUSTAINABLE DEVELOPMENT

Sustainable development is defined as “meeting the needs of the present without compromising the ability of future generations to meet their needs” (Burton, 1987). A balance of environmental, economic, and social sustainability is required to achieve sustainable development. By increasing the availability of natural resources, promoting biodiversity, stimulating the economy, and empowering the community, this project will contribute to sustainable development in Gibeon.

Environmental Sustainability: For sustainable development to occur, there must be a balance between human lifestyles and natural ecosystems. Focusing on the maintenance of biological resources and other techniques promotes environmental sustainability (Brown et al., 1987). In Gibeon, *Prosopis* is currently disturbing the environmental balance through its rapid spread. Management through harvesting is a potential way to restore order to the ecosystems in the OFRB.

Economic Sustainability: As defined by Merriam-Webster’s Dictionary, an economy is a system by which goods and services are produced, sold, and bought in a country or region (2011). Economic stimulus is crucial for a nation to become independent and efficient because the economic state determines the nation’s growth and development (Giddings, Hopwood, O’Brien, 2002). Economic growth and sustainability increase private incomes and generates resources that can be marshaled to improve social services such as public healthcare, basic education, and safe drinking water (Anand, Sen, 2000). *Prosopis* has the potential to increase Gibeon’s economic sustainability through harvesting and marketing it as an income-generating product.

Social Sustainability: “Social sustainability is achieved when...processes, systems, structures and relationships actively support the capacity of current and future generations to create healthy and livable communities” (McKenzie, 2004). Some view the achievement of social sustainability as the foundation by which societies can work to achieve economic and environmental sustainability (Dillard, 2008). Indicators used to gauge social sustainability include:

- Equal access to public services
- Equal opportunities between generations

- Community responsibility
- Self-advancement (McKenzie, 2004)

In an International Policy Centre for Inclusive Growth (IPCIG) study, various regions in Namibia were reviewed in five different arenas that, when combined, can determine levels of deprivation within the region (UNDP, 2001). Results from the study for the Hardap region are shown in Table 1. As shown in this table, the region is subject to multiple deprivations. Thus, a chief focus of our project is to ensure that the community moves in a direction of social sustainability. Using Prosopis as an income-generating product in Gibeon would help the community accomplish this.

TABLE 1: PERCENTAGES OF HARDAP POPULATION DEPRIVED OF CERTAIN OPPORTUNITIES (ADAPTED FROM UNDP, 2001)

Hardap Population	
Reviewed Opportunity	Population Deprived
Material Resources	30%
Employment Options	35%
Education Plan	78%
Public Services	78%
Housing Options	45%

2.5 BUSINESS DEVELOPMENT IN NAMIBIA

One way to improve livelihoods in a developing community is to create a sustainable business that generates income and allows for the acquisition of marketable skills for further employment. These businesses can be small and may only address a limited market, but can be integrated to empower community development and streamline the IWRM approach. The following sections outline the importance of small and medium enterprises (SMEs) in Namibia and explore the potential for the development of a Prosopis Firewood business in Gibeon.

Small and Medium Enterprises (SMEs) in Namibia: Small and medium enterprises (SMEs) can play a pivotal role in Namibia’s economy and therefore need to be promoted in order to contribute to employment creation and poverty reduction (Bank of Namibia Research Department staff, 2010). SME development, entrepreneurship, and job creation aligns with the nation's long-term agenda; Namibia's Vision 2030 calls for “a prosperous and industrialized Namibia” (Räty, 2010). The 160,000 registered SMEs in Namibia create approximately 16,500 new jobs annually (Ipinge, 2010).

SME Development in Gibeon: The support of the government in the development and growth of SMEs, combined with the need for employment in Gibeon, indicates the creation of a SME has great potential to improve the livelihoods of participating community members. After the DRFN determined firewood as the most lucrative product, they identified and trained thirty Gibeon residents to harvest and package Prosopis as firewood. This enterprise, referred to as Prosopis Firewood, will be operated by the Gibeon community members group.

Business Type: It is crucial to understand and classify the legal status of a business, such as Prosopis Firewood, when considering its potential for sustainable development. There are several kinds of business entities in Namibia, including sole proprietorships, partnerships, companies and close corporations (Companies and Patents Registration Office, n.d.). Of these business forms, the close corporation (CC) matches DRFN's vision for the development of the Prosopis Firewood business in Gibeon. A close corporation:

- Is a hybrid of a company and partnership, designed to enhance small business and promote free enterprise
- Is founded by means of a founding statement
- Cannot exceed 10 managers
- Provides members with limited liability (Companies and Patents Registration Office, n.d.)

The main advantage of registering the Prosopis Firewood business as a CC is that it would result in less paperwork and requirements compared to other business entities. Registering as a CC provides benefits like the elimination of compulsory meetings and financial audits.

Elements of Creating a Business Plan: No matter what type of business is being created, its success is highly dependent on the organizational framework and planning that precedes it; a good business plan can help a company stay organized and on track, and is also required when seeking loans, funds, or outside investors (Jinnett & Pinson, 1993). Most business plans, regardless of the type of enterprise, contain the same basic components. These elements provide a detailed look at every aspect of the business. Table 2 describes all elements a business plan should include.

TABLE 2: ELEMENTS OF A BUSINESS PLAN (ADAPTED FROM EHMKE & AKRIDGE, 2005; JINNET & PINSON, 1993; SMITH, 2011)

Elements of a Business Plan	
Section	Contents
The Company	Overview of business and objectives - mission statement, vision, company name and licenses, brief description of products or services
Products and Services	Detailed description of products or services offered (from raw materials to finished products)
Market Analysis/Strategy	Discussion of target customers and how products should be priced in order to be profitable yet competitive
Competition	Identification and review of competitors - how they appeal to market, relative strengths and weaknesses
Operations	Logistics - how products are produced and delivered, number of employees required, skills and training needed, equipment and technology requirements
Organization	Framework for structure of company - management responsibilities, description of each employee position, important advisors (attorneys, accountants, board of directors)
Financial Analysis	Monetary considerations - equipment, manufacturing, packaging, distribution, advertising, overhead, and labor costs, projected revenues, budgets
Supporting Documentation	Miscellaneous forms not included in other sections - resumes, financial statements, credit reports, contracts, legal documents

Marketing Strategies: A thorough business plan incorporates a successful marketing strategy that will yield a sustainable marketing plan. Important considerations for developing a product specific marketing strategy are to first identify a target market and then specify proper pricing and distribution methods (Harvard, 2006). For the Prosopis Firewood business, possible markets to target include supermarkets and gas stations in Mariental (DRFN, 2012), tourist locations in Namibia, or environmentally aware residents within Gibeon (Kasouf, 2015). Additionally, a sound marketing strategy should identify the action items that must be taken to achieve the aforementioned goals (Harvard, 2006). According to Christerline Ndeleki from the DRFN, the Gibeon community is excited about the Prosopis Firewood business and is willing to take measures to ensure its success (Ndeleki, personal communication, March 16, 2015).

To target the most lucrative market, successful marketing strategies account for the four P's of marketing: price, product, place, and promotion (Heierli, 2000). An overview of the considerations that should go onto these pillars is shown in Table 3. When considering these

aspects, a variety of stakeholders in the business should be included so that critical factors are not overlooked (Galton, 2005). Finally, it is important to anticipate any unexpected problems that may arise such as a shift in demand, a competitive product, or unforeseen costs (Harvard, 2006).

TABLE 3: THE FOUR "PS" OF MARKETING (ADAPTED FROM HEIERLI, 2000)

P	Description
Product	<ul style="list-style-type: none"> • Considering targeted customer's needs • Understanding product's social implications • Ensuring the market's need for the product
Price	<ul style="list-style-type: none"> • Designing a product that is affordable yet still profitable • Understanding that in developing areas, low price may be more desirable than good quality • Determining appropriate price reduction for bulk quantities • Establishing what profit margins are viable • Identifying payback period
Place	<ul style="list-style-type: none"> • Determining where the market is located in conjunction with business • Understanding customer demographic in market • Selling through a local dealer or representative
Promotion	<ul style="list-style-type: none"> • Deciding how to promote the product • Exploring available PR sources • Demonstrating usability of product • Identifying how usability will increase trust in product • Determining incentive for consumers continuing to use the product • Seeking links to larger businesses

2.6 SUMMARY OF BACKGROUND

The previous chapter connected the IUCN/USAID's overarching project, "A Water Secure Future for Southern Africa: Applying the Ecosystem Approach in the Orange-Senqu Basin," to the DRFN's pilot project in Gibeon. It introduced Prosopis as an invasive species and explained why the plant should be harvested as firewood through IWRM to generate income for a Gibeon community group. Information regarding sustainable development and business enterprises in developing nations provided a baseline to guide our efforts towards ensuring the Prosopis Firewood business would be a viable option given available resources in Gibeon and employee backgrounds.

3.0 METHODOLOGY

This project assisted the Prosopis Firewood business, a Gibeon community group, in collaboration with the Desert Research Foundation of Namibia, achieve sustainable livelihoods through harvesting and selling the invasive plant species, Prosopis, which depletes the available groundwater and degrades the biodiversity of the region. The following objectives guided our project:

1. Determined the Prosopis Firewood employees' business skills, agricultural knowledge, and employment status, as well as identified available infrastructure and resources in Gibeon to support the business
2. Applied criteria for best practices in developing small businesses in Namibia to create an efficient operations structure for the Prosopis Firewood business in Gibeon
3. Explored the market potential of Prosopis firewood in and around Gibeon.
4. Identified criteria for measuring how harvesting Prosopis influences livelihoods and impacts the environment.

In this chapter we explain the methods utilized to achieve each objective. Our primary methods were interviews, literature review, surveys, and a group brainstorming session. Some of these methods incorporated community based participatory research (CBPR) to actively include stakeholders in our project.

COMMUNITY BASED PARTICIPATORY RESEARCH

According to the W.K. Kellogg Foundation, "CBPR builds capacity and studies locally relevant issues and concerns with the aim of combining knowledge and action for social change" (2009). By including the ideas and concerns of employees in the business creation and market development processes, the business was more likely to be successful. The NIH Office of Behavioral and Social Sciences Research identified the main advantages of CBPR:

- Increasing trust and bridging cultural gaps between partners
- Joining partners with diverse expertise to address complex problems
- Improving design and implementation through participant recruitment and retention
- Increasing the quality and validity of research
- Benefiting the community and researchers through the knowledge gained and actions taken (Proctor, 2009)

Including the employees in the planning process enhanced our understanding of community dynamics and business concerns. It ensured that our efforts positively contributed to the

development of sustainable livelihoods and would continue to develop once our involvement with the business ended.

3.1 EMPLOYEE SKILLS AND GIBEON RESOURCES

Determined the Prosopis Firewood employees' business skills, agricultural knowledge, and employment status, as well as identified available infrastructure and resources in Gibeon to support the business

Desired Knowledge: To determine the support the Prosopis Firewood employees needed, we administered a survey and gained the following information regarding past work experience and education:

- Experience interfacing with customers
- Past work experience
- Agricultural knowledge
- Education level
- Reading and writing ability
- Languages spoken

We also determined the available resources and infrastructure Prosopis Firewood could utilize, particularly storage and transportation.

Methods:

1. At the DRFN, our team reviewed reports regarding the socioeconomic and environmental status of the community, the role of Prosopis in Gibeon, and census data from a portion of the community. We substantiated this data through conversations with our project facilitator and project coordinator at the DRFN, Lucky Ganeb and Christerline “Mandy” Ndeleki. Summaries from these conversations can be found in Appendix A.
2. During our site visit to Gibeon, we met with the Prosopis Firewood employees. Lucky was our translator, as Afrikaans is their primary language. In a group discussion with the employees, we engaged them by asking for their input and suggestions regarding transportation and storage. As part of this meeting, each member of our team also surveyed a portion of the employees. We broke into four smaller groups and surveyed each individual. The template for this survey is outlined in Appendix C.

3. Lucky communicated with the Gibeon Village Council (GVC) on our behalf and shared the most important and relevant information to us from their conversations. The questions that we asked the GVC through Lucky can be found in Appendix B.

Justification of Methods: The reports from the DRFN contained the most updated and relevant information to our project. Similarly, Lucky and Mandy were our best personal insight into Gibeon because they provided a better picture of the community's capabilities and cultural structure. The employees were also a valuable source of information because they were most aware of the support options available within the village.

Analysis: To organize the demographic data, we created a spreadsheet to categorize the employees' past education, employment, business experience, and agricultural knowledge. After compiling the data, we tailored our recommendations for the business and sought support in areas where necessary skills were lacking.

Limitations to Data: Our data has the following five limitations:

1. Information gathered from the DRFN about Gibeon was not entirely credible or completely encompassing. Since the DRFN is an outside entity, we only understood the DRFN's perceptions of the community.
2. The DRFN reports contained only the analysis and findings of the data, so we were unable to review the surveys and questionnaires distributed to community members and employees.
3. We could not observe how the DRFN's surveys were conducted in their reports, or what questions were asked; we did not know the extent to which researcher bias was present.
4. During the surveys we administered, the employees heard each other's responses, which could have influenced their own answers and caused them to reply differently than they would have on their own-we may never know.
5. The information Lucky relayed to us about his meetings with the GVC could have been lacking detail. Although we asked Lucky to clarify certain points, there was information we undoubtedly missed by not attending the discussion.

3.2 SMALL BUSINESS DEVELOPMENT AND OPERATIONS

Applied criteria for best practices in developing small businesses in Namibia to create an efficient operations structure for the Prosopis Firewood business in Gibeon.

Desired Knowledge: To effectively formulate a business plan catered to the skills and experiences of the employees, we evaluated Prosopis Firewood's operations and applied business

strategies from successful SMEs in Namibia. The following questions served as guidelines to determine how to most effectively organize the Prosopis Firewood business:

- What are the major challenges facing SMEs in Namibia?
- What size and type of business would be most suitable for selling Prosopis with the number of employees and current funds?
- What is the feasibility of the Prosopis Firewood business being sustainable?
- What instructions and guidelines do the employees need?
- Who or what organization will serve as an advisory board for Prosopis Firewood?
- How efficient is the current operating structure of the Prosopis Firewood business?

Methods:

1. Consulted with Lucky, our main contact at the DRFN. This informal discussion provided an overview of the DRFN’s efforts in regards to the Prosopis Firewood business. A summary of this conversation can be found in Appendix A. The main topics discussed were:

- Regional Prosopis biodiversity
- SMEs in Namibia
- Status of Prosopis Firewood business

2. To gather expert advice and recommendations for organizational structure and potential pitfalls of businesses in developing countries, we consulted business professionals from WPI, the Polytechnic of Namibia, and business support organizations in Namibia (see Table 4 for details).

TABLE 4: INTERVIEWEES FOR BUSINESS LOGISTICS AND SUPPORT INFORMATION

Interview Breakdowns		
Name	Job Title	Organization/Department
Eslon Ngeendepi	Junior Lecturer	Department of Accounting, Economics, and Finance - Polytechnic of Namibia
Chickery Kasouf	Associate Professor	School of Business - Worcester Polytechnic Institute
James V. Olu Ojo	Lecturer, Head of Department	Department of Management Studies - Polytechnic of Namibia
Hilya Kambanda	Financial Management Trainer/ SSDF Project Coordinator	Men on the Side of the Road
Danny Meyer and	Directors	SMEs Compete

Claudine Mouton		
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After receiving verbal consent for recording, the following topics were discussed:

- Levels of expertise the interviewees had in SMEs, entrepreneurships, and business planning in developing countries
- Advice on targeting consumers
- Examples of failed businesses and why they failed
- Economic viability of the Prosopis Firewood business with the available infrastructure
- Recommendations for seeking external partners
- Necessary employee financial and managerial skills needed to run a business

Templates for these interviews summaries can be found in Appendix D.

3. Each member of our team spent one day observing the Prosopis Firewood employees. Three members studied harvesting teams while one observed the packaging team. We watched the employees work, recording major challenges they faced and the effectiveness of operations.

Justification of Methods: All experts had extensive experience and knowledge in business or entrepreneurship in developing countries and had multiple recommendations for us to consider. After exploring the details and processes involved in business planning, specifically in Namibia, we provided the employees with recommendations on how to properly run the business. The information also enabled us to contact different support options for the business.

Lucky's discussion with the GVC was also extremely important because of the large role the Council plays in the business plan and structure. The councilors' support is critical to the success of Prosopis Firewood.

Observing the employees at work provided a better understanding of the issues present in the operational structure of the business. Prior to our site visit, we had no clear picture of how the business should function. After spending a day in the field and witnessing how the business operated, we were better prepared to make recommendations to increase productivity.

Analysis: To determine the GVC's role in the business, we compared the current advisory needs of the business with the services the Council told Lucky they would provide. We also compiled all of our individual observations from the day spent in Gibeon with the employees to establish the major issues with production. See Appendix C. We noted common stopping points or problems all employee teams faced, then brainstormed ways to overcome these challenges.

Limitations on Data: Our data has the following four limitations:

1. Explaining the USAID/IUCN project and our role with the DRFN in helping the Prosopis Firewood business was difficult. The interviewees could have provided us with incorrect information and suggestions because of their confusion and our attempts on clarification.
2. Inability to meet with the GVC forced us to rely on Lucky to ask questions on our behalf. There were likely details we missed by not attending the discussions.
3. Our observation when spending the day with the employees on site might have caused changes in working behavior.
4. We were unable to spend a sufficient amount of time due to the limited project budget.

3.3 MARKET POTENTIAL

Explored the market potential of Prosopis firewood in and around Gibeon

Desired Knowledge: A successful business plan requires a marketing plan with strategies that will help the business become sustainable. Based on successful marketing strategies, our team established the following information that was essential to include in the marketing plan for Prosopis Firewood:

- Potential markets for Prosopis
- Four “Ps” of marketing
 - Product, Price, Place, Promotion
- SWOT analysis of the business

Additionally, we identified potential pitfalls, such as:

- Lack of product demand
- Competitors
- Unforeseen cultural barriers

For each of these factors, we focused on how they applied specifically to Gibeon.

The main topics discussed in interviews with business experts were:

- Framework of a successful marketing plan in a developing country
- Challenges to marketing products in developing nations
- Middlemen and selling to distributors
- Selling directly to vendors
- Integrating new products into an existing market

- Identifying target markets for Prosopis firewood

A template for these interviews and their summaries can be found in Appendix D.

Methods:

1. Our team conducted a literature review by consulting studies on successful marketing strategies. We noted elements that would be crucial to incorporate in the marketing plan for Prosopis Firewood.
2. We identified questions for our interviews with the same lecturers and professors that we interviewed for business strategies (Kasouf, Olu Ojo, and Ngeendepi). To explore the market potential of the product, we reviewed a DRFN report on firewood sold by supermarkets and service stations in Mariental.
3. During our site visit to Gibeon, our team expressed to the employees the need to explore different markets. The group brainstormed potential places or people to sell the wood and we shared our ideas with them. Additionally, we worked with the employees to develop possible solutions to the issue of transporting the materials to external markets, thus creating a larger market scope.
4. Our team identified two tourism resorts around Gibeon and Mariental. We met with staff from the Africa Safari Lodge and the Lapa Lange Game Lodge. During the visits, we asked questions about firewood supply and assessed their interest in purchasing Prosopis firewood. In Windhoek, we interviewed a procurement specialist for Namibia Wildlife Resorts (NWR). The question template followed for these interviews can be found in Appendix E.
5. We developed a set of key considerations and questions that Lucky used during negotiations with Mr. Sakkie Engelbrecht, a bulk purchaser we targeted through conversations with staff from the DRFN. This discussion guide can be found in Appendix E.

Justification of Methods: Our literature review allowed us to gain insight into successful marketing strategies, with a specific focus on SMEs in developing countries. By interviewing business experts, we explained limitations of marketing products to developing areas and broadened our scope about how and to whom Prosopis could be marketed. Our field conversations with the Prosopis Firewood employees served as a platform for a discussion about which marketing strategies were most pertinent to the business. Additionally, meeting with potential firewood buyers allowed us to gauge interest and assess where the strongest markets exist.

Analysis: We used a SWOT analysis to outline potential strengths, weaknesses, opportunities, and threats in the business (Pickton & Wright, 1998). See Figure 4 for a SWOT analysis structure and Appendix H for the Prosopis Firewood marketing SWOT analysis.



FIGURE 4: SWOT ANALYSIS FOR MARKETING PLANS (ADAPTED FROM PICKTON & WRIGHT, 1998)

After this analysis, we were able to make appropriate recommendations to the employees about how to best market their product.

Limitations on Data: Our data has the following three limitations:

1. Information obtained from our interviews was heavily influenced by interviewee opinions. We considered their knowledge and suggestions analytically to develop a marketing plan.
2. Our gathered data was approximate. The tourism resort staff did not have the exact information we sought and could only provide estimates.
3. We were unable to meet with Mr. Engelbrecht directly. We relied on Lucky to ask questions on our behalf and relay Mr. Engelbrecht's responses back to us.

3.4 SUSTAINABLE LIVELIHOODS AND ENVIRONMENTAL IMPACT

Identified criteria for measuring how harvesting Prosopis influences livelihoods and impacts the environment

Desired Knowledge: The goal of IUCN/USAID project is to encourage communities to manage land and water resources in a way that balances ecosystem need with human development. We wish to establish criteria to monitor and assess the livelihood and environmental impacts of this

business. It will be difficult to determine how well the pilot program in Gibeon is adhering to these guidelines if no indicators are identified.

Methods:

1. We reviewed past DRFN reports that focused on how livelihoods were determined to be sustainable.
2. We consulted with Lucky and Mandy from the DRFN to understand the criteria we should focus on to evaluate livelihood impacts.
3. Our team consulted with Clarence Ntesa from the Ecology department at the Polytechnic of Namibia to develop criteria for an environmental impact assessment. Ms. Ntesa was one of three lecturers from the Poly that conducted the baseline assessment for the DRFN to determine the amount and types of Prosopis in Gibeon. She recommended we consult with Dr. Ben Strohbach for further criteria. The interview questions and summary can be found in Appendix F.
4. We conducted a group discussion session with the employees that allowed us to establish a baseline on the state of their livelihoods: The main topics discussed were:
 - Current financial situations
 - Income
 - Governmental aid
 - Job opportunities available within the community

Following these questions, we asked what they thought would be good indicators to identify in the future for how their lives were affected as a result of working for the Prosopis Firewood business. A summary of these brainstorming results can be found in Appendix C.

Justification of Methods: Our literature review at the DRFN provided a baseline for criteria in evaluating the conditions of livelihoods. In addition, interviewing the experts and employees was essential because people have different ideas about criteria that should be used for livelihood evaluations. It was critical to include the Prosopis employees in the creation of the criteria because they were the ones who would understand best if or how the business has changed their lives.

For environmental impacts, it was critical to interview Ms. Ntesa because she understood the condition of the basin ecosystem before Prosopis harvesting occurred and identified signs to observe that would indicate significant environmental changes.

Analysis: After each literature review, interview, consultation, or group session was completed, we compiled the identified criteria for livelihood development. We then examined all the results

and looked for commonalities. The indicators identified by two or more sources were included in the final assessment criteria, along with any others that we as a team agreed were significant.

Limitations on Data: We planned to interview Dr. Strohbach for more information on environmental impact criteria, but were ultimately only able to meet with Ms. Ntesa. Dr. Strohbach has extensive expertise on monitoring environmental changes.

3.5 SUMMARY OF METHODS

Through literature reviews, interviews and discussions we gained substantial knowledge about the current impact of Prosopis in Gibeon. We also understood how Prosopis Firewood employees wish to proceed with developing the business and how they intend to manage the resource. After collaborating with the employees in Gibeon, we analyzed the results of our surveys and field observations to establish suggestions for the business. With these ideas, we worked with the employees to develop appropriate plans to harvest and create a sustainable business selling Prosopis firewood. Finally, we established criteria to evaluate employee livelihoods.

4.0 FINDINGS

In this chapter we analyze our data gathered through observations, interviews, and discussions. We determine the challenges the business faces and understand the importance of the Gibeon Village Council (GVC) as a stakeholder. Our team also assessed the market potential for Prosopis firewood and the presence of Prosopis regrowth within harvesting areas.

EMPLOYEE SKILLS AND GIBEON RESOURCES

Finding #1: Lack of transportation, storage space, and employee business knowledge threaten the Prosopis Firewood business’s viability, but the Gibeon Village Council's support will alleviate some of these problems.

Summary of Evidence: From our site visit to Gibeon, as well as conversations with Lucky, our team identified major threats to Prosopis Firewood as well as services the GVC is offering to help alleviate these threats. Table 5 summarizes these findings.

TABLE 5: THREATS FACING PROSOPIS FIREWOOD BUSINESS AND AVAILABLE GVC SUPPORT

Major Threats	GVC Support
Transportation	
<ul style="list-style-type: none"> Employees don't have a vehicle to transport themselves and equipment to and from harvesting sites or to markets 	<ul style="list-style-type: none"> Truck that could be used for transporting workers and equipment
Storage	
<ul style="list-style-type: none"> No permanent storage facility available for equipment, additional supplies, or drying and packaged wood 	<ul style="list-style-type: none"> Plot of land close to harvesting sites for drying, splitting, and packaging Equipment manager to oversee equipment is returned and properly stored Shed for storing packaged firewood
Business Skills and Education	
<ul style="list-style-type: none"> None of the employees had business backgrounds Limited employee education 	<ul style="list-style-type: none"> Human Resources representative to help with conflict management Accountant to help with finances

Explanation: Prosopis Firewood must explore alternative options for services the DRFN currently provides to address the major threats it will face without their involvement.

The employees rely heavily on Lucky and his truck for transportation to and from harvesting sites, as well as for travel to Mariental to replenish fuel supplies and restock materials. When Lucky is not in Gibeon, they are unable to continue harvesting. There are a few options to address this lack of transportation, but most are unreliable and inconvenient. For example, the employees can take a shuttle to Mariental if needed, but the shuttle only operates a few times each day. The business managers must ensure enough supplies are on hand or production will slow down when they have to leave for an elongated trip to Mariental. Some of the other options the Prosopis Firewood employees brainstormed for addressing this transportation issue include asking the village or regional councils for assistance, paying other residents of Gibeon for the use of their personal vehicles, borrowing a church truck, or using the TransNamib train.

Lucky previously convinced the GVC to allow the Prosopis Firewood business to use the space behind their office building for drying, splitting, and packaging harvested wood. However, this is only a temporary agreement and the area is not large enough to accommodate future firewood production. Additionally, the equipment and packaged firewood bags are currently stored in the living room of one of Lucky's contacts in Gibeon. This arrangement is also only a short-term solution because the space is inadequate and may be reclaimed by the owner at any time. Our team was unable to identify alternative options to help address these storage space issues.

The limitations posed by the employees' lack of business skills and education currently inhibit the business from succeeding independently of Lucky. Over half the employees did not attend school past grade ten, and only about ten percent noted any previous customer or business experience. They do not have the leadership, skills, or background to manage the business, interact with clientele, or handle finances. Our team does not think the business will be sustainable without further development of management skills.

The GVC understands the limitations and threats facing Prosopis Firewood and is willing to offer its support. The DRFN and the GVC are negotiating a formal contract to outline the terms and conditions by which the GVC will help the business.

Analysis: Recognizing the major threats to Prosopis Firewood was crucial to understanding the best support options to help alleviate these threats. Once project funding and the DRFN's involvement ends in May, the lack of resources will limit the potential of the Prosopis Firewood business to have a solid foundation to support itself. Finding that the GVC is willing to support the business was beneficial as it can reduce business costs and foster the relationship between the Council and Prosopis Firewood. Though the business faces many challenges, with the help of the GVC, its chances of success could be greatly improved.

Finding #2: Agencies in Namibia, through training and funding opportunities, offer support for SME development by helping new businesses overcome the common challenges of insufficient management skills, limited resources, and a lack of financial support.

Summary of Evidence: Mr. Eslon Ngeendepi, a lecturer for the Department of Accounting, Economics, and Finance at the Polytechnic of Namibia, explained that developing SMEs in Namibia face many challenges in terms of operations, marketing, and business logistics. These challenges are outlined in Table 6.

TABLE 6: CHALLENGES FACING DEVELOPING SMES IN NAMIBIA

Operations
<ul style="list-style-type: none"> • Lack of business and financial education • Security concerns and crime • Lack of access to technology • Training employees • Lack of trust from suppliers
Marketing
<ul style="list-style-type: none"> • Lack of Innovation • Lack of a market • Limited adaptability to market to more consumers
Business Logistics
<ul style="list-style-type: none"> • Lack of initial startup costs • Lack of proper infrastructure • High cost of utilities • Government regulations, taxes, and permits

Although all of these challenges pose potential problems for the Prosopis Firewood business, lecturers Ngeendepi and Oju from the Polytechnic of Namibia identified several agencies that offer support and services to help combat these threats. Table 7 summarizes these agencies and the support they offer.

TABLE 7: AGENCIES THAT OFFER SUPPORT TO DEVELOPING SMES IN NAMIBIA

Agencies and Available Support
SME Bank of Namibia
<ul style="list-style-type: none"> • Funding • Banking and financial management of business accounts
SMEs Compete
<ul style="list-style-type: none"> • Financial management training for entrepreneurial SMEs
Ministry of Agriculture, Water and Forestry
<ul style="list-style-type: none"> • Environmental education training and equipment

Explanation: Understanding the threats facing developing businesses in Namibia and relating them to Prosopis Firewood while also exploring potential avenues for support was crucial in the process of designing a suitable business plan. The business plan was tailored to guide the employees and provide strategies to address these challenges. Identifying both the threats to the business and available solutions helped our team understand how to provide business information and strategies tailored to Prosopis Firewood.

SMALL BUSINESS DEVELOPMENT AND OPERATIONS

Finding # 3: The current operation structure and lack of leadership of the Prosopis Firewood business results in minimal motivation for the employees, reducing productivity.

Summary of Evidence: The two core problems our team observed on the Prosopis Firewood workday were a lack of leadership and minimal group motivation. These observations were present in the managerial, harvesting, and packaging teams as outlined in Table 8.

TABLE 8: OBSERVATIONS OF PROSOPIS FIREWOOD EMPLOYEE MOTIVATION AND LEADERSHIP

Employee Group	Observations	
	Lack of Motivation	Lack of Leadership
Team Leaders	<ul style="list-style-type: none"> Expressed concerns of being able to manage business without the DRFN 	<ul style="list-style-type: none"> Did not have confidence or authority Heavily dependent on Lucky
Harvesters and Packagers	<ul style="list-style-type: none"> Indecisive Frequent unnecessary breaks 	<ul style="list-style-type: none"> Expected constant direction

Explanation: The Prosopis Firewood business is primarily led by three managers: Flora Hendricks, Ricardo Richard, and Geoffrey Keramen. The Prosopis Firewood employees needed constant direction, asked for advice on all decisions, and took frequent breaks. The managers lacked the necessary leadership skills, confidence, and authority to enforce efficient and autonomous behavior among the employees. A major problem throughout the workday was chainsaw maintenance. Frequent breaks were taken to refuel chainsaws or sharpen chains. When this would occur, several employees would completely stop working until the managers dealt with the technical difficulties. Instead of sitting around and taking unnecessary breaks, employees could have utilized the manual harvesting tools such as the machetes and bow saws to cut wood while the chain saws were being repaired. However, this was not done and production halted for long periods. At the end of the workday, we consulted with Lucky and shared our observations. We determined that the lack of motivation and leadership lead to inefficiencies in

production, as the employees could have produced more firewood if they took initiative and used the manual tools to produce more firewood.

Analysis: Our observations helped us identify major issues in the operational structure of the Prosopis Firewood business. This finding highlights the need for added incentives to work and further development of employee management skills.

Finding #4: Because too many employees were harvesting and not enough were packaging, the production line was inefficient.

Summary of Evidence: During our observations of a typical Prosopis Firewood workday, employees were divided into three groups of ten workers. Eight workers harvested and two packaged. This caused unequal distribution of work, which slowed production.

On the harvesting teams, each group was divided so that two employees operated or oversaw chainsaw use, while the remainder cleared what was cut, stacked cut wood, and cleaned the wood. Our team noticed that there were insufficient tasks for all employees because they were waiting on the chainsaw operators.

Explanation: On our site visit, the employees were following the labor distribution model implemented during the harvesting training session in November 2014. However, this model proved to be ineffective as there were too many assigned harvesters and not enough packagers per team.

The tasks of the two packagers from each team were to package and count their respective team's firewood. This meant one member of each team constantly split wood while the other packaged the wood. Figure 5 demonstrates the setup of the packagers throughout the day and Figure 6 displays the completed firewood bags, separated by team.



FIGURE 5: EACH TEAM WORKED INDEPENDENTLY OF EACH OTHER WHILE PACKAGING WOOD



FIGURE 6: EACH TEAM STACKED AND COUNTED FIREWOOD SEPARATELY

On the day our team was in Gibeon, the harvesters yielded approximately two tonnes of wood, while the packagers split and packaged approximately three fourths of a tonne of wood. The 1.25-tonne difference demonstrated the inefficiency of only having six employees packaging while twenty-four harvested.

At each harvesting site, too many workers took breaks because they lacked equipment. Chainsaws often needed to be refueled, chains frequently became dull, and the chainsaw operator was often preoccupied handling these issues while the other harvesters waited. The reliance on the chainsaw to cut large stumps and branches caused the employees to have few to no tasks to complete in the time that the chainsaw technicalities were dealt with. Meanwhile, back at the packaging station, the packagers were struggling to split and package wood to keep up with the harvesting production.

Analysis: Our observations determined that more employees from each harvesting team could have been placed on the packaging team without disrupting the workflow and harvesting production. A more balanced distribution of workers could help optimize overall production.

Finding #5: It is difficult to determine the economic viability of Prosopis Firewood because the anticipated costs of the business are based on assumptions and limited data.

Summary of Evidence: Using the information from Lucky, the Prosopis Firewood employees, Mr. Sakkie Engelbrecht, and tourism resorts, our team compiled lists of costs the business will incur. These numbers vary depending on market demands and expectations, as well as further negotiation with the GVC.

Harvesting costs, which fluctuate with chainsaw operator efficiency but are independent of other major variables, amount to approximately N\$144/tonne. The other main expense categories of packaging, transportation within Gibeon, and delivery to consumers were more complicated to assign values to. Estimates for different scenarios within these categories are presented in Tables

9, 10, and 11. These costs result in total anticipated production expenses that range from N\$261.50/tonne to N\$3184/tonne.

TABLE 9: COST SCENARIOS FOR PACKAGING

Packaging	
Scenario	Estimated Cost (N\$/tonne)
1 - Sakkie Engelbrecht's packaging requirements	117.50
2 - Current method for tourism market	1372

TABLE 10: COST SCENARIOS FOR TRANSPORTATION WITHIN GIBEON

Transportation within Gibeon	
Scenario	Estimated Cost (N\$/tonne)
1 - GVC provides vehicle free of charge	0
2 - GVC charges hourly rate for vehicle	440
3 - Community member charges flat fee for use of personal vehicle (plus fuel)	41.65

TABLE 11: COST SCENARIOS FOR DELIVERY OF FIREWOOD

Delivery of Firewood	
Scenario	Estimated Cost (N\$/tonne)
1 - GVC provides vehicle free of charge (only pay for fuel)	572
2 - Community member charges flat fee for use of personal vehicle (plus fuel)	772
3 - Rental truck from Mariental	1372
4 - Sakkie Engelbrecht picks up his own wood	0

There are also fixed costs associated with the Prosopis Firewood business. These overhead expenses cannot be evaluated on a per tonne basis like the other costs, but are still important to consider. The two major fixed costs we identified are Social Security fees, amounting to N\$240/month for all thirty employees, and a harvesting permit requiring N\$20/month.

Explanation: The values specified in this finding reflect a majority of anticipated expenses for the Prosopis Firewood business based on a variety of assumptions (see Appendix I for a complete list of assumptions, estimated values, and intermediate calculations used for these projections). However, some additional costs we identified could not be accounted for due to a lack of information on pricing and/or their highly variable nature, such as equipment maintenance and bookkeeping supplies. Therefore, the figures presented are in no way all-encompassing and are intended only to provide a look at the somewhat predictable production costs of the business.

Analysis: These costs can be used to make liberal attempts at deciding reasonable sales prices and employee wages. Refer to Appendix I

for the values and calculations used in the following estimates.

Based on the best case (lowest cost) scenarios with wood being supplied to Mr. Sakkie Engelbrecht and considering his offer of paying N\$900/tonne, the business would generate a profit of nearly N\$640/tonne. Divided evenly among all thirty employees, this would amount to about N\$21/tonne/person. Considering the stated weekly demand of seventeen tonnes (based on the thirty-four tonne biweekly demand) and average production rates of seven tonnes/day, each employee would earn about N\$360/week while only having to work two to three full days per week.

When the worst case (highest cost) scenarios are used with the tourism market, the five kg bags would have to be sold to resorts for about N\$16 each for Prosopis Firewood to break even, without accounting for labor. If the bags could sell for N\$20 each, then each employee would earn a little more than N\$27/tonne. In this case, resorts purchase Prosopis firewood for \$4000/tonne. Based on the limited pricing estimates of the two tourism facilities we visited, we are unsure if this price is competitive with what current firewood suppliers are charging. Furthermore, there is currently not enough of a demonstrated demand in the market to be confident in supplying enough resorts to have each employee earn a worthwhile weekly wage.

Market research indicated that tourism resorts would require, at most, one tonne of firewood per month. Comparatively, Mr. Engelbrecht is requesting sixty-eight tonnes per month. Using the values calculated above, this would yield a net profit of N\$816/month from the tourism resorts and N\$43,418/ month from Mr. Engelbrecht. Although the tourism resorts will pay more per tonne, Mr. Engelbrecht's demand outweighs the tourism market's price.

These projections are preliminary and do not account for fixed costs and several other unpredictable expenses the business will accrue. Further production observations and estimate inquiries are required for more accurate values.

MARKET POTENTIAL

Finding #6: Because selling firewood in Gibeon and Mariental demonstrated low market potential, a bulk purchaser and tourism resorts represent the most lucrative markets for Prosopis Firewood. The bulk purchaser has a large demand for firewood and is willing pick up the firewood in Gibeon, while tourism resorts have variable demands and require delivery.

Summary of Evidence: The following represents potential markets for Prosopis firewood, in addition to the markets' demands:

Gibeon: The DRFN indicated there is no market in Gibeon as the community is free to cut and harvest firewood themselves.

Supermarkets and Service Stations in Mariental: The DRFN performed a market research study in Mariental for supermarkets and service stations. All interviewed retailers in Mariental reported they purchase firewood for resale to the public even though it was not profitable. The low demand for additional or alternative firewood supplies indicated that it was necessary to explore other market opportunities for Prosopis Firewood.

Tourism Resorts around Gibeon: Two of the three tourism resorts we contacted were interested in supporting the livelihoods of Gibeon community members. The demand of the two resorts ranged from one to two tonnes at intervals of one to six months. Both resorts require delivery of firewood. In addition, both resorts liked how the sample five kg bags were in clear plastic bags with the Prosopis Firewood logo. These bags are expensive and require printing a logo as well as staples for sealing and packaging.

Bulk Purchaser: Mr. Sakkie Engelbrecht has extensive experience with Prosopis products. He manufactures furniture, constructs structures, and exports Prosopis firewood. He intends to purchase thirty-four tonnes of firewood every two weeks and has agreed to pick up his order directly in Gibeon. Mr. Engelbrecht also wants the firewood packaged in twenty kg fodder bags, which are cheaper, do not require a logo, and only need cheap wire to seal. Because of Mr. Engelbrecht's preferred packaging style and his ability to eliminate the need for delivery, doing business with him would result in lower associated costs for Prosopis Firewood.

Explanation:

Supermarkets and Service Stations: Reluctance of the local population was a major concern for selling Prosopis firewood locally, as camelthorn is the standard source of firewood in southern Namibia. From the market research study the DRFN performed in Mariental, each of the six surveyed retail stores bought camelthorn firewood because of its proven quality. All respondents in the survey expressed a willingness to sample Prosopis firewood, since it would mean supporting a local community group. When polled, most of the retailers preferred smaller firewood bags in the one to ten kg range.

The least preferred bag size for the retail sales market was the largest option (thirty-one to forty kg). The unanimous preferred style of firewood was, "normal braai firewood." Lucky explained this type should be split into logs approximately thirty to forty m long with seven to ten cm diameters. Most establishments typically bought their wood every other month, while others purchased monthly or every other week (see Figure 7).



FIGURE 7: FIREWOOD PURCHASING INTERVALS FOR RETAIL STORES IN MARIENTAL

Furthermore, the market research study showed that the amount of firewood purchased and prices charged by retailers varied. The greatest single delivery quantity for any of the retail stores was 350 bags while the least was six. In terms of purchasing price, retailers indicated they currently pay their suppliers anywhere from N\$0.75 to N\$4.90 per kg of firewood. The results revealed that larger bags generally had lower per kilogram prices. All of the retailers were content with the prices of their suppliers, mainly because the firewood was delivered to their establishments.

Tourism Resorts: The Africa Safari Lodge, located approximately eighty km from Gibeon, expressed interest in doing business with Prosopis Firewood if the wood is delivered. The manager, Chrizzell Kruger, liked that the business would be providing employment opportunities to the community and helping improve workers' livelihoods. Ms. Kruger stated that the current firewood supplier for the resort is a local farmer who delivers unpackaged, pre-split camelthorn in bulk (approximately one tonne) every four to six months, but she did not know the price.

The second resort visited, the Lapa Lange Game Lodge, showed no interest in purchasing Prosopis firewood. The owner purchases camelthorn firewood at prices that the Prosopis Firewood business cannot compete with.

The procurement specialist for Namibia Wildlife Resorts (NWR), Loide Namashana, indicated interest in the possibility of partnering with Prosopis Firewood. She particularly appreciated the business's focus on improving the lives of community members. She stated, "It's [NWR's] responsibility to support the community" (Namashana, L., personal communication, April 20, 2015). There are several NWR resorts in the south, all of which have firewood needs. Most resorts purchase mopani wood from local farmers. Ms. Namashana stressed that the firewood

must be delivered. A typical resort was estimated to purchase firewood monthly in amounts of one to two tonnes, depending on the size of the resort and the season (the busiest months are May through November).

Bulk Purchaser: Mr. Sakkie Engelbrecht requests thirty-four tons of firewood every two weeks and wants to pay N\$800-900 per ton. Negotiations between Mr. Engelbrecht and the Prosopis Firewood business are ongoing. Mr. Engelbrecht would like the firewood to be packaged in unbranded twenty kg fodder bags. He will pick up the firewood in Gibeon, but specified if the order is late, he will charge N\$7000 for each day after the original pick up date that the truck waits in Gibeon.

Analysis: Packaging and other associated business costs (transportation, payments, etc.) are dependent on the markets Prosopis Firewood sells to. While Mr. Engelbrecht can provide transportation and has cheaper packaging preferences, he is expecting to receive the wood at a lower unit price and would be purchasing large quantities. The resorts require delivery, but are more likely to pay higher prices. These variables are important to consider when determining who to do business with. Targeting these markets was crucial for the DRFN and our team because it allowed us to add marketing elements to the business plan for Prosopis Firewood as the employees did not have the appropriate resources and technology to investigate themselves.

SUSTAINABLE LIVELIHOODS AND ENVIRONMENTAL IMPACT

Finding #7: Failure to implement the recommended eradication techniques during Prosopis harvesting has led to regrowth.

Summary of Evidence: Our observations indicate that there was significant Prosopis regrowth on previously harvested trees. Figure 15 displays new shoots sprouting from stumps left from the November 2014 harvesting training session. The Prosopis took five months to grow to these heights.



FIGURE 8: POST-HARVESTING PROSOPIS REGROWTH

Although the employees left the unused brush lying around the harvesting sites, Prosopis does not take root again from those pieces. Figure 9 shows brush lying in the field since the harvesting training session and there are no signs of regrowth. However, the pods from the trees contribute to regrowth because they carry seeds. If not handled properly these pods can easily contribute to the growth of new trees.



FIGURE 9: LEFTOVER BRUSH FROM HARVESTED TREE

Explanation: Currently, the employees are not burning the stumps of Prosopis because they are too focused on matching the production rate that Lucky set. Additionally, USAID does not want

employees to use herbicides for eradication because chemicals may infiltrate groundwater. As such, the employees harvested multiple *Prosopis* trees from the area but are not taking any steps to prevent regrowth. Ms. Ntesa from the Polytechnic of Namibia said the employees must either use herbicides or burn stumps ensure eradication.

Analysis: One of the limitations to our finding is that the employees are not expected to eradicate the trees, so their failure to do so is accepted by the DRFN. There is no plan to implement eradication measures in the project. Our team observed significant regrowth in old harvesting sites and saw scattered piles of brush near each stump. Lucky stated that this was not a problem, because the employees had not been trained differently. According to Ms. Ndeleki from the DRFN, they don't mind the regrowth because it will allow for continued harvesting and production of firewood. In terms of the goal of the USAID project, which is to conserve water resources and empower community development, this is problematic, as *Prosopis* will continue to grow and consume water.

5.0 CONCLUSION AND RECOMMENDATIONS

Research into the operations, marketing, business logistics, and environmental impacts associated with harvesting Prosopis as firewood yielded the following findings:

1. Lack of transportation, storage space, and employee business knowledge threaten the Prosopis Firewood business's viability, but the Gibeon Village Council's support will alleviate some of these problems.
2. Agencies in Namibia, through training and funding opportunities, offer support for SME development by helping new businesses overcome the common challenges of insufficient management skills, limited resources, and a lack of financial support.
3. The current operation structure and lack of leadership of the Prosopis Firewood business results in minimal motivation for the employees, reducing productivity.
4. Because too many employees were harvesting and not enough were packaging, the production line was inefficient.
5. It is difficult to determine the economic viability of Prosopis Firewood because the anticipated costs of the business are based on assumptions and limited data.
6. Because retail markets in Mariental, the city nearest to Gibeon, will not likely be profitable, tourism resorts and a bulk purchaser represent the most lucrative markets for the Prosopis Firewood business. The bulk purchaser requires a large supply of firewood and will provide transportation, while the tourism resorts require variable supply and transportation.
7. The Prosopis Firewood business' failure to implement the recommended eradication techniques during Prosopis harvesting has led to regrowth.

Our team provided Prosopis Firewood with a business plan, including financial and marketing management plans, to guide the employees to successfully operating the business by themselves. The business plan was tailored specifically to the skills and abilities of the Prosopis Firewood employees.

Based on our findings from interviews, observations, and discussions, our team developed guidelines to help Prosopis Firewood become a sustainable, income-generating business. We divided these recommendations into five categories: operations, marketing, business logistics, monitoring, and future WPI projects.

OPERATIONS

1. We recommend that there should be 12 harvesters and 18 packagers. In addition, if the Prosopis Firewood business decides to sell to Mr. Sakkie Engelbrecht (a bulk purchaser), all employees should be present to load his truck twice a month. The Prosopis Firewood employees were unevenly distributed throughout the harvesting and packaging areas when we conducted our site visit. Although during the training session Mr. Sakkie Engelbrecht recommended a configuration placing twenty-four employees in the harvesting field and six in the packaging area, this is inefficient. There should be more employees packaging, as too many harvesters did not have enough work to do. In the packaging area, the wood splitters were busy while the packagers' main limiting factor was waiting for wood to be split. We propose that in the harvesting field, two workers operate each chainsaw (switching off with each other to avoid fatigue) and two other workers clear, clean, and cut smaller branches. We recommend that in the packaging area, twelve employees split firewood using axes. The rest of the employees should be splitting and packaging the dried wood. It would be best if three employees use hand saws to cut logs to the desired size and the remaining three employees put the split wood pieces into bags, check the bag weights, and seal them.

In addition, the business must consider the labor required to transport firewood and tools. To keep normal operations running smoothly, both teams should be ready to begin work promptly at 8h00. They should move the tools to their correct locations, and work until 16h00. At that time, they should begin moving the firewood to trucks and moving firewood bags to their correct storage locations. If the employees cannot move all firewood in that time frame, more time should be allocated throughout the day. When Mr. Engelbrecht picks up the firewood, the team will need to spend the day loading his truck. We recommend that the packagers load the truck so the harvesters can continue to cut Prosopis. If this is not fast enough, the harvesters should assist the packagers.

It is important to note that this model may not be the ideal arrangement for all instances; employees, especially managers, should make adjustments as they see fit.

2. We recommend that the Prosopis Firewood business use future profit to invest in more equipment to increase production. The Prosopis Firewood business cannot surpass current production rates because they do not have the necessary equipment. The production lines were slowed because there were not enough chain saws and axes to keep workers busy. We recommend that they purchase at least one more chain saw to have on reserve in case one breaks. Ideally, they would have six operational chain saws and one back up. Additionally, we recommend that the business purchase ten more axes so more employees can split wood. Although the business cannot afford these tools at this time, it is important they save for this equipment.

3. We recommend that the Prosopis Firewood business employees receive pay based on production output rather than time. A production-based payment system would provide more incentive than hourly wages. This model discourages unequal distribution of labor because it reflects what the workers are producing and not how long they worked.

The most convenient method for measuring production is the number of bags of firewood packaged per week. This model prompts employees to hold each other accountable for reaching their targeted number of bags. One way to structure this pay scale is by attaching a value to each bag of packed wood. A price should be established that each team will receive per bag of firewood they package. Then the total payment for all bags should be split evenly between all team members, assuming they all work the same number of hours. The form managers will fill out regarding employee production can be found in Appendix G. Unfortunately this payment system has a significant limitation - it is directly dependent on the packaging teams and cannot account for the production of the harvesting teams or the time it takes for wood to dry before it is packaged. However, employees do rotate through harvesting and packaging duties, which will help spread out the production responsibility.

A second possible incentive structure is profit sharing. In this set up, all of the employees would know the production rate needed to supply to their identified market. They would have to meet quota and the profits would be divided evenly between the employees based on the number of hours they worked. Managers would fill out the same form as the previous payment option, which is displayed in Appendix G. This structure is limited because it has less frequent payouts and does not put the pressure on individuals as effectively as the first option, but is easier to organize payments.

MARKETING

4. We recommend that the Prosopis Firewood business focus on supplying Mr. Sakkie Engelbrecht with firewood because of the demand frequency and low production costs. Mr. Engelbrecht stated that he wants thirty-four tons of wood every second and last Friday each month. This is compared to the tourism resorts market that would purchase approximately one tonne of wood each month. Therefore, we recommend selling to Mr. Sakkie Engelbrecht as his firewood demands render a constant production and cash flow for the Prosopis Firewood business.

Mr. Engelbrecht also stated that he wanted the firewood to be packaged in twenty kg fodder bags. His bags would not have the Prosopis Firewood logo, would be closed with wire, and are less expensive than the bags needed for tourism resorts. Additionally, the Prosopis Firewood business would have to provide transportation to the resorts while Mr. Sakkie Engelbrecht will

pick up the firewood in Gibeon. Mr. Engelbrecht is currently the most viable market, considering the limited funding available to the Prosopis Firewood business. However, Mr. Engelbrecht said he would pay N\$900 per ton, so we recommend the business negotiate a higher price with Mr. Engelbrecht.

5. We recommend that the DRFN continue to assess market potential of tourism resorts. Our team concluded there is potential to sell firewood to resorts, but the market requires further investigation. We visited two resorts and consulted with the Namibia Wildlife Resort (NWR). One of the resorts, the Africa Safari Lodge, expressed interest in Prosopis Firewood. We recommend the Prosopis Firewood business keep in touch with the contacts we established at the interested resorts and contact other local lodges.

Because Mr. Engelbrecht currently represents the most lucrative market, the Prosopis Firewood business will likely need to concentrate their efforts on his market as a short-term goal. Once they can comfortably meet his demand, we advise the business to develop a more diversified market. The NWR tourism resorts surrounding Gibeon could serve as another market if the business produces more wood than Mr. Engelbrecht requires.

BUSINESS LOGISTICS

6. We recommend that the DRFN and Prosopis Firewood employees confirm the roles and services the GVC will provide through a finalized legal contract. Prosopis Firewood's ability to achieve sustainability without an outside entity's assistance is questionable. There is an outstanding need for transportation, infrastructure, and guidance that the DRFN is currently providing the business. The GVC indicated that they would be willing to support the business by providing them with the following support and services:

- Transportation to and from harvesting sites
- Equipment manager
- Accountant
- Human resources representative
- Plot of land for storage
- Advisory board

The GVC did not indicate whether or not they require payment for these services. A legal contract clearly defining all services and support the GVC will provide Prosopis Firewood would be most appropriate in providing security for the business.

7. We recommend that the Prosopis Firewood employees reach out to community members to explore additional transportation and storage options. To promote community growth and independence, the Prosopis Firewood business should investigate options for private

transportation and storage. Contacting individuals who own donkey carts or trucks will enhance the community aspect of the project. The business needs to transport tools, firewood, and its employees on a daily basis. Ideally, the business would arrange for transportation to and from the harvesting fields and potential markets. This alleviates some of the dependence on the GVC. The employees should also explore private storage options. Although the GVC indicated they would provide a storage space for the firewood, the employees should search for additional lots. Having more storage space will allow the business to cater toward larger markets.

8. We recommend that the Prosopis Firewood business utilize a business plan to ensure market, operational, and financial success. Our team designed a business plan that was tailored to the Prosopis Firewood business. The plan includes guidance in areas that we identified: market and financial analysis, operations, and organization. Because the employees lack business experience, it is crucial they follow the plan to learn how to successfully run a sustainable business. Furthermore, once the funding for this project stops, the business can use the plan to pursue further funds. Interviewed business experts identified the SME Bank as a potential funding source as they could provide loans to developing small businesses in Namibia. However, Prosopis Firewood needs a strong business proposal before requesting funds.

9. We recommend that the Prosopis Firewood business apply for training from SMEs Compete. SMEs Compete specializes in educating new SMEs about business operations, financial management, and employee accountability. This organization is willing to assist the business if it is sustainable and all the employees are willing to make a long-term commitment to the business. This training is appropriate due to the lack of education and relevant experience amongst the employees. In particular, the managers could benefit from this training, as they need to further develop their supervisory skills to be effective leaders within the business. SMEs Compete understands the obstacles that new managers encounter and provides them with tools and resources for success. The Prosopis Firewood business will be able to develop concrete, actionable goals to grow and sustain the business. We advise the business to maintain contact with Danny Meyer and Claudine Mouton, the directors from SMEs Compete, who were recommended to our team as the people who can coordinate such training.

MONITORING

10. We recommend that the stumps of harvested Prosopis trees be burnt to inhibit regrowth. From our observations of the riverbed during the site visit to Gibeon, it was evident that Prosopis regrowth is rapid. In addition to preventing regrowth, burning the stumps will improve Gibeon's biodiversity. We recommend Dr. Strohbach, or another qualified professional, trains the employees in the safe, proper methods of stump burning.

11. We recommend the *Prosopis* Firewood employees clear *Prosopis* from the appropriate areas, as outlined in the Baseline Assessment Report. The report contains a management plan designed to prevent rapid depletion of *Prosopis*, contribute to water security efforts, and avoid legal infractions. The report identified areas with the highest densities of *Prosopis* and the projected timelines for harvesting at sustainable rates. On our site visit to Gibeon, it was evident the employees were not following a structured harvesting plan based on location, density, and biomass of *Prosopis* trees. If this unstructured harvesting continues, it can lead to rapid exhaustion of the *Prosopis* trees and legal violations. The Baseline Assessment Report outlines significant harvesting and eradicating areas along the riverbed that will increase water availability (Ntesa, Kabajani, & Strohbach, 2014). The business should apply to the Ministry of Agriculture, Water & Forestry for special permission to harvest closer to the river. The Ministry may grant permission if they act in accordance with the suggestions of the agricultural and natural resource experts who conducted the assessment and created the harvesting plan.

12. We recommend that the DRFN work with Dr. Ben Strohbach, to create a means of monitor the environmental impact of *Prosopis* harvesting. Potential environmental changes that occur from harvesting *Prosopis* must be monitored to assess the severity of the environmental impact on the region. Dr. Strohbach, a lecturer from the Department of Agriculture and Natural Resource Management at the Polytechnic of Namibia, was instrumental in the development of the Baseline Assessment Report of *Prosopis* in Gibeon and has extensive knowledge of plant and ecosystem health. We advise that Dr. Strohbach conduct an environmental impact assessment and that the results be reported to the DRFN on a semiannual basis. After this, we recommend that Dr. Strohbach train the employees to monitor the impacts themselves. With his expertise, Dr. Strohbach can provide several techniques and observation methods to the employees. If Dr. Strohbach is unable to provide his expertise, we hope that he can recommend a colleague with similar credentials and knowledge who might be willing to help monitor.

13. We recommend the DRFN ensure that USAID monitors the *Prosopis* Firewood business in terms of livelihood improvement and environmental impact. USAID allocates funds for monitoring their projects. We recommend that the DRFN maintain contact with this organization to access these funds and determine the success of the project. An assessment to determine livelihood improvement can be found in Appendix J.

FUTURE WPI PROJECTS

14. We recommend a future WPI team assess the potential of implementing biochar stoves within the Gibeon community because the brush of the harvested trees is currently unused. Currently, the harvesters leave large piles of brush from the trees throughout the harvesting sites. The build-up of the brush blocks access to some areas and can potentially add to the spread of *Prosopis*. This leftover biomass could be used in biochar stoves, initially providing fuel for cooking and later improving soil quality with the charcoal-like end product. We determined that

evaluating the potential of biochar stoves within a community was beyond the scope of our project, but that it is worth investigating.

During our time in Namibia we experienced many different cultures. We found the project process was much different when working with sponsor. This led us to some realizations:

1. Although a project may be different than what was expected, resilience and adaptation help in understanding the new scope that is required to meet the project's needs. When preparing for this project, our team had certain expectations for what we would do in country and designed our plans accordingly. Upon our arrival in Namibia, we found that our sponsor had completed two of the three proposed deliverables. Additionally, we were unaware of numerous objectives that our sponsor intended to accomplish with the project.

We adapted quickly to these changes and realigned to the updated project scope. Our team met with our sponsors at the beginning of our time in Namibia to reiterate what had been included in our project proposal and learn how their objectives differed from ours. From there, we tailored our objectives to comply with the outputs that our sponsor expected.

This miscommunication is understandable, considering how busy the DRFN is with its numerous projects. This project was our primary focus during our preparatory period and we wanted to contact the DRFN frequently so we could get constant updates on the progress of the project and understand exactly what the DRFN wanted us to do. However, this project was one of many that the DRFN was involved with and therefore they did not have the ability to sacrifice much time to assist us. In this situation, it was pertinent that we remained flexible and changed our project as we learned what the DRFN had already accomplished in Gibeon and what the overarching project goal actually was.

2. Working on the project on-site is a very different experience compared to preparing for it thousands of miles away. Before coming to Namibia, we made certain assumptions and did as much research as possible to prepare for our project. While this provided us with a valuable foundation, we gained the most useful experience in the Gibeon community and at the DRFN. Collaboration was much easier in person. Direct access to our sponsors helped us exchange relevant information and increased availability of materials. Furthermore, we felt a greater sense of ownership of our project as we interacted with community members and professionals that were invested in it. These interactions provided us with more motivation and commitment to the project than we had before.

3. Sometimes there are elements of the project that we cannot control; accepting this brings perspective to feasible accomplishments. Among the numerous variables that defined our project, various aspects were out of our team's control. At first, we bogged ourselves down trying to account for these elements. We fixated on what we could not control, noting shortcomings at almost every step of the project. Eventually, we realized that it was not our purpose to control and solve every variable of the project. Once we redefined our project, it

became easier for us to work around the roadblocks that we could not prevent. For example, we had no control over the fact that before we began working on the project, the employees became exclusively dependent on Lucky's assistance for all aspects of the project and the business development. This was a hindrance when trying to empower the employees. When asked how they would manage various issues like delivery of firewood, tool maintenance, and business logistics, many answered that Lucky would do it. Although initially deterred, we reshaped our recommendations to include more community training in business and management skills and contact other partners for transportation and storage needs.

Challenges like this force project teams to consider why they have been placed on the project. While it is impressive to state the far-reaching success of a project, it is equally meaningful to be able to identify a project's shortcomings. Essentially, the challenges that come with the project become the IQP team's challenges. It is their task to decide which challenges they can effectively address and how to best account for the ones they cannot.

4. Because every project has numerous unknown variables, it is inappropriate to fixate on “one solution.” No silver bullet answer exists. After over two years of solving analytical problems in engineering courses, no math or science student wants to hear that they are being presented with a problem that they cannot solve. Immediately, obtaining a solution to their IQP problem becomes the ultimate challenge. Often, students feel as though they go on IQP to complete a project, so they can put a check mark on an experience that will surely qualify them to be a marketable professional. They learn about culture, help a community, develop writing skills, and understand more about social science. Yet, what many do not consider is that they might just leave their IQP site with more unanswered questions than they came with.

Eager to create a successful project, our team plunged into background research. Suddenly, we dreamt of Prosopis and could accurately speak about the climate, geography, and demographic of Gibeon, a small community in the southern part of Namibia. On paper, we could tell you exactly what sustainability is and may have even come up with a way to empower the employees to develop sustainable livelihoods. We had one, foolproof plan to hit the ground running and delve into the most successful project that Namibia has ever seen.

Then, we arrived on site. Suddenly, our sponsor was asking whether we had made considerations about transporting firewood to a market and gauging our expertise in the field of firewood pricing. Did we know how much it would cost for a donkey cart to travel 100 km? How well could we explain financial management to a group of thirty adults who were about to become entrepreneurs? We faced an onslaught of unforeseen variables. Suddenly, our “solution” was shattered.

The strongest way to approach an IQP is to understand, as early as possible, that there is no single solution. Students are not coming into a project to pick up a set of neatly cut puzzle pieces and arrange them on a board. If they were, there would be no project. Instead, they are being

tossed wisps of information while encountering pitfalls and dead ends. Their task is to assemble the information into a logical framework and provide a series of findings and recommendations that will enable the community to fill in gaps and create their own successes.

A project can have many viable directions and there is no need to focus on one and eliminate all others. Instead, consider all directions and how the project can best accomplish a wide range of objectives. Most projects are structured to have multiple facets; in our case, we aimed to find a balance between community income generation and environmental conservation. It was important to address both of these objectives throughout the project so that we did not have a singularly focused project.

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8.0 APPENDICES

APPENDIX A – DRFN CONVERSATIONS WITH LUCKY AND MANDY

Conversation with Mandy: 16th March 2015

Question	Answer
Where is the project currently? What has been done so far?	<ul style="list-style-type: none"> • Project began in 2013, but implementation started the middle of last year • Identified the main stakeholders <ul style="list-style-type: none"> ○ <u>Gibeon Village Council</u> - Gibeon is considered urban in Namibia, not very rural but still a village ○ <u>Orange Fish Basin Committee</u> -We want to take workers from the Gibeon village to work by the Fish river, we will be coordinating activities there ○ <u>Ministry of Agriculture</u>: We will be working with them to arrange permits and understand regulations ○ <u>Communities</u>- We want to engage community members as much as possible • An awareness campaign about Prosopis for community members was implemented • Targeted 30 unemployed community members to involve in the project for harvesting • Safety trained the 30 targeted people on how to cut Prosopis (not sure how much was cut, where it was cut, or what was done with it)
What documents and reports are available for us to use?	<ul style="list-style-type: none"> • <u>Biodiversity Assessment</u>- Details on how Prosopis affects water resources, economic uses for Prosopis, shows major Prosopis zones, how much can be harvested and for how long (completed by the Polytechnic of Namibia) • <u>Socioeconomic Report</u>: Is being finalized, Lucky will have more details • <u>Market Research Report</u>: Research was done in Mariental, a bigger city with service stations and super markets where Prosopis could be distributed <ul style="list-style-type: none"> ○ We wanted to understand the demand and supply of Prosopis ○ Report is not finalized, will consult with Rennie for updates on completion • <u>Technical Harvesting Manual</u>: An expert on harvesting and selling Prosopis was paid to train and provide a harvesting manual (still in the process of being finalized)
Additional Project Details	<ul style="list-style-type: none"> • Project involves 4 other countries that share the Orange Fish River Basin, goals are to integrate and implement resource management • Funding comes from USAID • Community members are provided with the necessary materials and

	<p>safety gear for harvesting, as we keep it after activities for safety reasons</p> <ul style="list-style-type: none">• We are clearing areas mostly near the river because we want to protect the groundwater from Prosopis• We are not eradicating Prosopis so that resources don't run out• Prosopis can be mainly used for firewood, fencing poles and biochar (saves energy compared to an open fire, ash can also be used for gardening)
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Conversation with Lucky: 16th March 2015

Question	Answer
How many people will be working in business?	30 total, specific roles will be assigned
Has a group of workers already been identified?	Yes, they were trained to harvest Prosopis already
Are we willing to pay workers?	Yes
Is the wood already dry? (Takes 4 – 6 mos.)	Will inspect Sunday, aiming for 70% dry
Where will the rest of the Prosopis be stored?	It will be harvested on one side and packed on the other **note: there is no established structure yet
Where will we store the wood?	Consult GVC to see if they can provide infrastructure
When will we sell Prosopis and for how much?	Figure out market, general price, etc. when we go to Gibeon, we need to buy a scale for weighing Prosopis
How much are we selling the wood for?	Still looking, will be around N\$15 **note: need to consider costs of production
When will we develop the constitution?	<ul style="list-style-type: none"> • There is already a draft, need it by Apr 6 **note: Must be said in constitution that no manager or employer can use company's name for personal gain. • Initially 30 people to whom roles are assigned, management team, bank account, council member, accountant, HR • When we go to Gibeon we will talk about management plan, setting up a bank account, rules and regulations, possible clients

Conversation with Lucky: 18th March 2015

Question	Answer
Where will the firewood be transported to? How does it get there, by a professional or community member?	<ul style="list-style-type: none"> • Community members have very little in general (don't have their own cars) • Potentially can use donkey carts - will involve spending more money • Tonnes of wood will need to be transported, unsure of the feasibility of donkey carts
What are the requirements for the packaging stage?	<ul style="list-style-type: none"> • Looked into a Namibian plastic packaging company (Plastic Packaging?) - normal plastic bags (440 mm x 600 mm) • Wood needs to be cut to fit in and not cut holes in bags • Need appealing bags - don't want cheap fodder bags from farmers • If the wood is to be exported somewhere, the business will not need to worry about the appealing bags
Do we want more than 30 people involved for more job creation?	<ul style="list-style-type: none"> • We want the community to feel ownership of this project once the DRFN's involvement stops; they can accept more workers if they choose to • We can account for six extra people (mentioned in the training manual) • Ownership is tough - business must be kept small (the people don't need an office, billboard, etc.) • Closed Corporation business would work well - three quick forms to fill out (Social Security Commission, tax forms for government, registration form) and workers don't pay tax if the business makes N\$200,000 or less per year
Is there an established building to work in?	<ul style="list-style-type: none"> • Currently, the Gibeon Village Council has allocated a small space behind their office building for packaging wood • GVC wants money for allowing use of the space • Ultimately, we don't know where to bring the wood and need to find a place to work
Who are the potential buyers of Prosopis and where are they located?	<ul style="list-style-type: none"> • Market region will be Mariental (some people there showed interest already) • The problem is people are more comfortable with camelthorn trees - they see Prosopis as weird to use for firewood because it's not normal
After the pilot harvesting stage, was any wood packaged?	No, it was cut down and left there. Tarps were placed over the wood in the hopes of protecting it.
Are there any past DRFN projects that involved the creation of a business plan?	No.
Will someone in the Village Council be	<ul style="list-style-type: none"> • GVC Human Resource officer already said no. Pitch to them should be about social responsibility and how it is their job to give back to

willing to take charge of the project once the DRFN is done?	<p>the community. If people make money, they can pay the Council for services like water and electricity, so the Council can benefit from involvement.</p> <ul style="list-style-type: none"> • Councilors are politically oriented. The CEO has little power, the Council is possibly corrupt and controlled by the Councilors. • Councilors are meddling with the general administration when they should be monitoring the people. • There should be two supervisors: one from the Council and one from the administration. They should have minimal power.
Who will we meet with when we visit Gibeon?	<ul style="list-style-type: none"> • We will first meet the CEO to determine her stance on the project. • Next meeting with Councilors and CEO to gauge entire council's opinion. • We can find out where community members currently buy local wood and talk to those sellers about their business processes. Some people may not be willing to disclose their sellers and sellers may not want to disclose their information. • Most sellers are from out of town and just send shipments of wood periodically • Unrelated to Gibeon, we can potentially visit Sakkie's farm in Leonardville to see what they do there. Although the wood is not harvested in the same area the packaging is done
Do community members have access to cell phones and computers?	<ul style="list-style-type: none"> • All participants own cell phones, but don't have access to computers. Bookkeeping should be kept simple.
Other Notes	<ul style="list-style-type: none"> • People can claim skills that they don't have, this is important to note in the methodology • Need environmental management plan from Lucky • Need baseline data for sustainable livelihood impact from Lucky <ul style="list-style-type: none"> ○ This has perceptions of community members ○ List from Lucky with all workers?

DRFN: Meeting with Gibeon Village Council Agenda

Date: 11th April 2015

Team: Kelly Beisswanger, Raquel Mendoza Cabral, Ryan Clark, Jessie Ciulla

Facilitators: Lucky Ganeb

DRFN Staff: Lucky Ganeb

Gibeon Village Council (GVC) staff: Unknown

Topics to be Discussed:

1. Introductions
 2. Project Proposal
 3. Interview Questions
 4. Business Plan
 5. GVC Role in Prosopis Firewood business
 6. Expectations
 7. Business Concerns
 8. Moving Forward
-

1. Introductions
 - a. WPI Students
 - b. Lucky's role with WPI
 - c. GVC Members
2. Project Proposal
 - a. WPI in Namibia
 - b. WPI's role at DRFN
 - c. Overview of goal statement
 - d. WPI objectives in Gibeon
3. Interview Questions
 - a. Acknowledgement to record
 - b. Guarantee of confidentiality

GVC Interview Questions

Background Information	
1.	What are the major roles and responsibilities of the GVC within the community?
2.	What are all of your (present GVC members) individual roles and responsibilities within the GVC? How long have you had this position?
3.	What other resources and services could the GVC provide that were not previously mentioned?
4.	How does the decision making process work in the GVC?
5.	Has there ever been a community project such as Prosopis Firewood business? Were you involved with the project? (Yes) How were you involved? What worked and what did not? (No) Why didn't you get involved with the project?
Business Questions	
1.	If you (present GVC council members) decide to undertake the roles and responsibilities of providing support to the business, does there need to be a discussion with the entire council to get approval or consent to agreement? <ul style="list-style-type: none"> o If so, when can this take place? o Do you anticipate any conflict with other members regarding your participation in the business?
2.	Are there any other legal documents/permits/paperwork we need to administer with the GVC or any of the ministries that we have not mentioned already?
3.	What capacity do you have for assisting the Prosopis Firewood business?

4. Proposed Business Plan
 - a. Mission Statement
 - b. Close Corporation
 - c. 3 Managers, 30 employees
 - d. Production Line: Harvesting → Storage → Packaging → Transportation → Selling
 - e. Finances
 - f. Highlight need for GVC support
 - i. Lack of storage space
 - ii. Lack of business and management skills
 - iii. Their responsibility to give back to the community
5. GVC Role in Prosopis Firewood business
 - a. Storage Space/Facilities
 - b. Administration /Human Resources
 - c. Human Resources
6. Expectations
 - a. What does WPI expect from GVC?
 - i. Provide workers with guidance and advice when necessary
 - ii. Be available and receptive to ideas, recommendations, concerns, questions, and comments from all employees

- iii. Understand that monetary compensation will not be provided now or anytime in the future
 - iv. Assist with transportation and storage costs
 - b. What does GVC expect from project?
 - i. Monetary compensation?
 - ii. Community growth and advancement
 - iii. Development of sustainable livelihoods
 - iv. Increased biodiversity in Fish River Basin
- 7. Business Concerns
 - a. Activity: Can be done by a simple question and answer session or by handing out a piece of paper to each member (to maintain discretion) and asking them to comment on Prosopis Firewood business:
 - i. Comments
 - ii. Concerns
 - iii. Questions
 - b. WPI's major questions and concerns
- 8. Moving forward
 - a. Legal Documents and Paperwork (Contracts and Constitutions)
 - b. Further communication with the DRFN will be established
 - c. Updating DRFN on business progress

APPENDIX C – INFORMATION FROM GIBEON TRIP

Prosopis Firewood Employee Brainstorming Results

Potential Expenses	Fuel (petrol) Bags Chainsaw chains Oil Transport Labels Staples Storage
Potential Markets	Shop Rite Fill stations (Gibeon and Mariental) By the main road (B1) Partnership with bulk purchaser (Sakkie) Windhoek, Keetmanshoop Schools (nearby boarding school) Shops Lodges/ B&Bs (NWR - our suggestion)
Possible Means of Transportations	Village Council Private transportation (Gibeon residents with vehicles) Office of the Governor Regional Council Church truck (Roman Catholic Church) Sakkie Train (Trans Namib)
Potential Markets/Prosopis Uses	Burns longer (?) Cook Iron Clothes (extends duration) Backup when electricity gets shut off Heat Source (winter) Furniture (Sakkie) Make bread, braai, cook Start fires - catches faster Sell in package with other wood that lasts longer (?)
Anticipated Uses for Income	Flour to make bread (food) Support household - utilities (water, electricity) School Fees Toiletries Improving living standards Cell phones and accessories

Survey Questions for Prosopis Employees

Employee Name:

Age:

Grade Achieved in School:

How many years have you lived in Gibeon?

How many people live in your home?

Position in family:

What is your household's main source of income?

Which members of your family work?

Previous Employment:

Employment	Location

What employment opportunities are available to you?

Have you ever been involved in a business such as this?

Do you have any past experience with selling a product to a customer?

Have you ever been involved with agricultural work?

What language(s) can you comfortably speak?

What language(s) can you comfortably write?

What language(s) can you comfortably read?

What do you expect in terms of work time commitment? (Every day, biweekly, etc.)

How many hours/ day do you expect to work?

Survey Results for Prosopis Firewood Employees

Name	Age	Grade Level	Years in Gibeon	Household Size	Position in family	Main Household Income	Working members of Household	Previous employment	Employment Available	Past Customer Experience	Agricultural Experience	Languages Spoken	Languages Written	Languages Read	Expected Time Commitment
Susanna Reither	26	8	26	5	daughter	mom, pension	mom	testing materials in a lab	no	yes	no	3	2	2	40/week
Elson Hendricks	19	5	19	22	brother	all males	all males	bricklayer, planting, welding houses	no	no	no	3	2	2	40/week
Theo Rooi	33	7	33	5	head of household	all	all	woodworker	no	no	no	2	0	0	40/week
Fredrek Visser	29	4	29	6	head of household	interviewee	interviewee	can do anything, no previous experience	no	no	no	3	2	2	40/week
Flora Hendricks	27	12	27	7	daughter	mom	mom	security, bricklaying, contractor, first aid	no	yes	no	3	2	2	40/week
Theresia Afrikane	37	10	37	5	mother	husband	husband	braiding hair, cashier	no	yes	no	3	2	2	40/week
Susanna Mara Isaa	27	9	27	4	head of household	pension	none	braiding hair, small sweets business	no	yes	no	3	2	2	40/week
Ricardo Richard	26	12	26	14	brother	domestic work	parents	clerk	no	no	yes	3	3	3	40/week
Geoffrey Keramer	24	10	24	13	brother, son, grandson	2 pensions	self	sewer pipe laying	no	no	no	3	2	2	40/week
Johannes Booyser	23	10	23	7	brother, son	pension/job	self, sister	handyman/constructi on	no	no	no	2	2	2	40/week
Raymond Richard	21	12	21	15	brother, son	5 pensions	none	handyman	no	no	no	3	2	2	40/week
Brianna	45	7	45	5	mother	pension/job	self	housekeeping	no	no	no	3	2	2	40/week

Maria Keiser	21	10	21	5	daughter, sister	4 pensions	self, brother	babysitting	no	no	no	2	2	2	40/week			
Patricia Basson	24	10	24	9	daughter, sister	pension	none	housekeeping	no	no	no	3	2	2	40/week			
Sylvia Philander	38	12	38	9	mother	2 pensions	self	housekeeping	no	no	no	1	1	1	40/week			
Marianna Witbooi	42	7	42	8	mother	self-employed	self	bread baking	no	some	no	3	2	2	40/week			
Katrina Jacob	42	8	42	9	mother	pension	self	housekeeping	no	no	no	3	2	2	40/week			
Bernadette Visser	39	9	39	6	mother	pensions	none	housekeeping	no	no	no	2	2	2	40/week			
Esme	38	7	38	2	mother	pension	self	housekeeping	no	yes	no	3	2	2	40/week			
Maouritia	23	7	23	3	mother	boy friend	self	domestic work	no	yes	yes	3	2	3	40/week			
Beata	25	10	25	7	mother, daughter	none	self	single day jobs (nothing permanent)	no	yes	no	2	2	2	40/week			
Rodney	27	8	27	2	son	mothers pens	self	single day jobs (nothing permanent)	no	no	yes	2	2	2	40/week			
Andy	30	10	28	2	son	none	none	single day jobs (nothing permanent)	no	yes	yes	2	1	1	40/week			
Johannes	33	4	33	7	head of household	none	self	single day jobs (nothing permanent)	no	no	no	3	3	3	40/week			

HARVESTING TEAM OBSERVATIONS

Number of Teams: 3

Workers per Team: 8

Worker Roles

- Chain Saw Operator (2)
- Clearing (6)

Equipment

- Chainsaw
- Hand saw
- Machete
- Oil for chain saw
- Petrol for chain saw

Transportation Needs

There are three trips each morning and each afternoon.

- Morning trip
 - Transporting all equipment from storage facility to each harvesting site
 - Transporting each team of workers from GVC to harvesting
- Afternoon trip
 - Transporting each team of workers from harvesting site to GVC
 - Transporting all chopped firewood to GVC
 - Transporting all equipment from harvesting site to storage facility
- Miscellaneous trips
 - Refueling chain saws
 - Starting chainsaws

Approximate Output

- 100 – 150 bags per team (estimated by Lucky)

Inefficiencies

- Too many workers clearing
- Too few chain saws
- Incorrect chainsaw operation

Reasons for stops in productivity

- Chain saw would not start
- Chains needed to be sharpened or adjusted
- Chain saw ran out of oil

- Teams could not contact Lucky for some need
- Food/water break
- Waiting for tree to be cut into pieces
- Clearers often waited for chain saw operators

PACKAGING TEAM OBSERVATIONS

Number of Teams: 3

Workers per Team: 2

Worker Roles

- Wood Splitter (1)
- Firewood Packager (1)

Equipment

- Axe
- Hand Saw
- Firewood Bag
- Prosopis Firewood Logo
- Scale
- Staples

Transportation Needs

- Transporting equipment from storage facility to GVC
- Transporting packaged firewood to storage facility
- Miscellaneous trips (replenishing equipment, fixing broken tools, etc.)

Approximate Output

- 50 bags per team

Inefficiencies

- Staples missing all morning
- Workers leaving unannounced
- Not enough workers splitting wood
- Both team members using hand saw to split wood because axe broke

Reasons for stops in productivity

- Axe broken
- Ran out of bags
- Wrong size staples
- Teams could not contact Lucky for some need
- Food/water break
- Waiting for tree to be cut into pieces
- Packagers often waited for chain saw operators

APPENDIX D - INTERVIEW TEMPLATES AND SUMMARIES FOR BUSINESS AND MARKETING EXPERTS

Template for Business and Marketing Interviews

1.	Do you have experience with income generating projects involving communities? If so, what was the project about, what was accomplished, and what tips/recommendations do you have for us?
2.	Our sponsor wants us to help 30 people from the Gibeon village start a close corporation. What advice do you have in creating business guidelines for the size and nature of this business? Would an SME make sense for this type of business?
3.	<p>Our plan is to:</p> <ul style="list-style-type: none"> • Determine the different management skills of the Gibeon Village Council, and the 30 community members • Identify the supply and demand of Prosopis • Investigate all of the available resources in terms of packaging, distributing, marketing, and selling Prosopis <p>Do you have any recommendations or suggestions for additions to this list?</p>
4.	<p>What would be the best marketing strategy to effectively sell Prosopis?</p> <ul style="list-style-type: none"> • Prosopis is an alien invasive species, purchasing wood harvested from this tree would help clear the area and provide sustainable livelihoods • Prosopis makes good quality wood, burns hot • Prosopis is an alien invasive plant species that is consuming precious water resources form the Orange Senqu River Basin, by purchasing this product you are participating in much needed water conservancy efforts
5.	What literature do you suggest we read here at the university and/or the polytechnic to understand the details of a closed business, marketing strategies, and designing business guidelines?
6.	Are you familiar with or know any other projects similar to ours that have been done in Namibia that we can reference? If so, how can we access these project reports?
7.	Do you know of any other experts in this field or related fields that we can consult with?

INTERVIEW SUMMARY WITH ESLON NGEENDEPI FROM THE POLYTECHNIC OF NAMIBIA

Interviewee: Eslon Ngeendepi

Position: Junior Lecturer, Department of Accounting, Economics, and Finance

Location: Polytechnic of Namibia campus

Date: 23rd March 2015

Time: 1100-1200

Main Topics Discussed:

- Mr. Ngeendepi's experience with SMEs
- Main challenges faced by two SMEs in Katatura
- Advice on targeting consumers
- Recommendations for seeking additional funding from other organizations and the government

The interview began with Mr. Ngeendepi sharing his experience in working with two SMEs in Katatura. His work was mainly focused on the challenges facing SMEs in Namibia and analyzing how and why they fail. Mr. Ngeendepi conducted his research by handing out 100 questionnaires to several businesses to understand why so many of the SMEs in Namibia do not become sustainable businesses. From his research, Mr. Ngeendepi determined several challenges that developing SMEs Namibia face:

1. Capital - commercial companies and financial institutions are not willing to provide start up capitals to SMEs
2. Collateral and security - difficulty applying and qualifying for loans
3. Lack of financial education and bank accounts
4. Lack of trust from suppliers to open accounts
5. Lack of proper infrastructure
6. Security issues and crime
7. High cost of utilities
8. Lack of knowledge on technology
9. Government regulations and taxes
10. Training employees

After learning about Mr. Ngeendepi's experience with developing SMEs, we asked him if he could talk about his experience or knowledge involving income-generating projects like ours. Mr. Ngeendepi also mentioned that for a project like this, in addition to combating all of the

challenges listed above, there is a need for a trustee to be involved from the beginning to guide the business to sustainability.

Next, Mr. Ngeendepi recommended that we refer to population demographic reports of the Gibeon village to determine the best practices for the business. This would help in understanding what resources and infrastructure are readily available to the Prosopis business. He also recommended that we seek support from the Gibeon Village Council.

In addition, Mr. Ngeendepi recommended contacting the Ministry of Trade and Industry, as the ministry is very supportive of SMEs and is often willing to provide equipment, training, and legal advice, as long as they are presented with a good plan. For further funding, Mr. Ngeendepi recommended that we contact the SME Bank of Namibia. He also suggested that we contact the Ministry of Environment and Tourism and the Namibia Wildlife Resorts because they are very supportive of community income-generating projects and may be willing to do business or offer funds, services, and guidance.

The market advice from Mr. Ngeendepi was to target our consumers and advertise our product strategically, based on the consumers' wants and needs. He also recommended that we explore a market outside of Gibeon, as the population is very poor and firewood is not in high demand. Another suggestion was to explore other firewood businesses in the area and determine what type of wood they are selling.

INTERVIEW SUMMARY WITH CHICKERY KASOUF FROM THE WORCESTER POLYTECHNIC INSTITUTE (WPI)

Interviewee: Chickery Kasouf

Position: Associate Professor, School of Business

Location: Pension Cori Guest House via Skype

Date: 23rd March 2015

Time: 1600-1645pm

Main Topics Discussed:

- Exploring different markets for Prosopis
- Resources and Infrastructure
- Searching for middlemen and external partners
- Economic viability of Prosopis business

Professor Kasouf began the interview by informing us on literature that he had found from the Harvard School of Business database he accesses. The literature was on marketing and businesses in developing countries around the world. Professor Kasouf then told us about a company in South America that sold shampoo bottles in travel-sized bottles for people who did not have the money to purchase regular sized amounts. Professor Kasouf used this example to emphasize how we need to be extremely familiar with our target consumers to successfully sell a product.

Next, we discussed the specific market and consumers of our project. We pitched the idea of selling the Prosopis firewood in Mariental and nearby tourist locations. Professor Kasouf encouraged us to find more tourism resorts and campsites that we could target; he also expressed his concerns of transportation and costs, considering the available resources and infrastructure in Gibeon. To address this issue, we told Professor Kasouf that we wanted to search for a middleman that would be willing transport the wood to Mariental. Professor Kasouf responded with a set of questions that we must answer before our search, as the middlemen would want to know the answers:

1. What does Prosopis firewood compete with?
2. How else are people going to solve the need for firewood?
3. Can Prosopis firewood be sold for a reasonable price?

After explaining the marketing challenges the Prosopis business faces, Professor Kasouf recommended we speak to the employees to understand and determine other uses for Prosopis where there is a stronger market available. Once we explained our sponsor's determination to sell Prosopis as firewood, the experience and education of the employees, and the infrastructure and

resources available to business, Professor Kasouf predicted that the business was not economically viable and would not grow and become sustainable. To avoid the reality of the business failing, he recommended that we determine:

1. What we are going to do with the Prosopis (type of product)
2. How can we generate interest and expand the market for Prosopis
3. How can we find a middleman or partner to export Prosopis out of Gibeon

Professor Kasouf then talked about providing us with material that would help us write a business plan. He did, however, warn our team that we should tailor our business plan to the Prosopis Firewood business, its employees and their abilities.

Professor Kasouf also offered to Skype with us again should we have any questions relating to writing the business plan for Prosopis Firewood.

INTERVIEW SUMMARY WITH JAMES V. OLU OJO FROM THE POLYTECHNIC OF NAMIBIA

Interviewee: James V. Olu Ojo

Position: Lecturer, Head of Department, Department of Management Studies

Location: Polytechnic of Namibia campus

Date: 25th March 2015

Time: 1100-1200

Major Topics Discussed:

- Mr. Ojo's experience and role in the development of a SME in Nigeria
- Main factors that contributed to the failure of the SME in Nigeria
- Different Markets for Prosopis
- Suggestions for transportation
- Suggestions for a campaign to raise awareness for deforestation and marketing Prosopis
- Advice on transportation for Prosopis business

Mr. Ojo began the interview with sharing his experience in SME development, specifically in Nigeria. In Nigeria, Mr. Ojo was involved with a neighborhood community project in the soap industry. The business consisted of the local people making a body soap using a special processing machine that processed raw ingredients into soap bars. In the start-up phase, the business had a budget of approximately \$N2500, its own store in which the soap was made, processed, packaged, and sold, and a board of trustees for additional support. The business began with weekly meetings for those who were interested. In these meetings, those who were interested met on Saturdays to discuss the project plan that Mr. Ojo had written. The business was able to take off and eventually became sustainable. However, Mr. Ojo explained the business failed after 10 years for the following reasons:

1. Lack of innovation for creating a new product or improving the product
2. Lack of adaptation to major changes
3. Support from trustees and senior founders was lost over the years for reasons such as moving and losing interest in the business

His major recommendation was to establish the market for our project, but to also be innovative to continue to create ideas for other products derived from Prosopis.

Next, we discussed exploring different markets for Prosopis. Mr. Ojo suggested that we explore markets in the pharmaceutical and chemical industries as Prosopis produces sap and pods. Additionally, he recommended that we think about creating a campaign for harvesting Prosopis that would promote the biodiversity of the area:

“Every time we cut one Prosopis tree down, we also plant a native species”

Mr. Ojo suggested that the Ministry of Agriculture, Water and Forestry would be a great contact for proposing this campaign for support.

Next we discussed transportation - a major issue facing the Prosopis business. Mr. Ojo identified aggregators: Telecom and MTC (phone companies), which have large databases and access to various numbers in, specified areas. He explained that these numbers could be used to send an SMS to a large group of people in the area asking for possible rides to nearby cities such as Mariental to distribute wood. In addition, we also talked about how we are trying to involve the GVC to provide transportation and other support for the business. Mr. Ojo agreed that they are a great resource and that we should try to build a strong relationship with them to have a truly sustainable business.

Template for Interview with Men on the Side of the Road (MSR)

1.	What is your position/function within MSR? How long have you worked here?
2.	Do you have any experience in helping start a business?
3.	What major business and management skills do you teach? How?
4.	What are the main challenges you face when training people? How do you overcome them?
5.	Are there any teaching/training methods that you find to be especially effective? What are they?
6.	Would you recommend having all employees present during the manager training sessions or just the actual managers? <ul style="list-style-type: none">• We want to make sure that everyone understands the duties and responsibilities of everyone else's position/job, but we don't want to waste people's time.

INTERVIEW SUMMARY WITH HILYA KAMBANDA FROM MEN ON THE SIDE OF THE ROAD (MSR)

Interviewee: Hilya Kambanda

Position: MSR Trainer/ SSDF Project Coordinator

Location: MSR office in Katutura

Date: 2nd April 2015

Time: 1100-1200

Main Topics Discussed:

- MSR's mission and the services they provide
- Financial and Business Management Training
- Suggestions and recommendations for training Prosopis business employees

Ms. Kambanda began our interview by telling us about MSR and the services and support that they provide. Ms. Kambanda said that most clients come from the northern part of Namibia and have minimal education and no previous unemployment. MSR helps these men by providing financial management training and services to help them draft resumes to seek permanent employment. During this training Ms. Kambanda said it is important to work with the people to help make their money last longer.

After explaining what our tasks focusing on training the employees in Gibeon, we asked Ms. Kambanda if she had any advice for us. She told us about the workshops and trainings that MSR offers. The two-day workshop begins with the Life Skills Workshop. In this workshop, the men are taught basic life skills relating to keeping a job, communication skills, negotiation skills, writing skills, and helping them draft resumes to help look for employment. On the second day, the workshop teaches the participants about money management, emphasizing separating personal money from business money. After these workshops are complete, the participants receive MSR membership cards.

Ms. Kambanda then asked questions about the employee demographics of the Prosopis Firewood business. We explained to her that most of the employees spoke primarily Afrikaans, had minimal education, minimal or non-existent previous employment, and no business skills. Ms. Kambanda recommended we speak to SMEs Compete, an organization that offers trainings for small and medium-sized enterprises. Another organization Ms. Kambanda referred us to was the Namibia Youth Credit Scheme. This organization works with youth who want to start a business and help provide them with start-up capital. Ms. Kambanda reiterated that these would be great resources as both organizations would give us helpful advice on training employees with similar backgrounds to those involved with the Prosopis Firewood business.

Next, we asked Ms. Kambanda about any strategies she has found helpful when administering her workshops. Icebreakers, she said, are key. Ms. Kambanda has found that having a simple, fun, and engaging icebreaker at the beginning of a workshop has a major effect on participation and interest. She said it makes them feel more comfortable and relaxed, making communication easier.

Finally, Ms. Kambanda shared with us one of her observations based on the people she works with: lack of commitment on behalf of those involved often leads to the failure of a business. She warned us that people do not save their profits, but instead see the profits as their own money and use it for personal expenses. Ms. Kambanda wished us the best of luck with our project and gave us several pamphlets on financial and business management training. She also provided us with contact information for the organizations mentioned above.

APPENDIX E - INTERVIEW TEMPLATES AND SUMMARIES FOR MARKET ANALYSIS

Template for Tourism Resort Interviews: Potential Prosopis Firewood Markets

Tourism Resort Name: _____ **Contact Name:** _____

Tourism Resort Location: _____ **Contact Position in Tourism Resort:** _____

Tourism Resort Contact Info: (Phone): _____ (Email): _____

Date of Assessment: _____ **Tourism Resort Description:** _____

1. Is there a need for firewood at or near your tourism resort?
2. When is your peak tourism season?
3. Can patrons purchase firewood from your tourism resort?

If YES

1. From where do you purchase firewood?
2. How much firewood do you purchase at once from suppliers? How frequently?
3. Does this amount vary by season?
4. What type of wood do you purchase to use as firewood?
5. How does the firewood get transported to your location?
6. Do you pay for transportation or does the supplier?
7. How much does it cost you to purchase/transport firewood?
8. How many kgs are in each back of firewood?
9. How much do you pay per bag?
10. How much do you sell each bag for?
11. How is the firewood packaged? (photo if possible)
12. How is the firewood labeled to be sold? (photo if possible)

If NO

1. Why don't you provide firewood to your patrons?
2. Would you provide firewood to them if you could?
3. What issues do you foresee with providing patrons with access to firewood?
4. Is there another location where patrons can easily purchase firewood?

ALL

1. Would you be willing to sell Prosopis firewood at this location?

2. Would you be willing to pay someone to transport Prosopis firewood to your tourism resort?
3. How much would you pay per 15kg bag?
4. What would you expect out of a firewood supplier in terms of delivery and frequency in supply?
5. Do you think that having different labels on packaging would cause variability in sales?
 - a. “Prosopis firewood burns efficiently and stays hot”
 - b. “By purchasing Prosopis firewood, you are helping eliminate an invasive species from the Orange Fish River Basin, allowing indigenous vegetation to return to the area”
 - c. “By purchasing this firewood, you are supporting sustainable livelihood development in Gibeon, where community members are developing a business to clear Prosopis, an invasive tree in the region”

INTERVIEW SUMMARY WITH CHRIZELL KRUGER FROM THE AFRICA SAFARI LODGE

Interviewee: Chrizell Kruger

Position: Manager

Location: Africa Safari Lodge

Date: 11th April 2015

Time: 1130-1200

Main Topics Discussed:

- Current firewood needs
- Future business deal
- Prosopis firewood samples

Ms. Kruger began the interview by stating her responsibilities and position at the Africa Safari Lodge. She wanted our team to know that she was not in charge of purchasing wood and that she may not have the most concrete information but she was still happy to meet with us. Ms. Kruger said that their lodge primarily uses firewood for braais. When asked if the patrons purchase wood directly from them, Ms. Kruger said that they do not have the self-catering facilities, so the lodge kitchen prepares the food and they are the ones who actually use the firewood.

Next, Ms. Kruger told us that their peak tourism season is from May to September. She also stated that they braai mostly on Saturday afternoons, at large functions/gatherings such as a weddings and general large celebrations. Ms. Kruger then told us that they purchase camelthorn wood in bulk from a nearby farm, about one ton every four to six months. She mentioned that delivery was provided.

She was willing to sample Prosopis firewood and provide feedback on how the lodge liked it. She enjoyed the logo and clear plastic bag packaging, as the firewood they currently purchase is not packaged. Ms. Kruger ended the interview by stating that the lodge would be interested in doing business with Prosopis Firewood.

INTERVIEW SUMMARY WITH LOIDE NAMASHANA FROM THE NAMIBIA WILDLIFE RESORT

Interviewee: Loide Namashana

Position: Procurement Specialist

Location: NWR, Head Office: Windhoek, Namibia

Date: 11th April 2015

Time: 1100-1130

Main Topics Discussed:

- Current firewood needs
- Current suppliers and prices
- Possibility of doing business

Our team began the interview by asking Ms. Namashana about all NWR resorts. She said that they currently have about 20 resorts in Namibia, with several in the South. Ms. Namashana said that if the NWR would do business with Prosopis Firewood, it would be with the southern tourism resorts. She told us about NWR's responsibility to supporting local communities, and how they purchase wood from nearby farmers. She also mentioned that there is a high demand for firewood, mainly used for braai. The resorts usually make frequent firewood purchases (about once a month), depending on the clientele, volume, and size of the resort.

Next, Ms. Namashana told us that their peak tourism season is May through November. Currently, the resorts generally pay \$10N per 10 kg bag of pre-packaged Mopani wood. She explained the wood has to be delivered to the resorts. Ms. Namashana said that they would be open to negotiation on the firewood price if they purchase wood from Prosopis Firewood in the future. She said that NWR would be willing to do business with Prosopis Firewood once the company is registered company and has proper documentation. The employees can contact Ms. Namashana directly in the future, and she will connect them to the managers from resorts in the South. Ms. Namashana then reiterated how much she liked our project because it supports livelihood development.

Questions for Sakkie Engelbrecht: Potential Prosopis Firewood Bulk Purchaser

1.	What is the price that you generally sell a tonne of Prosopis firewood for?
2.	<p>What price would you be willing to buy firewood for?</p> <ul style="list-style-type: none"> • The minimum that we could sell a tonne to break even is about N\$1700/tonne. We would recommend N\$2000/tonne as a minimum to account for costs like tools breaking, registration fees, and transportation. • We would recommend getting a price per tonne instead of a price per bag
3.	<p>How would you prefer the firewood to be packaged?</p> <ul style="list-style-type: none"> • Bag size (5kg, 10kg, 20kg), type of bag (plastic or fodder)
4.	Does the wood need to be split prior to collection?
5.	Do you want the wood cleaned?
6.	<p>If production rates are not high enough could you:</p> <ul style="list-style-type: none"> • Pick up every third week or monthly • Pick up less wood biweekly
7.	What is your intended method of payment?
8.	<p>How do you pay your workers?</p> <ul style="list-style-type: none"> • Hourly vs. Per bag/kg (piece wise) • Frequency of payment • How much are they paid • What hours do they work
9.	Will you be able to pick up the firewood in your truck from Gibeon?
10.	How is your business registered?
11.	What permits do you need to harvest firewood?
12.	What do you do with the extra branches that cannot be used for firewood or other products?
13.	Can the Prosopis Firewood logo be placed on all of the firewood bags?
14.	How soon do you want to start picking up firewood?
15.	What is the best method of communication between you and the Gibeon employees once the DRFN is no longer involved in the project?

APPENDIX F –TEMPLATE AND SUMMARY FOR PROSOPIS EXPERT INTERVIEW

Template for Interview with Prosopis Expert

1.	What are the major issues Prosopis is causing in the OFRB?
2.	How much water do young and mature Prosopis trees consume on a daily basis?
3.	Why were firewood, droppers, and charcoal found to be the most suitable products to make from Prosopis found in Gibeon?
4.	Do you know what type of wood is currently harvested and used for firewood in the Gibeon and Mariental regions? Are there any existing biodiversity reports on this specific area?
5.	Were there any findings on the quality of the firewood from Prosopis that can be used in creating a marketing strategy to convince people to try Prosopis wood instead of the more common/popular wood being used? (Ex- "Prosopis is more energy efficient! More energy for less!!")
6.	How would you suggest the community manage the rate of harvesting? Through the Gibeon Village Council, the workers, or the community as a whole?
7.	What would be the best approach in determining how much Prosopis can be harvested sustainably, yet still profitably on a daily/weekly/monthly/yearly basis?
8.	Is there any evidence that harvesting Prosopis might have negative impacts on the ecosystem?
9.	What kinds of things should be monitored to track changes on the surrounding ecosystem of the harvesting sites?
10	Would you recommend total eradication or letting the Prosopis grow back for further harvesting and why? If yes, wouldn't this be counterproductive to securing water from the basin?
11	Are you familiar with or know any other similar projects that have been done in Namibia that we can reference? If so, how can we access these project reports?
12	Do you know of any other experts in this field or related fields that we can consult with?

INTERVIEW SUMMARY WITH CLARENCE NTESA FROM THE POLYTECHNIC OF NAMIBIA

Interviewee: Clarence Ntesa

Position: Lecturer, Department of Nature Conservation

Location: Polytechnic of Namibia Campus

Date: 27th March 2015

Time: 1030-1130

Main Topics Discussed:

- Baseline Assessment Report of Prosopis in Gibeon
- Possible Markets to explore in northern Namibia
- Examples and contacts from successful Prosopis firewood businesses
- Eradication vs. Harvesting Prosopis around the OFRB
- Criteria for measuring the environmental impacts of harvesting Prosopis

Ms. Ntesa began the interview by providing us with a brief overview of the Baseline Assessment on Prosopis in Gibeon that she co-wrote with her colleagues Dr. Ben Strohbach and Ms. Miya Kabajani. She first explained why the Prosopis trees in Gibeon were chosen to be harvested for firewood:

1. The trees were not big enough to be harvested for furniture
2. The diameters and heights of the trees were too small to be made into droppers
3. The biomass of the trees present in Gibeon (in comparison to the Prosopis trees of northern Namibia) was too low for use as other wood products

Ms. Ntesa suggested that because firewood was the most appropriate use for the Prosopis found in Gibeon, we should explore markets in northern Namibia. In northern Namibia, the population has exhausted most of their trees and therefore has a high demand for firewood.

Next, we were interested in possible uses for the excess branches and leaves leftover from harvested trees. Ms. Ntesa informed us that this excess plant matter could be used in biochar stoves. Although biochar stoves are not currently used in the community, she recommended that we investigate the potential of implementing these stoves and using the byproduct to fertilize soil.

Ms. Ntesa then discussed the current market for Prosopis firewood in different areas of Namibia. As mentioned earlier, she emphasized that we attempt to explore the market in northern Namibia, as the South might not be receptive to using Prosopis as firewood since camelthorn is more popular. Ms. Ntesa also mentioned that she recommend the DRFN complete a marketing strategy

analysis report to gain a better understanding of where Prosopis firewood can be sold. Ms. Ntesa suggested that we market Prosopis firewood to the general public by emphasizing the quality of the wood, not the sustainable development aspect. For further advice on selling to markets and creating different products from Prosopis, Ms. Ntesa suggested we talk with Omba Artz Trust, a contact that has experience in selling crafts. She also recommended we consult with Henk Kempen, the owner of a Prosopis firewood business located in Leonardville, Namibia.

Ms. Ntesa also provided information about Prosopis characteristics. She told us that mature Prosopis trees have roots as deep as 50 m and can access groundwater; an average Prosopis tree could consume 60-100L of water a day. Ms. Ntesa spoke about the Forestry Act, and how Prosopis harvesting in Gibeon is not allowed within 100m of the river. She mentioned that this was counterintuitive because there is a very dense population of Prosopis trees in that area. She recommended that the business negotiate for a permit to harvest 25% of the trees within that 100 m zone. It is important to harvest around indigenous trees because Prosopis outcompetes them by consuming the surrounding groundwater. Ms. Ntesa identified this as a major problem because the indigenous trees looked unhealthy during the baseline assessment; she mentioned that post monitoring of the indigenous trees is needed. Ms. Ntesa also cautioned that harvesting should be gradual to avoid major degradation and consequences such as soil erosion and the destruction of animal habitats.

Prosopis Firewood



Prosopis Firewood cc
P.O. Box 20232, Windhoek, Namibia
Contact: 061- 377 500

Firewood from an Invasive Tree in the Gibeon Community
Burns Hot and Ignites Quickly
Supports Sustainable Livelihoods

Business Plan

Kelly Beisswanger, Jessie Ciulla, Ryan Clark, Raquel Mendoza Cabral
May 2015

THE COMPANY

MISSION STATEMENT

Prosopis Firewood is committed to providing quality firewood products through harvesting techniques that help improve the biodiversity and water security of the Orange-Fish River Basin. We strive to improve both the environment and the livelihoods of employees in the Gibeon community.

BUSINESS CONTACT INFORMATION

Lucky Ganeb, DRFN
PO Box 20232, Windhoek, Namibia
061-377-500

STAKEHOLDERS

The following groups are stakeholders in the Prosopis Firewood Business:

- United States Agency for International Development (USAID) – responsible for project funding
- International Union for Conservation of Nature (IUCN) – responsible for project funding and goal
- The Desert Research Foundation of Namibia (DRFN) – Project Coordinators
- Gibeon Village Council (GVC) – Business Trustees
- Gibeon Community Group – Entrepreneurs

MARKET ANALYSIS

- A bulk purchaser represents strong potential considering he will purchase 34 tonnes of Prosopis Firewood every two weeks and will pick it up directly in Gibeon.
- Tourism resorts are another potential market, as they like to support local communities. Namibia Wildlife Resorts expressed interest in supporting the business.
- Filling stations and supermarkets in Mariental, located 60km from Gibeon, represent a potential market. Some filling stations were open to selling Prosopis Firewood, while others were content with their current supplier.
- There is no local market for Prosopis Firewood within the Gibeon community, so the business must sell to outside markets. If any Gibeon residents need firewood, they simply go cut it down themselves.

The Prosopis Firewood business can supply firewood to the bulk purchaser to meet his demand of 34 tonnes every two weeks. If the bulk purchaser stops purchasing from the business, Prosopis Firewood can meet the needs of various filling station, supermarkets, and tourism resorts once transportation is provided.

MARKETING OBJECTIVES

- Create multiple avenues for the business to generate income
- Provide sustainable livelihoods for the employees

INDUSTRY DESCRIPTION AND OUTLOOK

There is a high unemployment, estimated at 80%, in Gibeon, and this business provides jobs for 30 community members. This business supports the sustainable livelihood development of its employees. Most employees have no other employment options and they rely on family members' pensions for money.

TARGET MARKETS

- Bulk Purchaser – Mr. Sakkie Engelbrecht. The two major benefits with this market are: transportation is provided and there is a high demand to be met every two weeks.
- Tourism resorts. At least one resort in the area, in addition to Namibia Wildlife Resorts, would support the business because they support local communities.

TARGET DEMOGRAPHICS

- People who want to support local communities
- People who want to assist a community in removing an invasive species
- People who want to support livelihood development
- People who want to purchase firewood in bulk
- People who have a less frequent demand for firewood

COMPETITIVE ADVANTAGES & DISADVANTAGES

Farms in the area that sell camelthorn firewood represent the competition. Some people are not interested in purchasing Prosopis Firewood because they are content with camelthorn and do not wish to try new products.

Prosopis Firewood offers the following advantages:

- This business supports the sustainable livelihood development of members in a poor community.
- By purchasing Prosopis Firewood, the consumers are assisting in the removal of a harmful invasive plant species.
- The firewood burns hot and ignites quickly.
- The business can generate a large quantity of firewood.

MARKETING AND SALES ACTIVITY

The Prosopis Firewood business will focus on providing the bulk purchaser, Mr. Sakkie Engelbrecht, with 34 tonnes every two weeks. This frequent, high demand will generate significant revenue for the business and also cut down on production costs. Mr. Engelbrecht will also promote the business by informing buyers where the Prosopis firewood comes from. The logo and description sold in firewood packages to tourism resorts, filling stations, and supermarkets describes the business and the benefits of purchasing the product. The description emphasizes that buying the Prosopis firewood helps develop sustainable livelihoods and that the product itself ignites quickly and burns hot.

COMPETITION

The main competitors for the Prosopis Firewood business are local farmers. The most common firewood sold by local farmers to their consumers is camelthorn and acacia. The main advantages that local farmers hold over the Prosopis Firewood business are transportation and pricing. Local farmers have the ability to deliver firewood to their consumers, while the Prosopis Firewood business is limited and does not have vehicles suitable for delivery. In addition, local farmers can offer lower prices per tonne, whereas the Prosopis Firewood business cannot compete because they need to sell a certain amount of wood to break even and be profitable. Although local farmers have these advantages over the Prosopis Firewood business, the employees are able to produce large amounts of wood, which enables to fulfill large demands, like Mr. Engelbrecht's 34 tonnes biweekly. With this ability to supply large demands, Prosopis Firewood can outcompete local farmers.

Although local consumers are not primary marketing targets for the Prosopis Firewood business, their suppliers should still be considered as competitors. In Gibeon, the local population has the ability to cut firewood for themselves, making it pointless to attempt selling within the community. However, selling to local consumers would be more feasible in Mariental, the administrative capital of the Hardap region and only 60 km from Gibeon. The major firewood suppliers in Mariental are supermarkets and service stations. SPAR is a Dutch multinational retail chain and franchise with thousands of stores worldwide. Currently there are SPAR supermarkets in Mariental and Keetmanshoop (a city located approximately 180 km from Gibeon). The main advantage SPAR has over the Prosopis Firewood business is that they have established themselves in the areas and sell camelthorn. Locals would feel more inclined to purchase this wood because it is common and more traditional. However, if marketed correctly, the Prosopis Firewood business has the potential sell Prosopis firewood to local consumers by persuading them to try something new and developing a reputation for themselves.

OPERATIONS

RESOURCE REQUIREMENTS

Prosopis Firewood has two major resource needs: storage and transportation.

Storage space is necessary for the wood itself as well as for harvesting and packaging equipment/supplies.

Harvested wood requires time to dry out before it can be packaged, and packaged wood needs a place where it can be stored before it is delivered. This needs to be a rather secure location to prevent theft of the wood, and also offer protection from the elements to keep wood dry.

Currently, the Gibeon Village Council has agreed to provide a business plot within Gibeon to Prosopis Firewood (free of charge) and has also discussed offering funding for fencing off the perimeter and erecting a shed or some type of storage facility on the premises. This location will also serve as the splitting and packaging location for the business.

Harvesting and packaging equipment/supplies need a safe place to be kept when they're not in use to prevent theft or personal use. The Gibeon Village Council owns an equipment shed and has agreed to allow Prosopis Firewood to store their materials in it.

Transportation is a crucial resource for Prosopis Firewood as many operations rely on it.

Employees and tools require daily transportation to and from harvesting sites (which can be located up to 10 km away from the main storage site); harvested wood needs transport from the field back to the storage site; packaged wood for orders may require delivery; acquiring additional fuel and material supplies necessitate a 60 km trip to Mariental (most likely on a weekly basis). The Gibeon Village Council has agreed to provide these transportation services to Prosopis Firewood because none of the employees have vehicles of their own. The Council will help with transportation free of charge while Prosopis Firewood continues to develop.

*For more details and information regarding these arrangements with the Gibeon Village Council see the GVC Contract in Supporting Documentation (to be added by Lucky upon completion).

DISTRIBUTION OF LABOR

Employees are divided into three different teams of ten with one elected manager for each group. These teams are intended to help manage and keep track of employees; all employees still work cooperatively with one another no matter what "team" they belong to. There is also an elected advisory assistance committee, made up of one other member from each team. This group of six individuals (two from each team) helps manage and direct the business, but every member is still responsible for sharing in the regular labor duties.

There are two major divisions of labor within Prosopis Firewood: harvesting and packaging.

Harvesting involves the collection of Prosopis wood, which is done with chainsaws, machetes, and bow saws in areas around the Fish river. The number of workers harvesting on any day fluctuates given weather conditions, previous production rates, and demand. The typical distribution consists of three 5-person harvesting teams in which two workers share chainsaw operating duties, and the three remaining workers clear away slash, clean off shoots and small branches, cut smaller branches to size, and stack correctly sized pieces. These roles are decided based on personal preference and physical ability - currently, only males operate the chain saws but females are welcome to perform this duty as well if they wish.

Packaging operations involve splitting dry harvested wood, putting split pieces into bags until they are at the correct weight, and securing the bags. The number of workers packaging on any day fluctuates given weather conditions, previous production rates, and demand. The typical distribution includes three 5-person teams in which each team has three workers use axes to split dried logs and the remaining two workers pack, weigh, and seal the split pieces in bags. The roles within these teams are chosen based on physical ability and preference.

*Employees are not solely on a harvesting or packaging team, but alternate between both to ensure that responsibilities are shared as evenly as possible. Furthermore, all employees are expected to help with wood loading/unloading and delivery duties as needed.

TRAINING

An initial harvesting and identification training given to 50 Gibeon community members was conducted by Mr. Sakkie Engelbrecht and his two technical assistants on the 4th to the 6th of November, 2014. Mr. Engelbrecht, who has been heavily involved with Prosopis harvesting on his farms in Leonardville, Namibia, taught the trainees how to identify and distinguish Prosopis trees from other indigenous species as well as proper precautionary measures and techniques for cutting Prosopis down. Mr. Engelbrecht is currently developing a technical training manual that will instruct Prosopis Firewood employees on proper harvesting methods. In the meantime, managers and other experienced workers who attend the initial training can teach newcomers. Chainsaw operators will require the most instruction to ensure the chainsaws are maintained. Most other employees need little training, mainly aimed at safety.

EQUIPMENT REQUIREMENTS

Prosopis Firewood has various equipment needs for harvesting and packaging purposes.

As permanent fixtures, the business currently owns:

- 3 light-weight chainsaws
- 8 bow saws
- 6 axes
- 10 machetes
- 1 trailer (for hauling wood)
- 1 scale
- 1 staple gun
- 1 large fuel container

These materials were all initially supplied by the DRFN; Prosopis Firewood will invest profits to purchase additional and better equipment as they continue on their own. The current tools are inefficient and make production difficult. It is important that they be properly operated and maintained carefully in order to extend their working lives. Business profits should first be used to purchase a more powerful chainsaw and more axes.

Beyond these tools, there are a variety of supplies that are needed on a regular basis, including:

- Staples
- Wire
- Plastic bags
- Fodder bags
- Paper logos
- Chains (for the chainsaws)
- Petrol/oil

Based on Mr. Engelbrecht's current demands, there is a need for 772 fodder bags and four 50-meter wire spools on a weekly basis. Petrol and oil are crucial for harvesting purposes - there is an estimated 125 liters of petrol and 45 liters of oil being used weekly. Plastic bags, staples, and paper logos will also be necessary if deals are made with tourism resorts.

ORGANIZATION

ROLES AND RESPONSIBILITIES

The Prosopis Firewood business is composed of 30 employees. Within the 30 employees there are three managers. The three managers and three other employees comprise the Advisor Management Committee. The 27 other employees are harvesters and packagers, and often rotate tasks. All of the employee roles and responsibilities are explained below:

MANAGERS

- Accept legal ownership of the Prosopis Firewood business
- Know the roles and responsibilities of all employees
- Ensure all employees follow the constitution and code of conduct
- Moderate disputes among all employees
- Actively encourage and motivate employees
- Have a positive attitude
- Supervise assigned harvesting and packaging teams
- Manage timesheets and inventory forms for employees
- Call in replacements for sick or missing employees
- Sign in and out of work daily
- Properly pre-mix fuel for chainsaws
- Wear appropriate clothing and safety gear
- Coordinate with the two other managers to:
 - Ensure weekly/monthly orders are recorded and paid for
 - Write weekly paychecks for employees
 - Rotate book-keeping responsibilities
 - Record daily amounts of wood harvested
 - Track and record wood drying times
 - Consult with the Equipment Manager provided by the Gibeon Village Council for updates on equipment upkeep and replacements
 - Purchase supplies (packaging materials, fuel, notebooks, etc.)
 - Maintain contact with clients to ensure satisfaction with purchases
 - Express concerns to the Advisor Management Committee and the Gibeon Village Council
 - Schedule monthly meetings with the CEO of the Gibeon Village Council
 - Complete monthly expense reports
 - Consult with and seek guidance from the accountant and the Human Resource representative provided by the Gibeon Village Council
 - Actively search for further markets to sell to

ADVISOR MANAGEMENT COMMITTEE (6 employees total - 3 elected regular employees and 3 managers)

- Express concerns of all employees to managers
- Schedule weekly meetings with managers to discuss any updates relating to the business
- Attend monthly meetings with managers and the Gibeon Village Council

HARVESTERS

- Follow the code of conduct
- Know the roles and responsibilities of all employees
- Actively encourage and motivate employees
- Have a positive attitude
- Wear appropriate clothing and safety gear
- Express altercations and disagreements among other employees to Managers and Advisor Management Committee
- Sign in and out of work daily
- Sign out all equipment used for the day to the Equipment Manager provided by the Gibeon Village Council
- Follow safety procedures when harvesting
- Cut wood to the appropriate size
- Treat harvesting equipment with care
- Notify a manager if equipment is damaged, missing, or stolen
- Notify a manager if a chainsaw needs to be refueled
- Only take one hour for lunch
- Practice honesty and integrity

PACKAGERS

- Follow the code of conduct
- Know the roles and responsibilities of all employees
- Actively encourage and motivate employees
- Have a positive attitude
- Wear appropriate clothing and safety gear
- Express altercations and disagreements among other employees to Managers and Advisor Management Committee
- Sign in and out of work daily
- Sign out all equipment used for the day to the Equipment Manager provided by the Gibeon Village Council
- Notify a manager if equipment is damaged, missing, or stolen
- Notify a manager if packaging supplies are low
- Properly weigh the wood

- Treat harvesting equipment with care
- Only take one hour for lunch
- Practice honesty and integrity

PAYMENT PLAN

All employees are expected to work Monday through Friday and will be paid accordingly. A full workday begins at 0800 and ends at 1700. At the end of the week, each employee will be paid \$N250.00. If an employee is absent for a full workday there will be a \$N50.00 reduction to their weekly paycheck. If an employee is only present for half of a full workday there will be \$N25.00 reduction to their weekly paycheck. Half of a workday consists of being present for exactly four hours during the entire eight-hour workday. There are no other exceptions. In addition, if an employee works for more than four hours but still works less than an entire eight hour workday, their weekly payment will still be reduced by \$N25.00, no exceptions.

WORK SCHEDULE

All weekdays are workdays for the exception of nationally recognized holidays.

Daily Work Schedule: Monday – Friday			
	Tasks		
Time	Managers	Harvesters	Packagers
0800-0830	- Fill out time sheets - Assign harvesting and packaging teams	-Fill out time sheets -Sign out necessary equipment	-Fill out time sheets -Sign out necessary equipment
0830-1300	-Appropriate harvesting and managing tasks	-Appropriate harvesting tasks	-Appropriate packaging tasks
1300-1400	LUNCH		
1400-1700	-Appropriate harvesting and managing tasks - Fill out time sheets	-Appropriate harvesting tasks - Fill out time sheets	-Appropriate packaging tasks - Fill out time sheets

INVESTORS

Investors are crucial for the sustainability of the Prosopis Firewood business. Not only would investors contribute to the development of sustainable livelihoods, but they would also contribute to the potential for the business to explore different markets that were otherwise unattainable without the necessary funds. Exploring different markets would promote the Prosopis Firewood business and generate additional revenue for both the employees and the investors.

POTENTIAL INVESTORS

1. Bank of Windhoek- Emerging Small and Medium Enterprises (ESME) Branch

The ESME branch of the Bank of Windhoek offers products, services, and support for developing small and medium-sized enterprises in Namibia:

- Term Loans
- Article and Vehicle Finance
- Property Finance
- Bridging Finance
- Co-operative Finance
- Letter of Credit/Letter of undertaking
- Letter of guarantee
- Investment accounts

The application process for funding from this institution includes submitting a detailed business plan that includes the following information: market analysis, marketing strategy, a budget with applicable pro forma invoices issued in favor of Bank of Windhoek Ltd, and financial projections for at least 12 months. For loans, the institution requires further documentation that can be found on their website: www.bankwindhoek.com.na

2. Small and Medium-sized Enterprises (SME) Bank

The Namibian government originally founded the SME Bank and they are now a fully-fledged Commercial Banking Institution. This bank provides special attention to developing SMEs. There are unique schemes that promote entrepreneurship across priority and growth sectors. Different capital opportunities and support that the SME Bank offers:

- Retail Banking, where the business can hold both a person and executive banking accounts.
- Cooperate Banking, where there are two account options that are available depending on annual turnover of the client
- Money Market Products

- Fixed Deposit
- Bankers Acceptances
- Foreign Exchange
- Promissory Notes

The SME Bank aims to help investors work with emerging businesses, while also providing the developing businesses with other resources and support. It is important for the Prosopis Firewood business to establish a banking system that would promote investor partnerships to make the funding process and transactions involved more professional, reliable, and efficient.

3. Institute for Management and Leadership Training (IMLT)

The IMLT is a training institution that was established in 1983 and is directed toward the commercial and agricultural sectors. The German Hanns Seidel Foundation is the IMLT's main donor who provides a fund for implementing the training and credit programs aimed at the SME sector. The IMLT provides the following support and services to SMEs:

- Specific training courses in business management
- The Revolving Credit Fund, a pilot scheme to supply loans to small enterprises in Namibia
- The IMLT/FNB Credit Guarantee Fund

The IMLT could be a great resource and potential investor in the Prosopis Firewood business as they not only provide funding, but management training as well. The IMLT has certain eligibility criteria that a business must meet before they extend their support. For more information the Prosopis Firewood business should contact the institution directly.

4. Development Fund of Namibia (DFN)

The DFN was established in 1987 and has several objectives, which are focused on stimulating Namibia's economy through supporting developing small business. The main support this institution offers is:

- Finance to economically viable projects
- Technical assistance and training in the identification, preparation, appraisal, implementation and management of development efforts

The DFN offers its support to businesses once the eligibility criteria is satisfied.

INVESTOR BENEFITS

Potential investors receive various benefits from the Prosopis Firewood Business:

- Return on investments once business is established
- Assist a developing community
- Promote environmental conservation
- Promote sustainable livelihood development

FINANCIAL ANALYSIS

This section presents cost and pricing considerations for the business. The values used for these projections are broad approximations and a more in-depth assessment should be done to more accurately determine optimal selling prices and employee wages.

Markets: **Bulk Purchaser** **Tourism** **Both**

Bulk Purchaser - Sakkie Engelbrecht: 20kg bags
$(1000 \text{ kg/tonne}) * (1 \text{ bag}/20\text{kg}) = \mathbf{50 \text{ bags/tonne}}$

Tourism Market - Lodges/Resorts: 5kg bags
$(1000\text{kg/tonne}) * (1 \text{ bag}/5\text{kg}) = \mathbf{200 \text{ bags/tonne}}$

*Average Production Rate: **7 tonnes/day** (according to Lucky's continued observations)

Harvesting:

Petrol

- Consumption of all three chainsaws - **25 L/day** (based on site visit observations and Lucky)
- Average cost - **N\$11/L** (high estimate based on observations and Lucky's

$$(30 \text{ L/day}) * (\text{N}\$11/\text{L}) / (7 \text{ tonnes/day}) = \mathbf{\text{N}\$47.14/\text{tonne}}$$

Oil

- Consumption of all three chainsaws - **9 L/day** (based on site visit observations and Lucky)
- Average cost - **N\$75/L**

$$(9\text{L/day}) * (\text{N}\$75/\text{L}) / (7 \text{ tonnes/day}) = \mathbf{\text{N}\$96.43/\text{tonne}}$$

$$\text{TOTAL} = (\text{N}\$47.14/\text{tonne}) + (\text{N}\$96.43/\text{tonne}) = \mathbf{\text{N}\$143.47/\text{tonne}}$$

Packaging:

Bags

- Fodder bags - **N\$2/bag** (price provided by Lucky)
- Plastic bags - **N\$4.80/bag** (price provided by Lucky)

$$(50 \text{ bags/tonne}) * (\text{N}\$2/\text{bag}) = \mathbf{\text{N}\$100/\text{tonne}}$$

$$(200 \text{ bags/tonne}) * (\text{N}\$4.80/\text{bag}) = \mathbf{\text{N}\$960/\text{tonne}}$$

Sealing

Wire

- Length necessary for closure - **0.5 m/bag** (estimated by Lucky)
- Cost of spool - **N\$35/50m** (price provided by Lucky)

$$(50 \text{ bags/tonne}) * (0.5 \text{ m/bag}) * (\text{N\$}35/50\text{m}) = \text{N\$}17.50/\text{tonne}$$

Staples

- Amount necessary for closure - **6 staples/ bag** (based on observations)
- Cost of package - **N\$130/500 staples** (price provided by Lucky)

$$(200 \text{ bags/tonne}) * (6 \text{ staples/bag}) * (\text{N\$}130/500 \text{ staples}) = \text{N\$}312/\text{tonne}$$

Branding

- Printing cost (black&white) - **N\$1/sheet** (price from printing shop in Mariental)
- Size - **2 logos/sheet** (based on Lucky's preference)

$$(200 \text{ bags/tonne}) * (\text{N\$}1/\text{sheet}) * (1 \text{ logo/bag}) / (2 \text{ logos/sheet}) = \text{N\$}100/\text{tonne}$$

Packaging Costs For Supplying Bulk Purchaser vs. Lodges/Resorts

	Sakkie Engelbrecht	Lodges/Resorts
	(N\$/tonne)	(N\$/tonne)
Bags	100	960
Sealing	17.50	312
Branding	NA	100
TOTAL	117.50	1372

Storage:

*Assumed to be provided by the GVC free of charge (based on Lucky's negotiations)

Transportation:

- Borrowed community member truck flat rate - **N\$200/day** (speculated option and amount)
- Truck fuel usage - **13 L/100km** (based on average for Toyota Land Cruiser pick-up trucks)
- Truck and trailer capacity - **1 tonne** of harvested or packaged firewood (estimated by Lucky)
- GVC vehicle - **free or N\$385/hr** (based on Lucky's conversations with the GVC)
- Average distance of roundtrip from storage to harvesting site - **8 km** (estimated by Lucky)
- Number of roundtrips required - **8/day** (estimated by Lucky)

Scenario 1- GVC provides vehicle free of charge

= **N\$0/tonne**

Scenario 2 - GVC charges hourly rate for vehicle

$((8 \text{ hrs/day}) * (\text{N}\$385/\text{hr})) / (7 \text{ tonnes/day}) = \text{N}\$440/\text{tonne}$

Scenario 3 - Community member charges flat rate fee for use of personal vehicle (plus fuel)

$((8 \text{ trips/day}) * (8\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L}) * (1 \text{ tonne/trip}) + (\text{N}\$200/\text{day})) / (7 \text{ tonnes/day}) = \text{N}\$41.65/\text{tonne}$

Delivery:

- Borrowed Community Member Truck - **N\$200/day** (speculated option and amount)
- Truck Fuel Usage - **13 L/100km** (based on average for Toyota Land Cruiser pick-up trucks)
- Truck and Trailer capacity - **1 tonne** of harvested or packaged firewood (estimated by Lucky)
- Rental Truck - **N\$800/day** (price estimate for generic full-size pickup truck in Windhoek)
- Roundtrip to Lodge/Resort: **400 km** (average of 3 NWR sites and the Africa Safari Lodge)

Scenario 1- GVC provides vehicle free of charge (only pay for fuel)

$((400\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L})) / (1 \text{ tonne/trip}) = \text{N}\$572/\text{tonne}$

Scenario 2- Community member flat fee for use of personal vehicles (plus fuel)

$((\text{N}\$200/\text{day}) / (1 \text{ trip/day}) / (1 \text{ tonne/trip})) + ((400\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L})) / (1 \text{ tonne/trip}) = \text{N}\$772/\text{tonne}$

Scenario 3- Rental truck from Mariental

$((\text{N}\$800/\text{day}) / (1 \text{ trip/day}) / (1 \text{ tonne/trip})) + ((400\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L})) / (1 \text{ tonne/trip}) = \text{N}\$1372/\text{tonne}$

Scenario 4- Sakkie Engelbrecht picks up his own wood

= **N\$0/tonne**

Fixed/Overhead Costs:

Social Security

- Fee - **N\$8/month per employee** (according to Lucky)
(N\$8/month)*(30 employees) = **N\$240/month**

Harvesting Permit

- Fee - **N\$20/month**

Finances/Accounting

*Assumed to be provided by the GVC free of charge (based on Lucky's negotiations)

Selling Price and Wage Calculations

*Not accounting for fixed costs

Lowest Cost Scenarios with Sakkie Engelbrecht's Demand and Offer:

Profit (N\$900/tonne) - Total Production Expenses (N\$261.50/tonne) = **N\$638.50/tonne**

(N\$638.50/tonne) / (30 employees) = **N\$21.28/tonne/employee**

(17 tonnes/week)*(N\$21.28/tonne/employee) = **N\$361.81/week/employee**

(7 tonnes/day)(5 days/week) / (17 tonnes/week) = **2.1 days**

Highest Cost Scenarios with Tourism Market:

Total Production Expenses (N\$3184/tonne) / # of 5 kg Bags (200 bags/tonne) = **N\$15.92/bag**

(break-even selling price)

(N\$20/bag)*(200 bags/tonne) = **N\$4000/tonne** (selling price)

Selling Price (N\$4000/tonne) - Total Production Expenses (N\$3184/tonne) = **N\$816/tonne** (net profit)

(N\$816/tonne) / (30 employees) = **N\$27.20/tonne/employee**

SUPPORTING DOCUMENTATION

OVERVIEW OF SME BANK LOAN OPPORTUNITIES

(To be explored in case Prosopis Firewood business does not have enough funding to get through startup costs)

- a. Products and services
 - i. Working capital for the purchase of raw materials and overheads and pre-operating costs.
 - ii. Revolving working capital loan gives you a line of credit which can be paid off over one to five years. Once you have repaid 25% of the loan, you can withdraw funds up to the original limit, without affecting your monthly repayments.
 - iii. Term Loans/Leasing/Hire Purchase for Asset Acquisition (factory, building, furniture/fittings, computers, machinery & equipment and vehicles).
 - iv. Bank Guarantees/Letter of Credit/Trade Finance a flexible financing solutions to assist SMEs comply with tender requirements and access to funding after the Tender process.
 - v. Start-up funding for starting up a new business venture or diversifying your business.
- b. Special features
 - i. Mentorship and advisory service
 - ii. Easy to apply
 - iii. Flexible Loan options
 - iv. Dedicated Relationship Manager to cater to your business needs
- c. Requirements
 - i. Namibian ID/ Valid passport of shareholders, directors or sole owner
 - ii. Business documents
 - iii. Proof of business registration
 - iv. Founding statement

How to fill out template (see above):

- i.** Start each new template on a new line
- ii.** Record date of transaction so that all managers know when transaction occurred and transaction can be tracked later
- iii.** Mark an “x” under “Withdrawal” or “Deposit” to indicate which type of transaction took place
- iv.** Describe what the transaction was (ex: Employee Salaries, Bought new Chainsaw, Payment from Sakkie for 34 tons of firewood, etc.)
- v.** Describe who was involved in transaction (ex: business and hardware store in Mariental, business and GVC)
- vi.** Mark an “x” under “Cash,” “Check,” or “Direct Deposit” to indicate how transaction was made
- vii.** Record how much money was involved in transaction. (+) indicates that money was added to bank account and (-) indicates that money was taken from bank account
- viii.** Add or subtract amount from **vii.** to determine how much money is remaining in account.

*Check your financial records with the bank monthly to ensure that amounts are the same.

PURCHASING CONTRACT

Record what is being purchased for business:

- Keep track of business expenses and their frequency
- Track who purchases items for business
- Appropriately reimburse employees for spending personal money on business items
- Ensure that managers approve of what is being purchased

Purchasing Contract – Prosopis Harvesting Group

Name: i.	ID NO: i.
Date: i.	

Item(s) to be Purchased	Amount Requested (N\$)	Anticipated Date of Purchase
ii.	ii.	iii.
Total	ii.	

Signature

Team member: v.	Managers: vi.
Comments: vii.	

How to fill out template (see above):

- i.** Employee who is purchasing item fills out Name, ID, and Date of request
- ii.** Employee who is purchasing item lists what they are purchasing and how much they would like to request for the purchase. Use a new line for each proposed item. Total amount to be spent at bottom of form.
- iii.** Employee who is purchasing item identifies when they intend to make purchases
- iv.** Employee who is purchasing item and managers discuss purchases to check that prices are appropriate and items are necessary
- v.** Employee who is purchasing item fills signs off on contract, acknowledging agreement
- vi.** All managers sign off on contract, acknowledging agreement
- vii.** Any additional comments written

PROOF OF PURCHASE

Document what was purchased

- Remember who needs to be reimbursed for their purchase
- Collect receipts for what was purchased
- Ensure that employees are only using company money to purchase company items

Proof of Purchase – Prosopis Firewood Business

i. **ATTACH RECEIPT(S) FROM PURCHASES TO THIS FORM**

Name: ii.	ID NO: ii.
Date: ii.	

Item Purchased	Amount Spent (\$)	Date of Request	Date of Purchase
iii.	iii.	iv.	iv.
Total	iii.		

Signature

Team member: vi.	Managers: vii.
Comments: viii.	

How to fill out template (see above)

- i. ATTACH ALL PURCHASING RECEIPTS TO FORM OR DO NOT EXPECT A REIMBURSEMENT
- ii. Employee who purchased item fills out Name, ID, and Date
- iii. Employee who is purchasing item lists what they purchased and how much they actually spent on purchase. Use a new line for each proposed item. Total amount actually spent at bottom of form.
- iv. Employee who is purchasing item identifies when they requested funds and when they purchased the items
- v. Employee who purchased items and managers discuss check over purchases so that item is accounted for
- vi. Employee who is purchasing item fills signs off on contract, acknowledging that item is property of Prosopis Firewood business
- vii. All managers sign off on contract, acknowledging that item is property of Prosopis Firewood business and that employee will be reimbursed
- viii. Any additional comments written

TIMESHEETS

Weekly Time Sheet – Prosopis Harvesting Group

Name:	ID NO:
Job title:	
Dates:	

Task Description	Time Started	Time Stopped	Signature	Total Time
			Total	

Signature:

Team member	DRFN-IUCN
Manager	Comments:

PRODUCT SHEET

Manager Name:		ID NO:							
Date:									
Number of Employees Present for Full Day:		<table border="1"> <tr> <td>Total Number of 20 kg bags Packaged:</td> <td></td> </tr> <tr> <td>Total Number of 5 kg bags Packaged:</td> <td></td> </tr> <tr> <td>Total Trailers of Wood Harvested:</td> <td></td> </tr> </table>		Total Number of 20 kg bags Packaged:		Total Number of 5 kg bags Packaged:		Total Trailers of Wood Harvested:	
Total Number of 20 kg bags Packaged:									
Total Number of 5 kg bags Packaged:									
Total Trailers of Wood Harvested:									
Number of Employees Present for Half Day:									
Number of Employees Absent:									
Number of Employees Packaging:									
Number of Employees Harvesting:									

<p>Were there any problems in the Packaging Area? (broken tools, not enough dry wood, ran out of bags/logos/wire/staples, etc.)</p> <p>YES NO</p> <p>If YES, explain:</p>
<p>Were there any problems in the Harvesting Area? (broken tools, not enough fuel, etc.)</p> <p>YES NO</p> <p>If YES, explain:</p>

Signature

Manager:
Additional Comments:

Prosopis Firewood



Prosopis Firewood cc
P.O. Box 20232, Windhoek, Namibia
Contact: 061- 377 500

Firewood from an Invasive Tree in the Gibeon Community
Burns Hot and Ignites Quickly
Supports Sustainable Livelihoods

INFORMATION ON CLOSE CORPORATION REGISTRATION

- Business medium somewhere between a company and a partnership, designed to enhance the small business and promote the philosophy of free enterprise
- Founded by means of a founding statement and cannot exceed 10 members who own and manage the CC. Their interest in the CC must always add up to 100% and be expressed as a percentage
- Must be profit making in its intentions
- Provides the members with limited liability, but personal guarantees may negate a certain amount of this
- Legal entity on its own
- A Company cannot become a member, as ownership is limited to natural persons.
- Governed by the Close Corporations Act No. 26 of 1988.
- Dividends can only be paid if the close corporation is both liquid and solvent (dividends can only be paid if after they have paid, assets exceed liabilities and the business can still pay debts when they fall due).

Differences Between Companies and Close Corporation

COMPANIES	CLOSE CORPORATIONS
Return required at specific intervals	No returns required
Compulsory meetings as prescribed by Act. First annual general meeting must be held within eighteen months of incorporation.	No compulsory meetings (members may meet on ad-hoc basis)
Management rests mainly with directors	All members may take part in management
Close corporation may be a shareholder in a company	Company may not be a member of a close corporation
Audit of annual financial statements required	No audit required

The close corporation is a much more simplified legal form than the company and is specifically aimed at the small business.

Procedures and requirements for registration of a Close Corporation

- CC form can be purchased at most stationery stores dealing with statutory documentation.
- Complete the “Application for Reservation of Name or Translated Form or Shortened Form” (CC8). This must be submitted in duplicate to The Registrar of Companies and Close Corporations, PO Box 21214, Windhoek, Tel (061) 2837111. A Revenue stamp of N\$50 is required and is obtainable at any post office or at the Receiver of Revenue. A separate CC8 form is submitted for every other name together with a N\$50 revenue

stamp for each application. The current processing time is between 5 to 10 working days in order for you to be informed of the outcome of your application.

- Once you receive confirmation, submit the “Founding Statement” (CC1), in triplicate to the Registrar. All members must sign the founding statement. You are also required to submit a letter of consent from your accounting officer and a copy of your (CC8). A Revenue stamp of N\$100 is required and is obtainable at any post office. You can start your business after you receive your Registered Founding Statement. The name of the corporation must be followed by the abbreviation CC and all members’ names must be printed at the bottom of letterheads (and nationalities if not South African).
- A close corporation does not need to have an association agreement, but is recommended as it binds members and regulates the internal relationships between members. It lays down the voting powers, payments (dividends), members’ rights and duties, meetings, remuneration, benefits, obligations and the extent to which the CC will indemnify members from expenditure incurred for or on its behalf.
- The accounting officer is required to submit reliable annual financial records, which agree with the accounting records.
- Once the CC has been formed the Receiver of Revenue will ask for the name of your public officer, whose duty is to submit the annual tax returns to the Receiver.
- If you need to amend details of the founding statement then you will need to submit (CC2), in triplicate to the Registrar. A Revenue stamp of N\$30 (obtainable at any post office or at the Receiver of Revenue) is required when there are any changes to details in part A of the CC2 form. Always complete the form in full, even though the rest of the information is unchanged.
- If you need to amend the accounting officer then you will need to submit (CC2), in triplicate to the Registrar without a revenue stamp.
- If you would like to convert your company to a CC you will need to submit (CC4), in duplicate to the Registrar without a revenue stamp, together with all the other forms needed for registration.
- If you would like to de-register your CC you will need to submit a letter to the Registrar, informing the Registrar that the CC has ceased to carry on business and that they should take the necessary steps.
- If you would like to restore your CC you will need to submit (CC3), in duplicate to the Registrar with a Revenue stamp of N\$150. Restoration could take 3 months. (Sometimes it is better and quicker to form a new CC).
- If you would like to change the financial year end of the CC you will need to submit (CC9) with a revenue stamp of N\$40.00 plus half the annual duty if you wish to extend the period.
- Form CC7 (annual return) with a N\$80.00 revenue stamp must be submitted to the Registrar within one month after the end of the financial year.

For the incorporation of a close corporation, the following documents have to be lodged:

DOCUMENT	PURPOSE	FEES
CC8	Reservation of name	N\$50,00
CC1 (in triplicate)	Founding statement	N\$100,00
Letter by accounting officer	Consent of person named as accounting officer of close corporation to act as such*	

APPENDIX H – PROSOPIS BUSINESS SWOT MARKET ANALYSIS

Strengths		Weaknesses	
Bulk Purchaser	Resorts	Bulk Purchaser	Resorts
<ul style="list-style-type: none"> • transportation provided • high demand • frequent purchase intervals • cheap packaging preferences • already established contact with Prosopis Firewood 	<ul style="list-style-type: none"> • negotiable pricing • supportive of community development enterprises • separate entities • easy to meet demand 	<ul style="list-style-type: none"> • low price paid per tonne • increased equipment maintenance • not easily accessible 	<ul style="list-style-type: none"> • require delivery • only will deal with legally registered business • expensive packaging requirements • sporadic demand
Opportunities		Threats	
Bulk Purchaser	Resorts	Bulk Purchaser	Resorts
<ul style="list-style-type: none"> • potential for greater profits with increased production (he will pay for more wood if they can harvest it at a faster rate) • can give advice to improve harvesting method 	<ul style="list-style-type: none"> • spread of business name and reputation • ability to expand market reach • better advertisement 	<ul style="list-style-type: none"> • fines enforced if late on meeting demand • causes heavy reliance on single consumer • contact only maintained through Lucky 	<ul style="list-style-type: none"> • requires involvement of many facilities for Prosopis Firewood to make reasonable profit • requires many interactions with consumers • may require electronic banking capabilities

APPENDIX I– ASSUMPTIONS FOR DETERMINING BUSINESS AND MARKETING COSTS

Markets: **Bulk Purchaser** **Tourism** **Both**

Bulk Purchaser - Sakkie Engelbrecht: 20kg bags
(1000 kg/tonne)*(1 bag/20kg) = 50 bags/tonne

Tourism Market - Lodges/Resorts: 5kg bags
(1000kg/tonne)*(1 bag/5kg) = 200 bags/tonne

*Average Production Rate: **7 tonnes/day** (according to Lucky's continued observations)

Harvesting:

<p><u>Petrol</u></p> <ul style="list-style-type: none"> Consumption of all three chainsaws - 25 L/day (based on site visit observations and Lucky) Average cost - N\$11/L (high estimate based on observations and Lucky's) <p>(30 L/day)*(N\$11/L)/(7 tonnes/day) = N\$47.14/tonne</p>
<p><u>Oil</u></p> <ul style="list-style-type: none"> Consumption of all three chainsaws - 9 L/day (based on site visit observations and Lucky) Average cost - N\$75/L <p>(9L/day)*(N\$75/L)/(7 tonnes/day) = N\$96.43/tonne</p> <p>TOTAL = (N\$47.14/tonne) + (N\$96.43/tonne) = N\$143.47/tonne</p>

Packaging:

<p><u>Bags</u></p> <ul style="list-style-type: none"> Fodder bags - N\$2/bag (price provided by Lucky) (50 bags/tonne)*(N\$2/bag) = N\$100/tonne Plastic bags - N\$4.80/bag (price provided by Lucky) (200 bags/tonne)*(N\$4.80/bag) = N\$960/tonne

Sealing

Wire

- Length necessary for closure - **0.5 m/bag** (estimated by Lucky)
- Cost of spool - **N\$35/50m** (price provided by Lucky)

$$(50 \text{ bags/tonne}) * (0.5 \text{ m/bag}) * (\text{N\$}35/50\text{m}) = \text{N\$}17.50/\text{tonne}$$

Staples

- Amount necessary for closure - **6 staples/ bag** (based on observations)
- Cost of package - **N\$130/500 staples** (price provided by Lucky)

$$(200 \text{ bags/tonne}) * (6 \text{ staples/bag}) * (\text{N\$}130/500 \text{ staples}) = \text{N\$}312/\text{tonne}$$

Branding

- Printing cost (black&white) - **N\$1/sheet** (price from printing shop in Mariental)
- Size - **2 logos/sheet** (based on Lucky's preference)

$$(200 \text{ bags/tonne}) * (\text{N\$}1/\text{sheet}) * (1 \text{ logo/bag}) / (2 \text{ logos/sheet}) = \text{N\$}100/\text{tonne}$$

Packaging Costs For Supplying Bulk Purchaser vs. Lodges/Resorts

	Sakkie Engelbrecht	Lodges/Resorts
	(N\$/tonne)	(N\$/tonne)
Bags	100	960
Sealing	17.50	312
Branding	NA	100
TOTAL	117.50	1372

Storage:

*Assumed to be provided by the GVC free of charge(based on Lucky's negotiations)

Transportation:

- Borrowed community member truck flat rate - **N\$200/day** (speculated option and amount)
- Truck fuel usage - **13 L/100km** (based on average for Toyota Land Cruiser pick-up trucks)
- Truck and trailer capacity - **1 tonne** of harvested or packaged firewood (estimated by Lucky)
- GVC vehicle - **free or N\$385/hr** (based on Lucky's conversations with the GVC)
- Average distance of roundtrip from storage to harvesting site - **8 km** (estimated by Lucky)
- Number of roundtrips required - **8/day** (estimated by Lucky)

Scenario 1- GVC provides vehicle free of charge

= **N\$0/tonne**

Scenario 2 - GVC charges hourly rate for vehicle

$((8 \text{ hrs/day}) * (\text{N}\$385/\text{hr})) / (7 \text{ tonnes/day}) = \text{N}\$440/\text{tonne}$

Scenario 3 - Community member charges flat rate fee for use of personal vehicle (plus fuel)

$((8 \text{ trips/day}) * (8\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L}) * (1 \text{ tonne/trip}) + (\text{N}\$200/\text{day})) / (7 \text{ tonnes/day})$
= **N\$41.65/tonne**

Delivery:

- Borrowed Community Member Truck - **N\$200/day** (speculated option and amount)
- Truck Fuel Usage - **13 L/100km** (based on average for Toyota Land Cruiser pick-up trucks)
- Truck and Trailer capacity - **1 tonne** of harvested or packaged firewood (estimated by Lucky)
- Rental Truck - **N\$800/day** (price estimate for generic full-size pickup truck in Windhoek)
- Roundtrip to Lodge/Resort: **400 km** (average of 3 NWR sites and the Africa Safari Lodge)

Scenario 1- GVC provides vehicle free of charge (only pay for fuel)

$((400\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L})) / (1 \text{ tonne/trip}) = \text{N}\$572/\text{tonne}$

Scenario 2- Community member flat fee for use of personal vehicles (plus fuel)

$((\text{N}\$200/\text{day}) / (1 \text{ trip/day}) / (1 \text{ tonne/trip})) + ((400\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L})) / (1 \text{ tonne/trip})$
= **N\$772/tonne**

Scenario 3- Rental truck from Mariental

$((\text{N}\$800/\text{day}) / (1 \text{ trip/day}) / (1 \text{ tonne/trip})) + ((400\text{km/trip}) * (13\text{L}/100\text{km}) * (\text{N}\$11/\text{L})) / (1 \text{ tonne/trip})$
= **N\$1372/tonne**

Scenario 4- Sakkie Engelbrecht picks up his own wood

= **N\$0/tonne**

Fixed/Overhead Costs:

Social Security

- Fee - **N\$8/month per employee** (according to Lucky)
 $(\text{N}\$8/\text{month}) * (30 \text{ employees}) = \text{N}\$240/\text{month}$

Harvesting Permit

- Fee - N\$20/month

Finances/Accounting

*Assumed to be provided by the GVC free of charge (based on Lucky's negotiations)

Selling Price and Wage Calculations

*Not accounting for fixed costs

Lowest Cost Scenarios with Sakkie Engelbrecht's Demand and Offer:

Profit (N\$900/tonne) - Total Production Expenses (N\$261.50/tonne) = **N\$638.50/tonne**

(N\$638.50/tonne) / (30 employees) = **N\$21.28/tonne/employee**

(17 tonnes/week)*(N\$21.28/tonne/employee) = **N\$361.81/week/employee**

(7 tonnes/day)(5 days/week) / (17 tonnes/week) = **2.1 days**

Highest Cost Scenarios with Tourism Market:

Total Production Expenses (N\$3184/tonne) / # of 5 kg Bags (200 bags/tonne) = **N\$15.92/bag**
(break-even selling price)

(N\$20/bag)*(200 bags/tonne) = **N\$4000/tonne** (selling price)

Selling Price (N\$4000/tonne) - Total Production Expenses (N\$3184/tonne) = **N\$816/tonne** (net profit)

(N\$816/tonne) / (30 employees) = **N\$27.20/tonne/employee**

APPENDIX J– LIVELIHOOD CRITERIA SURVEY

Annual Business Assessment: Prosopis Firewood	
Questions	Response
How many employees does Prosopis Firewood currently employ?	
How many of the original employees are still working for Prosopis Firewood?	
How many of the employees have left the business to seek other employment?	
How many of those formers employees are currently employed elsewhere?	
Can the business employee more community members? If so, how many?	
How many employees consistently show up to work every day?	
Have the employees' wages increased? If so, by what amount?	

Annual Livelihood Assessment: Prosopis Firewood Employees	
Questions	Response
Is working for Prosopis Firewood your permanent occupation?	
How long have you been an employee for Prosopis Firewood?	
What was your main source of income prior to working for Prosopis Firewood?	
What new skills have you gained since becoming an employee for Prosopis Firewood?	
What in your life has improved since you became an employee for Prosopis Firewood?	
Do you save money from your paychecks? If so, what are these savings for?	
How much of your paycheck goes toward purchasing food for your household?	
How much of your paycheck goes toward paying water and electricity bills?	
How much of your paycheck goes toward paying for clothes and shoes for you and your household?	
How much of your paycheck goes toward education for either you or your family?	
Are you happy you became an employee for Prosopis Firewood?	
Do you feel that since working for Prosopis Firewood, you and your households' quality of life has improved?	