



*Empowered lives.
Resilient nations.*



FINAL REPORT

IDENTIFICATION OF POSSIBLE COMMUNITY ENTERPRISES FOR RAPPELSPAN AND STRUIZENDAM

**PROJECT: DESIGN AND BUILD OF GROUNDWATER
DESALINATION PLANTS IN RAPPELSPAN AND
STRUIZENDAM, IN THE KGALAGADI SOUTH DISTRICT IN
BOTSWANA**

May 2021

Submitting Company



Lead Partner

PARTNERSHIP

P.O. Box 405146 Gaborone, Botswana
Tel: +267 73230036
Fax: +267 311 3151
Email: info@indispensableengineering.co.bw



Technical Partner

Contents

List of Figures	4
List of Tables	4
List of Abbreviations	4
1. Introduction	5
1.1 Background	5
1.2 Description of the project area	5
2. Methodology and Approach	6
2.1 Consultations	6
2.2 Literature Review	7
2.3 Identification of Livelihood Options and Possible Enterprises	8
3. Livelihood activities in the project area	8
4. Community Engagements	11
4.1 Focus Group Discussions	11
4.2 Key Informant Interviews	12
5. SWOT Analysis of the Identified Enterprise Development Options	13
5.1 SWOT Analysis of the Prioritised Enterprise Options	13
6. Recommended Possible Community Livelihood Options for Enterprise Development	16
6.1 Agricultural Production	17
6.1.1 Smallstock Production	18
6.1.2 Horticulture	19
6.1.3 Fodder Production	22
6.1.4 Salt Processing	23
6.2 Funding and other support options	24
7. Appendices	25
Appendix 1: Attendance list for Rappelspan Community Meeting (25/11/2020)	25
Appendix 2: Attendance list for Struizendam Community Meeting (24/11/2020)	Error! Bookmark not defined.

List of Figures

Figure 1: Community gathered for consultations in Struizendam(L) and Rappelspan (R) 12

List of Tables

Table 1: Livestock numbers in the study area 9
Table 2: Identified possible options for community enterprises 11
Table 3: Advantages and disadvantages of hydroponics system 20

List of Abbreviations

BMC	Botswana Meat Commission
BORAVAST	Bokspits Rappelspan Vaalhoek and Struizendam
BTO	Botswana Tourism Organisation
CEDA	Citizen Entrepreneurial Development Agency
CSA	Climate Smart Agriculture
DDP	District Development Plan
FGDs	Focused Group Discussions
ISPAAD	Integrated Support Programme for Arable Agriculture Development
IVP	Integrated Vegetation Project
KCAMP	Kgalagadi Communal Area Management Plans
LEA	Local Enterprise Authority
LIMID	Livestock Management and Infrastructure Development
NAMPAAD	National Master Plan for Arable Agriculture and Dairy Farming
NDB	National Development Bank
NDP	National Development Plan
NGO	Non-Governmental Organisation
PA	Participatory Approach
ORASECOM	Orange-Senqu River Commission
SDGs	Sustainable Development Goals
SWOT	Strengths, Weaknesses, Opportunities and Threats

1. Introduction

1.1 Background

The Orange-Senqu River Agreement signed by the Governments of the four Riparian states (Botswana, Lesotho, Namibia, and South Africa) established the Orange-Senqu River Commission (ORASECOM) to advise the state parties on matters relating to the Development, Sustainable utilisation, and Conservation of the water resources in the Orange-Senqu River System. ORASECOM Secretariat contracted Indispensable ENGINEERING (*formerly Bitte GROUP*)- Arisu Projects GmbH Partnership to Design and Build Groundwater Desalination Plants in Rappelspan and Struizendam, in the southern Kgalagadi District -Botswana. The two desalination plants are aimed at assisting the communities of Rappelspan and Struizendam by treating brackish/saline groundwater that will be used for watering their livestock and to augment domestic water use, where necessary.

As part of the project implementation, one of the requirements is to identify possible livelihoods options that the communities in the two villages can engage in to enhance and diversify their income streams upon operation of the desalination plants, beyond the support of the UNDP- GEF project.

This report therefore presents livelihood options, identified through participatory engagements in Rappelspan and Struizendam. Community, or voluntary focus group discussions (FGDs) were facilitated to enable communities to participate at a range of levels. In addition, one- on-one sessions were also held with officials from Government Departments, Parastatals, and the Private sector to inform the selection of and feasibility of the proposed enterprises for the two communities.

1.2 Description of the project area

The area is located right in the south-western corner of Botswana and forms part of the Bokspits, Rappelspan, Vaalhoek and Struizendam (BORAVAST) cluster. The settlements are small, with population recorded at 404 and 510 for Rappelspan and Struizendam respectively, constituting about 3% of the total population in Kgalagadi South (Statistics Botswana, 2011).

The area is remote (over 700 km from Gaborone) and has poor infrastructure. The settlements have basic amenities such as Kgotla, health post, primary school, and shops.

In terms of economic activity, pastoral agriculture represents the main source of livelihood for the inhabitants, and cattle represent an important source of status and well-being for most communities in the project area.

2. Methodology and Approach

The approach to the study was largely qualitative, which is concerned with subjective assessment of opinions that can be gathered in a number of ways. Moreover, this qualitative approach and analysis focused on the consultants' insights and impressions. Taking cognisance of this approach, the information generated from the study is therefore highly qualitative. Generally, the techniques of focus group discussions, key informant in-depth interviews (physical and telephonically), document review and mass observations were utilised in this study. Further, after data and information were gathered through the above-mentioned techniques, a rigorous analysis of strengths, weaknesses, opportunities and threats (SWOT) was undertaken, in light of the selected or preferred enterprise development options as identified by the stakeholders.

2.1 Consultations

Community engagements were planned and designed to ensure a participatory approach towards identification of possible community enterprises. With that in mind, community or voluntary groups were facilitated to participate at a range of levels. The consultations specifically:

- Ensured the project responds to local needs,
- Understand the local context, and
- Prioritised and reached consensus.

A Participatory Approach (PA) during the community consultations was applied to identify the current livelihood activities as well as the possible community enterprises that could be explored in both Rappelspan and Struizendam for sustainable utilisation of the treated water

from the desalination plants. This is to ensure that the communities benefit further from the desalination plants, beyond provision of water for subsistence livestock and augmenting potable water. The participatory approach was undertaken in the form of focus group discussions (FGDs). The approach also ensured that all community members present during the meetings, had a fair chance to freely contribute to the discussions pertaining to the identification of possible community livelihood options and potential enterprises. Further, in prioritising the possible community enterprises, a ranking approach was used after the communities came up with the preferred options.

In addition to community engagements, key informant interviews were conducted with officials from Government entities, Non-Government Organisations (NGOs), Parastatals, village leadership (chiefs and Village Development Committee), commercial banks as well as members of the local community-based organisation-BORAVAST trust, which the two villages form part of. The entities' selection was based on their involvement and interest in community livelihoods and development issues as well as enterprise development and support. These engagements were also meant to provide more insight into the project sites.

2.2 Literature Review

A desk-top review of relevant studies as well as local and national planning documents was undertaken to provide an overview of the district and the project sites as well as to identify current and planned development initiatives for local economic growth. The document review covered the following, among others:

- National Development Plan (NDP 11) and its midterm review of 2020;
- Kgalagadi District Development Plan (DDP 8);
- Local plans (for example, Kgalagadi Communal Area Management Plan);
- Integrated Support Programme for Arable Agriculture Development (ISPAAD);
- Livestock Management and Infrastructure Development (LIMID) programmes; and
- Other research studies.

The literature analysis is not provided separately in this case, but rather the findings are integrated in the rest of the report, to provide more substance to the analysis.

2.3 Identification of Livelihood Options and Possible Enterprises

From the consultations and literature review, the results were subjected to a SWOT analysis to determine the strengths and weaknesses of the identified options as well as the opportunities and threats to these options to thrive. The SWOT framework also helped prioritise the options that the communities could explore to enhance the local economies for the two villages. It should be noted that a number of options were identified from the consultations and literature review, but these had to be sieved and taken off the list because the desalination plants under consideration will only produce a limited amount of water. For instance, fish farming is undesirable as it requires substantial volumes of water. Additionally, the project area is highly arid with excessive hot conditions and as such, water is prone to high evaporation which will not be feasible for fish farming to thrive.

3. Livelihood activities in the project area

As per DDP 8, the district is among the hardest hit in-terms of poverty levels largely due to limited employment opportunities and insufficient sustainable livelihood options. As indicated, livelihoods options in the sub-district traditionally combined pastoralism (commercial and subsistence) and hunting and gathering with limited dryland farming. The main reason for the limited crop ploughing is that the district has low rainfall and poor soils, hence is not suitable for arable agricultural activities (Madzwamuze et al, 2007). Contemporary livelihood strategies combine Government drought relief projects, social welfare programmes such as Ipelegeng, livestock rearing and collection of veld products.

Plant resources contribute to the livelihoods of the local communities on a seasonal basis and especially in times of good rains. According to literature, during droughts, the local communities, as in many parts of the district, regard livestock and wildlife utilisation to be more important as there is diminished nutrition in plants as well as limited availability of these resources.

The main source of wealth in the area is subsistence and limited commercial smallstock production with limited cattle farming for meat production and consumption (See Table 1). Food, domestic supplies and production inputs to the district are supplied from as far as Lobatse, Gaborone and Jwaneng. Resources and supplies from Tsabong (the nearest developed village, 280kilometres away) are inadequate and in some instances, quite basic. Cattle /small stock is sold to the locals, intermediaries as well as other producers in the nearby areas (Ministry of Local Government and Rural Development, 2017). A few individuals are able to sell their produce to the BMC in Lobatse. However, the local farmers decry low prices charged by local middle-men and distributors who in-turn sell at higher prices in urban centres and other areas outside of the district. As such, access to local and readily available market is a notable challenge for the producers. According to data from the Ministry of Agriculture and Food Security office in Tsabong, the estimated population of livestock for both villages is about 9,574 with sheep taking the largest proportion (about 40%; Table 1). Therefore, small stock forms an important livestock resource (and agricultural activity) in the area that could potentially be utilised to further enhance the livelihoods of the local population.

Table 1: Livestock numbers in the study area

Village	Cattle	Sheep	Goats	Donkeys	Horses	Total
Rappelspan	1,566	165	66	25	18	1,840
Struizendam	1,768	3,654	1,932	190	190	7,734
Total	3,334	3,819	1,998	215	208	9,574

Source: Ministry of Agriculture and Food Security (Tsabong) records

According to the mid-term review of NDP 11, it is noted that to improve the smallstock industry, the Lobu Small-stock Farm north of Middlepits has been resuscitated. If optimally utilised by the communities around the project area, it can serve as a good motivator for enhanced and sustainable small stock production in the two villages. The farm is expected to support the production of improved, quality small-stock breeds in the Kgalagadi District, and subsequently in the entire country.

In the past, through the CBNRM programme under the Indigenous Vegetation Project (IVP; 2006), there were a number of initiatives that were initiated and implemented as a way of

enhancing livelihood security and natural resource management in the BORAVAST villages. Among these, included hoodia cultivation, agro-forestry/horticulture project, bee keeping and sand dune stabilisation among others (Buzwani, et. al., 2007). Interestingly, on the horticulture aspect, the project was located in Struizendam, where a community borehole was acquired from the Council and equipped through the IVP programme. The project mainly produced spinach and tomatoes. Further, selected individuals underwent training in horticulture production and ultimately worked on the project on voluntary basis. From the production, the harvest was sold in the BORAVAST villages, and a portion of the proceeds would go to the Trust and individuals who were involved in the production process. The merits of the project are unclear, but the project seems to have died a long time ago. Further investigations are needed and perhaps, this could be resuscitated and recrafted with the advent of the newly developed desalination plants.

Also, noteworthy, is that tourism is emerging as a potential source of livelihood due to the establishment of the Kalahari Transfrontier Park that merged the Gemsbok National Park on the South African side and Kalahari Gemsbok Park in Botswana. BORAVAST has been allocated a piece of land adjacent to the park to set up a community campsite and as such this could provide a good opportunity to trade their products and even attract tourists for use of their camping facilities, if well organised, this presents a good opportunity for participation in the local tourism sector for diversification of livelihood activities. The communities still require substantial support to enhance CBNRM in their area and take advantage of their proximity to the park that attracts both local and international visitors.

Communities are also involved in a combination of livelihood strategies, which include collection of veld products such as hoodia for subsistence and to supplement their income, and employment as cattle herders and in drought relief schemes whereas some are employed in the local clinics, schools and shops at minimal wages.

4. Community Engagements

4.1 Focus Group Discussions

FGDs were conducted to engage various groups as possible and to provide a platform and opportunity for local community members to discuss their community needs, development priorities and implementation plans in Rappelspan and Struizendam. This was informed by the demographics of the two communities. The following local groups were subjected to FGDs:

- Youth groups,
- Women groups,
- Farmers' association,
- Village leadership,
- Community trust, and
- Civil servants.

It is worth mentioning that the consultations were held in accordance with COVID-19 protocols and lasted only for two hours maximum. The community consultations identified a myriad of possible and preferred enterprises in the two villages. The table that follows highlights the most preferred enterprises by the communities.

Table 2: Identified possible options for community enterprises

Rappelspan Community FGDs	Struizendam Community FGDs
<ul style="list-style-type: none"> • Water bottling, • Fish farming, • Horticulture • Salt processing, and • Brick moulding. 	<ul style="list-style-type: none"> • Laundry services, • Horticulture, • Salt processing, • Water bottling, • Recreational park, and • Fish farming.

From Table 2, the Rappelspan community prioritised *water bottling and horticulture* whereas Struizendam community FGDs identified *horticulture and salt processing* as the main enterprises with the highest potential for sustainable income generation in their villages.

Figure 1: Community gathered for consultations in Struizendam (L) and Rappelspan (R)



4.2 Key Informant Interviews

One-on-one engagements were conducted with officials from various institutions including: Government (Ministry Of Agricultural Development and Food Security in Tsabong, Social and Community Development office in Bokspits); and parastatals (Citizen Entrepreneurial Development Agency-CEDA, Local Enterprise Authority-LEA, Botswana Tourism Organisation-BTO) in Tsabong; Commercial bank; BORAVAST members; and village traditional leaders such as chiefs and members of the Village Development Committees. As indicated earlier, the selection of key informants to engage was informed by their mandates in relation to community development, financing and support to local enterprises, agricultural and tourism development, support to community-based programmes and overall livelihood security issues. These key informant interactions deduced the following possible options for community enterprises in the two villages:

- Small stock farming,
- Fodder production,
- Mobile safari tour operations,
- Horticulture,
- Salt mining,
- Purified water bottling and packaging,
- Game farming,

- Recreational and amusement park.

From these one-on-one interactions, what stood out the most is that, small stock production in Kgalagadi South is the mainstay socio-economic activity. However, the key informants collectively emphasized the need to diversify the local economy through inclusion of other livelihood options and increase employment opportunities for the locals. It was also indicated that further opportunities to enhance small stock production should be explored beyond subsistence utilisation, market access issues should also be addressed promptly. In addition, it was also indicated that there is an opportunity for communities to explore the use of and placement at Lobu Farm to enhance their capacity on small stock production and breeding for commercial utilisation. The consultations further surmised that fodder production has potential and could be explored, especially through among other, the collection of Prosopis which is highly prevalent in the area. This could be mixed with other ingredients such as sorghum bran, molasses and salt. The collection and use of Prosopis could control the spread of the Prosopis in an environmentally sustainable manner and enhance job creation for the local communities.

5. SWOT Analysis of the Identified Enterprise Development Options

A SWOT analysis was used to provide detailed analysis of the prioritised possible community enterprises in the two villages. The SWOT analysis assessed both internal and external factors that may help the enterprises to prosper and those that may threaten the existence, feasibility, and sustainability of these enterprises. Moreover, the analysis provided a justification for considering those possible community enterprises in Rappelspan and Struizendam.

5.1 SWOT Analysis of the Prioritised Enterprise Options

A. Rappelspan: Smallstock production

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • A common livelihood activity in the area, therefore high community exposure; • Local climatic conditions in the area are highly suitable for smallstock production; • Available treated water from the desalination plants for livestock drinking; • Business ideally placed as it will cover Kgalagadi South District; • Small stock production prioritised in the DDP 8 for commercial exploitation; • Fosters the local economic development drive; • Agricultural shows creating an opportunity for marketing; • Could enhance local trade with local intermediaries and butcheries in the sub-district. 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • Non-availability of ample land for commercial production; • Limited capacity for commercial production of small stock; • Limited business management skills for viable commercial production of small stock;
<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Existence of the government Lobu farm for capacity development and promotion of commercial small stock production and breeding; • Availability of further support from entities such as LEA and CEDA for business support and funding if the project is feasible; • Ride on the Government decree to enhance export of small stock to Middle east and other markets to be explored; • Government has commissioned construction of a smallstock abattoir in Tsabong hence an opportunity for local small stock producers. 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Limited immediate available market therefore need to target areas outside of the project area; • Transport costs to access the market; • Limited purchase power parity due to the uncertainties brought about by COVID-19 pandemic; • Competition from other areas especially in accessing the market as small stock production is an emerging viable and preferred commercial activity countrywide and most people are partaking in the activity.

B. Rappelspan: Horticulture production

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • Enabling environment as Government encourages agriculture and has schemes for financing; • District Agricultural Office available for community support; • Relatively low cost upon operation; 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • Storage facilities may be a challenge that may lead to loss of perishables • Insufficient machinery availability for use in the business;
---	--

<ul style="list-style-type: none"> • Market readily available in surrounding villages in the sub-district; Availability of labour in the villages; • Employment creation. 	<ul style="list-style-type: none"> • Remote location hence high transport cost to the nearest town (Tsabong) and other urban centres to access the market; • Need to invest in water efficient irrigation technologies which may be expensive in the initial stages; • Lack of capital to get the business off the ground.
<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Government's priority for food self-sufficiency, especially in-light of the ongoing COVID pandemic. • Use of climate smart agricultural practices and technologies to maximise production; • Growing demand for vegetables and fruits all year round; • Use of available manure as fertilisers for the vegetables (could get from the cattle posts). 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Vegetables infested with diseases; • Destruction due to frost in winter and heat waves in summer; • Climate change with high temperatures in summer and exceptionally low temperatures in winter; • Vandalism and or theft by community members.

C. Struizendam: Salt Processing

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • Low cost of operations and high returns; • Market is readily available; • Less labour intensive; • Available raw material (brine) in the area; • Access to and availability of local market for use in livestock feed production; • 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • Limited salt packaging capacity and marketing; • Lack of machinery for packaging;
<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Large domestic market in the district and rest of the country; • Market availability even outside the country e.g., South Africa; • Available Government programmes to support exportation of local goods through Botswana Investment and Trade Centre; • Political will towards support and purchasing local produce; • Availability of financial and technical support through CEDA, LEA, etc • Use of reject saline water from the desalination plant to generate salt. 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Competition from well-known salt brands e.g., Zutshwa Salt • Inconsistent market supply; • Fluctuating distribution costs; • Acceptance of the new product and brand by the market.

D. Struizendam: Fodder production

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • The area is highly infested with Prosopis which can be collected for fodder production; • Sustainable control of Prosopis; • Availability of local manpower within the community; • Business ideally placed as it will cover Kgalagadi South District; • Fosters local economic drive, economic diversification, poverty eradication and the attainment SDGs • Water efficiency as limited water is required for this production as additional feed components will be sourced elsewhere; 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • Limited business management skills for viable commercial production; • Lack of advertising and marketing capacity to publicise the business. • Non-availability of capital to start off the business.
<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Existence of the government Lobu farm for market access; • Local farmers are also a potential source of market for the fodder; • Availability of further support from entities such as LEA and CEDA for business support and funding if the project is feasible; 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Transport costs to access the external market; • The need to source feed components from outside the area to mix the Prosopis pods and leaves; • Sourcing the feed ingredients at competitive prices from the suppliers; • Reliability of the suppliers to constantly supply ingredients.

6. Recommended Possible Community Livelihood Options for Enterprise Development

Based on the consultations' findings, the SWOT analysis undertaken for the prioritised enterprises as well as desk top analysis, this section provides the recommendations on possible enterprises that are most feasible for communities in both Rappelspan and Struizendam. The selection of these livelihood options is also augmented by justification from national and district plans and initiatives as well as various previous research studies. Three main options are proposed as potential sustainable and efficient livelihood options for the two villages. These options are mostly centred around agriculture: **Horticulture, Small Stock Production and Fodder Production** as well as **salt processing**. These identified potential options support Government's aspirations for local economic development, realisation of the national Vision 2036, objectives of the National and District Development planning as well as propelling the attainment of the global SDGs and Botswana's relevant indicators and targets therein.

6.1 Agricultural Production

Although nationally agriculture has not performed well in terms of value addition over the years, it still plays a critical role in rural livelihoods and local food security, and is an important employer for rural communities as the sector is generally labour intensive. It is characterised by several challenges, which, with the right targeted efforts, resources and programmes can be overcome.

In the Kgalagadi region, some of the outstanding challenges for the sector include limited grazing resources in the District. These resources are further overgrazed which consequently exacerbate desertification and susceptibility to bush encroachment as well as invasion of alien species such as *Prosopis*. According to the DDP 8 for the district, the limited grazing pastures have led to some farmers grazing their animals in wildlife management areas increasing the threat of human wildlife conflict. Grazing options therefore have to be sought to address this challenge.

Most of the farming community in the communal areas within the district are subsistence farmers, mainly using traditional farming methods which have led to stagnancy, in terms of industry development and growth. As such, there is need to explore sustainable farming methods that can ultimately improve production and revenue generation for the communities. Further, agriculture, especially given the climatic nature of the district, is vulnerable to the impacts of climate change. Sustainable land management, climate smart as well as conservation agriculture are therefore critical.

Despite the many challenges faced by the farming community in the Kgalagadi south, and the district at large, the region, being a green zone - Foot and Mouth Disease (FMD) free zone, remains a worthwhile supplier of beef cattle through the Botswana Meat Commission (BMC) to international markets which have stringent supply requirements.

Government intends to stimulate and revive the agricultural sector through several initiatives in the quest to enhance food security and self-sufficiency as well as employment creation in the sector. Among these are the resuscitation of Lobu farm in Middlepits, development of a smallstock abattoir in Tsabong, livestock cluster development, horticulture cluster development, promotion of climate smart agriculture, improved rangeland ecosystem management (through Conservation International) as well as review of the 1991 Agriculture Policy and related

agricultural programmes- ISPAAD and LIMID. Some of these initiatives are discussed in the following sections simultaneously with the proposed potential livelihood options for enterprise development in the project area.

6.1.1 Smallstock Production

Traditionally, Batswana are livestock producers, and smallstock plays a pivotal role in the livelihoods of smallholder farmers in the study area and the country at large. Almost all the households in the project area have smallstock and thus a niche exists for commercial exploitation of this resource which is currently important for the traditional sector and sustenance of households' immediate consumptive needs. Implementation of commercial smallstock production and breeding is suitable for both villages but for purposes of piloting, we recommend this option for Rapplespan village and this would target mainly the youth. If the model works, it can later be replicated in Struizendam.

With the resuscitation of the Lobu small stock production farm in the Kgalagadi, this provides an immediate opportunity for the community in the project area. The farm was established to grow the sector with good small stock genes. Smallstock production is popular in the project area and requires further promotion to realise maximum economic benefits from this farming system, hence Lobu farm can enhance small stock production in the area. This government owned farm which is situated north of Middlepits, seeks to activate Batswana to venture into small stock production as a business, with a view to feeding Batswana and ultimately targeting the export market. At no cost, farmers can be put through a training and mentorship programme to enhance their capacity in small stock production. In addition, the farm would open numerous business opportunities for Batswana in terms of value addition along the lines of feeding, marketing, packaging, transportation, among others, hence advancing the economic diversification drive. The farm will also serve as the right market for the fodder production discussed later in this section.

As indicated earlier, the youth of Rappelspan could be targeted for smallstock production. In collaboration with the Ministry of Agricultural Development and Food Security, the Project could identify enthusiastic youths to venture into this, focusing on those with immediate access to land and equipped kraals. The Project would then buy goats for each of them to

facilitate production and breeding. The beneficiaries could then be placed at Lobu farm for mentorship and capacity development to enhance their production and breeding skills for commercial production. Destined to be a smallstock production hub, Lobu farm offers free support in various livestock commodities and this would add more economic value if the knowledge gained were to be optimally used. This highly praised farm by his Excellency President Masisi, will eventually open numerous business opportunities for Batswana in terms of value addition along the lines of feeding, marketing, graphic designs associated with packaging, transportation, among others, which would enhance farmers' productive and business capacity.

Development of a small stock abattoir in Tsabong village is underway and this will serve the local farmers and smallstock at Lobu farm. This would present an opportunity for the Rappelspan and Struizendam communities for local and export market access in the medium and long-term. Further, government also intends to establish mobile abattoirs countrywide to facilitate access at limited transport costs. This model is already underway in Ngamiland.

6.1.2 Horticulture

Horticultural production was identified as a potential socio-economic activity that could provide a diversified source of income for the community in the two villages of Rappelspan and Struizendam. However, the consultants are proposing for this activity to be considered for implementation in Rappelspan with ripple benefits spanning the nearby villages and the rest of the district. Horticulture forms part of the basis for diversification of the agricultural sector away from the renowned beef production and dry land farming. This form of production is a segment of agriculture that deals with cultivation of garden crops (fruits, vegetables, and flowers) on a domestic or commercial scale. The sector plays an important role in the economy through provision of nutritional value, employment creation, income generation and general improvement of the populace livelihoods. Horticulture provides an investment opportunity for individuals and enterprises of various scales. Horticulture is not a popular form of production in the sub-district given the poor climatic conditions and intermittent rainfall patterns. However, given the availability of treated water from the desalination plants, this form of production should be explored. As indicated earlier, through the IVP horticulture project that was implemented in Struizendam through the BORAVAST

community Trust, lessons could be explored and drawn from the then project in-order to avoid such issues in the future should the horticulture option be regarded. Further, support agencies such as CEDA and NDB are available and could be explored to develop the horticultural sector in the project area. Support from these entities should however be augmented with training and capacity building by entities such as LEA to ensure continuity and good management employed in the enterprise.

As indicated, efficient farming techniques should be exploited, and among these within the horticultural sector is the use of *Hydroponics system* to improve yields. This type of production has become popular with agencies such as CEDA receiving numerous proposals for funding. Further, BUAN is also often engaged in demonstration activities to show potential farmers how this form of production works and to build capacity to interested farmers.

Hydroponics is a method of growing plants in a water based nutrient rich solution. This system does not use soil; instead, the root system is supported using an inert medium such as perlite, clay pellets, peat moss, or vermiculite. The basic premise behind hydroponics is to allow the plants roots to come in direct contact with the nutrient solution, while also having access to oxygen, which is essential for proper growth. It is an excellent choice for all types of growers. Thus, advancing horticulture with hydroponics, will be of great choice because it will enable the community to control the variables that affect how well their plants grow. A fine-tuned hydroponic system would easily surpass a soil-based system in plant quality and amount of produce yielded. Currently, Hydroponic system is being practised in Botswana, covering parts of the northwest (Maun), central (Serowe) and southeast (Gaborone) districts of Botswana. Below we capture the pros and cons of Hydroponics.

Table 3: Advantages and disadvantages of hydroponics system

Advantages	Disadvantages
<ul style="list-style-type: none"> • Up to 90% water use efficiency; • Production increases 3 to 10 times in the same amount of space; • Crops can be produced twice as fast in a well-managed hydroponic system; 	<ul style="list-style-type: none"> • Requires technical skills to maintain the equipment and management of the production system; • Highly reliant on power supply; • If there is a disease outbreak all plants within the container will be affected;

<ul style="list-style-type: none"> • Decreasing the time between harvest and consumption increases the nutritional value of the product; • Indoor farming in a climate-controlled environment means farms can exist in places where weather and soil conditions are not favourable for traditional food production; and • No chemical weed or pest control products are needed. 	<ul style="list-style-type: none"> • Susceptible to water borne diseases if the hydroponic system is not working properly.
--	---

Promotion of Hydroponics system is one of the many ways of facilitating implementation of climate smart agriculture (CSA). CSA is highlighted in several of government’s plans and strategies that the country is promoting to help Botswana to transform her agricultural systems towards more productive, efficient, resilient and sustainable systems (e.g. NDP 11 and the Climate Change Strategy and Action Plan).

In terms of level of participation, horticultural production through hydroponics could target the village development committee, women and youth groups. Upon training and capacity building for hydroponic system usage, these groups could easily manage themselves as opposed to individuals. In addition, BORAVAST Trust could also be explored for the management of the production on behalf of the community. For the actual production, there is an existing area in the village that has been demarcated for cropping and livestock drinking (1 ha) and this could be used to facilitate the greenhouse hydroponic facility.

With regards to the market for horticultural produce, the consultants have identified Kgalagadi region as the immediate target market. Surplus produce will be sold to the rest of the country given that food security sits high on Botswana’s development agenda (see Vision 2036, NDP 11, Economic Recovery and Transformative Plan of 2020). In addition, it is encouraged for Batswana to be food self-sufficient and therefore this would be a step in the right direction for the community to venture into horticultural farming at the interface of hydroponics system.

Therefore, our proposition on utilisation of hydroponic system to augment horticultural production as the identified possible enterprise in Rappelspan will in no doubt ensure that communities have access to sufficient nutritious food all year round in line with the country food security and self-sufficiency agenda as well as envisioned in the SDGs.

6.1.3 Fodder Production

Notably, the community of Struizendam could also undertake livestock feeds (fodder) production as an add-on to the horticultural produce advanced through hydroponic systems. As indicated earlier, degradation of grazing pastures is one of the identified problems for livestock production in the area. This poses the need to explore additional sources of animal feeds for the growth of the sub-sector. Fodder is an important feed resource for livestock, particularly in the drought prone areas such as Kgalagadi and for intensive production systems that require supplementary feeds. In addition, as mentioned, Botswana is experiencing diminishing range pastures especially in the desert areas such as Kgalagadi. Bush encroachment has become a concern for rangeland management as it reduces availability of good rangelands.

Prosopis, an invasive alien species in the project area, is highly available and could be explored for fodder production in combination with other feed ingredients such as maize and sorghum bran, salt and molasses, among other. Prosopis is widespread and threatens the rangeland and its biodiversity and thus its control is critical. Therefore, the proposed collection of this plant for fodder production will serve as a control measure and enhance conservation of the rangeland in addition to economic benefits that will be derived from the production and sale of fodder. Kgalagadi district is not particularly suitable for dryland farming, and therefore by-products of sorghum and maize would have to be sourced from other areas to combine with Prosopis for feed production. Salt could be easily sourced from Zutshwa and the proposed salt processing plant in Struizendam that has been also identified as a potential business activity for the village (discussed later).

Fodder production has the potential to diversify the agricultural sector, enhance income generation for the local community and further create job opportunities for the two villages. In addition to the use of Prosopis, various additional fodder crops can be explored to identify which ones are most suitable for growth in the project area as well as their water and management requirements. More investigations should be undertaken to promote the right type of fodder crops in the region, and identify the market for the produce. However, given the availability of livestock and smallstock in the area as well as Lobu farm, a market already exists and requires further exploitation. The smallstock farmers and subsequently the entire Kgalagadi region will have direct supply of fodder and locally sourced as opposed to going far areas like Gaborone and across the border to purchase fodder for their livestock.

Government through its ISPAAD programme, promotes fodder production and horticultural in various parts of the country. The ISPAAD programme commenced in 2008, replacing the Arable Land Development Programme with the aim of improving arable sector productivity. With the recent revised ISPAAD guidelines, the programme provides a subsidy to commercial farmers, traditional existing and start up farmers. However, the aspiring beneficiary would get partial grant and a loan in order to benefit from this programme (under the current ISPAAD Horticulture Impact Accelerator Subsidy Fund facilitated by the Ministry of Agriculture and CEDA).

6.1.4 Salt Processing

Salt processing is another alternative livelihood activity that is recommended for utilisation of the desalination plants, an activity that could be implemented in Struizendam at a small scale given the expected low quantities of water from the plant. In addition, salt processing would also ensure that the concentrate effluent or reject water from the treatment plant is managed and does not contaminate the remaining or downstream resources. The reject water may pose strong negative impact on the sustainability of the environment due to the high concentration of salts and other pollutant contents hence the need for reuse of this water. Feasible salt extraction and processing techniques could be explored as the first step to determine what would be more suitable given the desalination process, available resources and other requirements. However, as indicated, the development will be implemented on a smaller scale.

In addition to reduced environmental impacts of the saline water residue, the salt produced will be used for various purposes including livestock feeds as well as human consumption depending on the product quality. There is an immediate market of livestock community in the area and the facility could easily accommodate these farmers. In addition, it could supply the fodder production enterprise that is also recommended for implementation as per this project. The salt processing plant will also create employment opportunities for the local community and contribute to local economic development.

6.2 Funding and other support options

For financial assistance and support, the communities in the two areas would take advantage of the support from NDB, Youth Development Funds and the recently launched revised CEDA funding guidelines to ease access to funding, amongst others. However, in any farming operation or enterprise, management and financial literacy skills are also key and as such capacity building on enterprise management and financial literacy should be considered for the enterprise to prosper through utilisation of LEA support programmes on enterprise development, management, and financial literacy. Furthermore, the communities will utilise Sebele Agricultural Training Centre that offers refresher courses on horticultural produce as well as the Lobu Farm training programmes for smallstock production. Over and above, the District Agricultural Office in Tsabong is available to offer mentorship of communities to ensure sustainable implementation of the identified community enterprises. The Government programmes and initiatives herein present a plethora of opportunities for the communities in Rappelspan and Struizendam to partake in various enterprises for the betterment of their livelihoods at household level and the district in its entirety. It goes without saying that taking advantage of these programmes and initiatives would lead to the sustainability of the identified possible enterprise upon execution.

ORASECOM/UNDP GEF as per this project, have supported the development of the desalination plants and associated works in the two villages. To ensure that these desalination plants are optimally utilised and are able to enhance the livelihoods of the respective communities, seed funding is available to support the recommended sustainable community

enterprises, particularly to facilitate their inception. A budget of about BWP1, 000,000 is available to fund the identified enterprises.

Other funding and support opportunities beyond the UNDP -GEF support should be mobilised to ensure sustainability of the enterprises. Therefore, partnerships and collaborative measures with other organisations are critical to sustain these projects. As indicated earlier, Ministry of Agricultural Development and Food Security is a critical partner in these endeavours as most of the recommended options lie within the agricultural sector. Other potential partner stakeholders are as follows:

- Poverty Eradication Programme;
- Citizen Entrepreneurial Development Agency;
- Local Enterprise Authority;
- Gender Affairs;
- Ministry of Youth, Sports and Culture;
- Non-Governmental Organisations;
- Academic institutions; etc.

This list is not exhaustive and will be further developed beyond this study.

7. Appendices

Appendix 1: Attendance list for Rappelspan Community Meeting (25/11/2020)

NAME AND SURNAME	CONTACT DETAILS	GENDER
1. Johannes Matthys	7370803	M
2. Jane Meyer	73504616	F
3. Johanna Elsa Matthys	76817922	F
4. Anna J.	73507937	F
5. Sophia Matthys	-	F
6. Sarina Matthys	73219654	F
7. Alletha J Matthys	73557518	F
8. Jannetta C. Morerwa	76832354	F
9. Salome M. Matthys	75869998	F
10. Paul Morerwa	73170114	M
11. Gilbert Matthys	73643736	M

Possible Community Enterprises For Rappelspan And Struizendam

12. Titus Matthys	71536632	M
13. Albert van Booth	75910915	M
14. Ivan Matthys	-	M
15. Elizabeth Witboi	-	F
16. Peter Matthys	75660018	M
17. Abreton van Neel	73271321	M
18. Gaone Witboi	76804232	F
19. Kenosi Rooi	73773480	M
20. Frederick Matthys	73507083	M
21. Susan Meyer	73044713	M
22. Sophia P. Bok	73905536	F
23. Ivonne Ditshipi	73170166	F
24. Mary M. Jagers	73473622	F
25. Andrew Jagers	73135753	M
26. Allea Meyer	73484729	F
27. Lenah Matthys	73530349	F
28. Hendrick Velkeen	-	M
29. Magdeline Meyer	73573515	F
30. Christina Matroos	74275222	F
31. Dinah Morerwa	75807798	F
32. Susan Rooi	75807864	F
33. Japie Jood	73517598	M
34. Joshua Otsheleng	75807089	M
35. Wileminah Coutree	73553518	F
36. Wilem Morerwa	-	M
37. Jan E Matthys	75455570	M
38. Katrine January	-	F
39. Christinah Januarie	73952104	F
40. Ragel Meyer	73512578	F
41. Piet Matths	73530349	M
42. Angel Matthys	73682087	F
43. Cathrine Meyer	73604825	F
44. G.S Kenosi	75554225	F
45. Evelyn van Rooyen	77754459	F
46. Segametsi	75807831	F
47. Annah k. Witbooi	73530290	F
48. Cathrine Morerwa	73116847	F
49. Magdeline van Rooyen	73952108	F
50. Idah Morerwa	73507021	F