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An economic viability assessment of sisal production and processing in Limpopo: A stochastic budgeting analysis

Thula S. Dlamini[1]*, Aart-Jan Verschoor[2] and Precious Tshabalala[3]

[1]Agricultural Research Council, Pretoria, South Africa.
[2]Economic and Biometrical Services, Agricultural Research Council, Pretoria, South Africa.
[3]Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.

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Creating sustainable jobs in the agricultural sector is an important aspect of rural development. Agriculture is often viewed as a *sine qua non* for rural development, because it provides the necessary economic stimulus for rural households to participate in productive economic activities. Yet, identifying viable agricultural projects that have the potential to create jobs in rural areas has continued to overwhelm policymakers. In this paper, the economic feasibility of sisal production and processing in Limpopo province is analysed. The study was motivated by the sisal crop's proven abilities to create many jobs and the growing appeal that natural fibres are currently receiving globally. Using both a deterministic and stochastic budget, this paper shows that sisal production and processing could be a viable investment in Limpopo. However, given the high costs of labour, investors are cautioned to look for community partnerships in order to spread the economic costs and benefits of sisal production and processing in Limpopo.

Key words: Sisal production, processing, stochastic, GRKS, simetar.

INTRODUCTION

Given increased job losses in the agricultural sector of South Africa (BFAP, 2012), there is a need to invest in labour intensive agricultural projects. It is envisaged that the identification and establishment of labour intensive agricultural enterprises could help redress the high unemployment levels in the rural economy. This is particularly so when considering that whilst commercial agriculture continues to employ a significant number of rural people; over the past 20 years, areas known for intensive farming have moved away from permanent workers to seasonal workers (BFAP, 2012). Similarly, "many people who used to live and work on farms no longer do so, principally as a result of the uncertain investment climate created by speculation around property rights" (BFAP, 2012). As well, "the application of labour legislation to agriculture has provided the motivation for farmers to increasingly use the services of labour brokers in an attempt to avoid the hassle factor

*Corresponding author. E-mail: thulad1@gmail.com, DlaminiTS@arc.agric.za

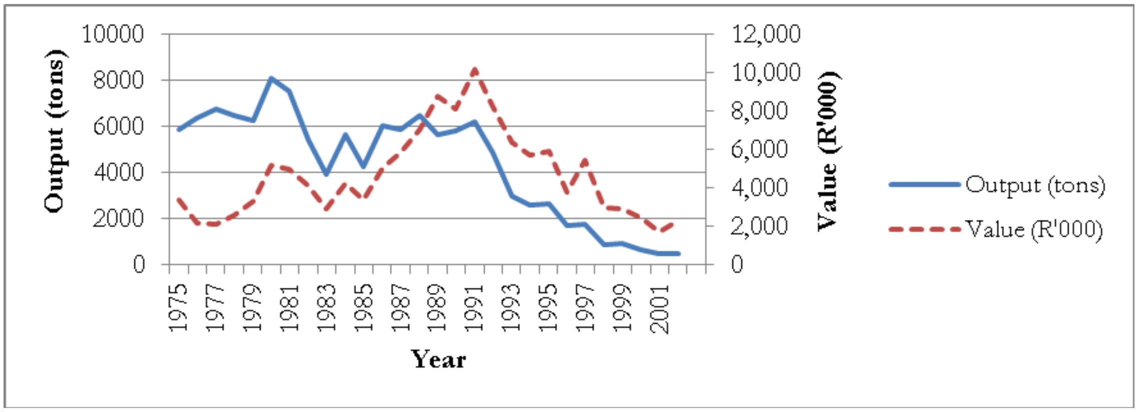

Figure 1. Production and sale of sisal in South Africa. Generated using data from the Department of Agriculture, Fisheries and Forestry (DAFF).

that comes with employing large numbers of workers for short periods of time" (BFAP, 2012).

This suggests that in trying to address the unemployment challenge in the rural sector, potential investments in agriculture ought to guard against the growing trend of farm workers being "exploit[ed] by unscrupulous employers …[especially] labour brokers" (BFAP, 2012). Likewise, such investments should be directed to the households in the affected communities if their true value is to be realised. Especially, there is a case to base the notion that for agricultural investments to have the desired job creation impacts, they may have to be focussed on the communities where the effects of unemployment and lack of sources of livelihoods are largely felt.

One project that has gained substantial consideration and possesses the ability to employ large numbers of people is sisal (*Agave sisalana*) production. Formally set up in the 1930s, sisal production is not new in South Africa, let alone in Limpopo. It gradually grew from less than 1000ha in 1950 to peak at 44000 ha in 1965 (Henderson, 1994). At its peak, Henderson (2012) reports that over 4000 people were employed by the sisal industry. Its growth was in part motivated by focussed government support and a vibrant local sisal market. The then Department of Agriculture and Forestry played a pivotal role, providing sisal growers with start – up resources, including technical assistance and guaranteed market access.

During the South African sisal production boom in the mid 1970s to early 1980s, local consumption varied considerably and was closely linked to the local economic situation much more than to what was happening abroad. Typically local demand was in the region of 4000 tons per annum with a potential supply of over 5000 tons per annum, which left an excess that was sold via export markets. By 1989, sisal produced locally was being exported to 11 countries by the National Sisal Marketing Company (NSMC) (Henderson, 1994).

This saw the export of about 1500 tons of sisal per year. Available data shows that sisal production grew from 5900 tons per annum in 1975 and peaked at 8107 tons per annum in 1980 (Henderson, 2012). However, since then, due to growth in synthetic based fibres, the production of sisal decreased significantly in South Africa. For example, between 1980 and 2002, production decreased by over 16 folds to hit a production low of 522 tons, as shown in Figure 1. Similarly, gross sisal income increased from 1975 to reach a peak of R10 million in 1991 and thereafter decreased to reach a low R1.7 million in 2001.

In Limpopo, sisal production was started at Malamulele village in the Vhembe district with support from the Department of Trade and Industry (DTI) in 2005 to 2006, to revitalise the now defunct sisal industry in South Africa. The DTI also made an initial investment of R25 million towards the establishment of a sisal processing plant. The project area consists of 212 ha of communal land of the Madonsi and Xigamani Traditional Authorities, and is known as the Khindimuka sisal project. However, owing to limited support and maladministration, the project was only functional for a very limited period where after it was closed down.

Currently, available data (see for example Henderson, 2012) suggests that, in South Africa, there is no production of sisal. This is notwithstanding a lucrative local market (Bruce Sunderland, 2012 pers*. comm.*). For example, South Africa imports sisal on an annual basis from as far as Tanzania, which further confirms the existence of a local market that needs rekindling with locally produced sisal. Resuscitating an almost non-functional sisal plantation and processing plant could be risky. A need to conduct an economic viability assessment of the Khindlimuka sisal production and processing project in Limpopo province becomes essential to form opinions on whether or not to continue investing on the project. Such an analysis is important because once set up, it becomes impossible to reverse the investment. In South Africa, added to the above concerns are labour laws which make the cost of labour to be higher than in most countries in southern Africa. Likewise, failure of rural households to internalise sisal production may have serious ramifications on the viability of maintaining the existing sisal processing plant. There are also higher production and marketing uncertainties that derive from output and price variation uncertainties and rising production costs. This implies downside risks which need to be considered in any economic viability assessment and especially before large amounts of resources are channelled into the project.

This paper presents the results of a stochastic budgeting model for a 212 ha sisal farm and processing plant in Limpopo. It is outlined as follows: First is a summary of the economic benefits of the sisal plant. Next is a description of the methods that were used to conduct the economic analysis, followed by presentation of the results or findings and then conclusion.

ECONOMIC VALUE OF SISAL

Sisal can be used for a variety of industrial products, ranging from heavy industrial uses such as composite material for the automotive industry and reinforcement in the construction industry to paper, newsprint, and telephone cable paper. It can be used to produce wood free thinning paper or Bible paper and floor coverings. As well, sisal can be used for domestic purposes such as household fuel and building materials. In the United Kingdom, sisal floor coverings have gained considerable consumer preference because of sisal's stain resisting abilities (Morley, 2011). In addition, current research shows that sisal has a potential to be used for pharmaceutical purposes (e.g. *Sisalana Americana*); in the production of cattle feed, decorative panels, hand bags and fashion accessories for women, as well as geotextiles. Sisal is a plant with remarkable qualities that allows it to survive harsh arid conditions. The plant is productive for roughly 6 to 9 years, in a 12 year growing cycle (Henderson, 2012). Usually, the first leaves are harvested 3 to 4 years after establishment. During its lifetime a plant produces 200 to 250 leaves and can weigh up to 135 kg. In fertile areas, Henderson (2012) reports that up to 8 tons of sisal fibre can be produced per plant per hectare. This could drop to 4 tons per hectare in less fertile and drier areas. Generally, the plant can survive with 1000mm of water per year. However, in South Africa, sisal has successfully been planted in areas with substantially lower rainfall (250 to 375 mm) per annum. Sisal prefers dry, permeable soils especially calcareous soils with an approximately neutral soil reaction (Dannhauser, 1999). With climate change and its superseding factor unreliable rainfall making it increasingly difficult to produce some commercial crops in many semi-arid parts of Limpopo (Maponya and Mpandeli, 2013), sisal could be a viable replacement cash crop.

Sisal production in Limpopo

The decline in, or collapse of, sisal production in South Africa has two implications. First, it suggests that nearly all the sisal used locally is imported. Secondly and given the high labour intensiveness of sisal production and processing, there is a case to argue that resuscitating sisal production locally could stimulate the establishment of new sisal plantations which could add significantly to job creation especially in the rural areas. This is truer in Limpopo where a comprehensive study by D'Haese et al. (2011) has suggests that 52% of the people in Limpopo's rural areas are severely food insecure, whilst 46% of households in the area are most likely to experience a hunger spell during the year. It is thus not farfetched to anticipate that the resurrection of sisal production could be a game changer for the rural economy in some parts of the Limpopo Province, especially in Malamulele where remnants sisal plants, in old sisal plantations, are still productive today. Industry experts and buyers of locally produced sisal have noted that the Malamulele project produces good sisal, in spite of the fact that the plantations are no longer being maintained.

With enough investments geared towards the resuscitation of these fields and the factory that was used for processing, it is not implausible to anticipate that these plantations could provide the much needed economic stimulus required for the creation of jobs especially in the hot and somewhat dry areas of the province where employment, probably because there is little economic activity taking place, is very scarce. In addition, and given that sisal has vast industrial and domestic uses, focussed investments in sisal production could lead to the development of additional sisal intensive industries which could help boost economic growth in the province. As well, given the sisal plant's special qualities to grow in water stressed areas, sisal could act as an ideal cash crop for rural households to produce, where other crops have failed, thus earning them some income. Lastly, sisal could be used to develop a green niche market in South Africa especially in the light of rising costs of producing synthetic fibres. Yet for all this to happen, sisal production must make business sense, which is explored next in this paper.

MATERIALS AND PROCEDURES

To conduct the analysis, the study used information gathered from different sources. Primary data was collected through structured interviews with stakeholders involved in the project. Secondary data was gathered from the Department of Agriculture, Fisheries and Forestry (DAFF). The opinions of experts on sisal production and marketing in South Africa were also solicited and captured. Other forms of data were collected from some of the firms that process sisal in South Africa as well as in existing literature. In order to programme the financial feasibility analysis model, the following assumptions were made:

Land: Using currently existing old sisal lands, it was assumed that 212 ha of old sisal land will be used for the project. This is made up off 30 ha in Boltman and 182 ha in Xigamani. These two production areas make up the Malamulele Sisal Project, which owns a sisal processing plant on land that belongs to traditional authorities. The community has been granted a 'permission to occupy' leasehold, so land was assumed to be 'free'.

Field layout: Because the project is being introduced on old sisal producing lands, the layout of the field was assumed to going to stay the same, that is, it will follow the current layout of the fields, where recommended planting patterns were a series of double rows 60 cm apart with a 2.5 m alley between a pair of rows.

Plant spacing and population: Plant spacing is at 75 cm, which gave 25000 plants per hectare. In the primary nursery, plant spacing was assumed to be 10 by 10 cm which yields 986, 300 plants per ha. In the secondary nursery, a 25 by 50 cm spacing pattern was assumed.

Current factory: The current processing facility was established in 2005 to 2006 through an investment from the DTI and was assumed to be producing 250 kg of twine per hour or 30 tons of twine in a five day working week, in a single 8 hr shift.

Sisal yield: It was assumed that a plant produces 100 to 135 kg of leaves and the lifespan of a plant was put at between 6 to 9 years. Moreover, this period could be longer by at least a few years.

Wage rate: A wage rate of R80/day was used, rather than the recently approved minimum wage of R105/day; a scenario where the minimum wage of R105/day is used was also explored.

Fertilisation: Ureum, lime-ammonium nitrate (LAN), and superphosphate are some of the chemical nutrients that are used for sisal fertilisation. The price for ureum and LAN was R14.10/kg and R17.50/kg, respectively.

Decortication: Decortication costs using a 6-door decorticator were computed to be R386.86/ton.

Species: *Agave sisalana.*

Key products: Sisal fibre harvested from old sisal lands was assumed to be the main product being produced by the two communities, which is then processed by the factory into twine. The twine is further processed into ropes and additional fibre products.

Harvesting and transportation costs: The cost for harvesting and transporting sisal from the fields to the factory were found to be R0.604/kg.

Other costs were also added in the financial model. The financial feasibility analysis used annual time steps and a planning horizon of 12 years based on a discounted cash flow design. To programme the model, the cash flow consisted of investment inputs, variable inputs and returns values. Following on Richardson and Mapp (1976) and Barry et al., (2000), the net present value (NPV), internal rate of return (IRR) and break-even year were used as key output variables (KOVs) in the model. A discount rate of 8% was assumed based on the minimum acceptable return that an investment of this magnitude would fetch[1] in South Africa.

[1] This is given that in 2012 the South African Government's 10 year Treasury bond was 7.8%.

The study used deterministic and stochastic budgeting procedures. Because deterministic budgets use point estimates, they are unable to give direction on the probability of success of an investment and management decisions on the farm (Lien, 2003). The stochastic budgeting procedure, on the other hand, allows the decision maker (DM) to assess the probability of failure or success of an enterprise before committing resources to a project. Since in reality, outcomes always change, the stochastic budget helps in obviating some of the shortcomings of the deterministic budget, by accounting for uncertainties and providing distributions of outcomes (Richardson et al., 2000). The stochastic budgeting model was programmed in Excel® and simulated using Simetar® through a three step process. In the first step, the probability distributions affected by sources of risk, namely price and output, were assigned to the model. In the second step, the resultant stochastic values were sampled from the probability distributions and used in a set of accounting equations to calculate production, receipts, and the KOVs. Lastly, the stochastic budgeting model was simulated using the random values for the risky variables. Drawing from Hardaker *et al*. (2004) the model used price and yield because they were assumed to have the biggest effect on the level of risk related with a certain outcome in the sisal enterprise.

Sisal output

Given that sisal production has long been abandoned in South Africa, it was impossible to get historical data to empirically determine the distribution functions of output and prices. Using expert opinion, sisal output was model based on the total amount of old sisal land available which is 212 ha. For the purpose of the analysis, sisal production was assumed to reach peak production in year six. A uniform distribution was used for the output values in the production areas. In a uniform distribution, the likelihood of occurrence is the same for all possible outcomes, such that the population of a continuous uniform distribution is defined by a minimum and a maximum value (Evans and Huntley, 2011). In order to specify the uniform distribution, the study used (Evans and Huntley, 2011):

$$U_i\ (a, b) \tag{1}$$

where U_i denotes a uniform distribution in year *i* and *a* and *b* are the minimum and maximum yield values per ha, respectively. In year 1 to 4, only sisal from the already existing sisal was used, whereas from year 5 onwards, sisal from newly planted fields in the old sisal plantations was used. For that reason, output in year 1 to 4 was assumed to vary from a minimum of 0.7 tons/ha to a maximum of 0.9 ton/ha, whereas from year 5 to 13 it was assumed to vary between 1.1 ton/ ha to 1.7 ton/ha. The minimum, middle and maximum sisal output of 0.7, 0.9 and 1.7/ha were used to generate the stochastic sisal output variable after taking into consideration the impacts of weather and farm management practices on possible yield.

Prices

The price was assumed to follow a GRKS distribution. Richardson (2012) defines a GRKS distribution as a "non-parametric distribution which allows the random variable to fall outside the minimum and maximum values" (Richardson, 2012). To obtain the GRKS distribution, minimum, middle, and maximum price values were defined. Furthermore, "pseudo minimum and maximum values [were] added so the stochastic value can extend beyond the min and max by about 2.25%" (Richardson, 2012).

Considering that the price of sisal varies based on the grade, an all grade average was used after extensive consultations with industry experts who have imported sisal into South Africa. The minimum, middle and maximum sisal prices of R4800, R6400 and R8000/ton were, respectively used to generate the stochastic sisal price variable after taking into consideration the impacts that increased production of sisal could have on local prices. The fitted price distribution was then obtained using the GRKS menu on Simetar®. This was then followed by constructing a cumulative distribution function (CDF) chart for the price.

Cost of labour and other costs

Labour costs were increased by about 10%, whilst other costs were assumed to increase by 8%, per year. The reason for increasing labour at a higher rate than other costs was informed by recent policy changes in South Africa which have led to an increase of the agricultural minimum wage rate by over 30%. So much that this has become a matter of serious concern, the cost of labour in South African agriculture is becoming a very critical factor in farm profitability. For that reason, and considering the fact that the primary motivation of establishing a sisal plantation and factory is to use sisal production to stimulate job creation, in quantifying the most progressive wage rate for the project, different daily wage rates were used to compute the minimum wage price for farmworkers and in the processing plant.

It should be kept in mind that the focus was on making an informed decision on the wage price that would make the project feasible. To arrive at such a decision, a uniform distribution of labour was used. A minimum, middle and maximum of R70, R75, and R80/day was therefore used. Keeping in mind that currently, there is no economic activity on the old sisal farms, the focus of the analysis was to develop the minimum acceptable wage rate that would make the project worthwhile to investors whilst meeting the short term need to create jobs. This is because of a provision that make it possible for agribusinesses which are struggling and have provided evidence to that effect to be exempted from paying the minimum wage, up until a time that they are financially liquid.

The stochastic budget results were then compared to the results of the deterministic budget.

RESULTS

Table 1 presents the results of the financial feasibility analysis. The net present value (NPV) is above zero on both analyses, suggesting that the Malamulele sisal project could be a financially viable investment over the 12 year planning horizon, under the assumptions of this study. For the deterministic budget, the NPV was found to be R20.352m whereas for the stochastic budget it was calculated at R2.573m with a standard deviation of R5.911m - signifying that the viability of the project will possibly be influenced by output and price variability. The minimum and maximum values for the stochastic NPV are R16.664m and R21.646m, respectively. Figure 2 shows the results of the cumulative distribution function (CDF) for the NPV in the stochastic analysis.

The CDF demonstrates a 33.4% chance that the NPV will be below zero at any time during the planning horizon. There is a 90% chance that the NPV will be less than R10m, whereas the probability that the NPV will be less than R5m is 66.6%, as shown in Figure 2. Increasing the area planted to sisal led to an increase of the deterministic and stochastic NPVs to about R47 and R22m, respectively whereas increasing the costs of variable inputs in the deterministic budget by 10% led to a decrease in the deterministic NPV from R20.352m to R7.565m suggesting that the project is sensitive to the costs of adjustable inputs.

Likewise, when either the yield or price was increased by 10%, the deterministic internal rate of return (IRR) decreased from 22.2 to 18 and 18.4%, respectively suggesting that increased output could depress prices or that increased prices could stimulate increased production which would in turn negatively affect prices in the long term. The IRR was calculated at 22.2% for the deterministic budget, whilst the results of the stochastic budget gave an IRR of 16.16% as shown in Table 1 and Figure 3. This further confirms that the project is financially viable and profitable. Even though the IRR is generally positive and above 15% which is often considered by financial analysts to mean that a project is substantially viable when stochastic prices and yields were used, the IRR decreased by 6.2%.

Sensitivity analysis

To conduct sensitivity analysis of the discount rate of 8% that was used in the model, discount rates of 5 and 15%, respectively were also verified. Using a discount factor of 5%, the deterministic NPV increased from R20.352m to R26.280m whereas the stochastic NPV increased from R2.573m to R3.474m. A 15% discount rate led to a decrease in the NPVs of both models, as shown in Table 1. Regardless, in both (5 and 15%) scenarios, the NPVs were positive. However, using a threshold analysis, the results show that an increase of 75 and 60% in either yield or prices would, respectively cause the deterministic NPV and the stochastic NPV to be below zero or unprofitable.

When the land under operation was increased from 212 to 1000 ha, the IRR increased from 22.2 to 36.1% for the deterministic budget and from 16.16 to 33.92% for the stochastic budget, suggesting that the project could be more viable if the amount of land under production were to be increased to at least 1000 ha.

DISCUSSION

The main aim of this paper was to investigate the viability of sisal production and processing in Limpopo, with the view of creating jobs that are expected to address the high unemployment challenge in the area. The results reveal that a total of 92 jobs would be created using the findings of the deterministic budget. The stochastic budget gave a total of 90 jobs, with a minimum and maximum of 82 and 97 jobs, respectively, and a standard deviation of 3 jobs.

Table 1. A contrast of viability indicators concerned with establishing and operating a 212 ha sisal farm and processing firm in Limpopo Province, South Africa.

Items[a]	Deterministic	Stochastic
Main assumptions		
Enterprise Scale (ha)	212	212
Initial investment ('000R)	2,708.00	2,708.00
Total decortication costs / month ('000R)	326.22	405.75
Average input costs(R / ha)	982.27	892.02
Average expected price ('000 R/ton)	6.40	5.60
Average marketable fibre yield (tons/ha)		
Year 1 – 4	0.5	0.56
Year 5 – 12	1.5	0.83
Cash flow analysis		
NPV ('000 R)	20,352.40	2,573.13
MIN	-	-16,663.46
MAX	-	21,646.00
IRR (%)	22.20	16.16
MIN	-	-3.83
MAX	-	30.45
Sensitivity (scenario) analysis		
NPV (R'000)		
at 5%	26,280.33	3,474.71
at 15%	12,442.49	959.73
IRR if		
Yield or prices decreased by 10% (%)	18.00	16.00
Variable inputs costs increased by 10% (%)	18.34	16.00
Land were to increase to 1000 ha (%)	36.10	33.92
NPV if		
Land were to be 1000 ha (R'000)	47,448.73	22,659.49
Land were to be 1000 ha and variable costs were to increase by 10% ('000 R)	7,565.84	68.28
Threshold analysis		
Investment becomes unprofitable if:		
Yield or prices decreased by (%)	75	60
Break-even year	7	8
Total number of jobs	92	90

[a]Enterprise scale refers to the size of the sisal farm in ha; initial investment is the amount of money essential to start the farming business. It comprises the costs of capital equipment; as well as all possible values a random variable can take (Barry et al., 2010); NPV is a risk free assessment of the profitability of an enterprise. A negative NPV means the investment is unprofitable whereas an NPV above zero denotes a financially viable business (Richardson and Mapp, 1976). The higher the NPV, the more likely the business will be profitable; payback period, is the time period it will take for the accumulated receipts to cover completely the initial investment (Barry et al., 2010). A shorter period is preferred to a longer period.

Most of the jobs were assumed to come from the processing facility, whilst most of the sisal was assumed to come from Boltman and Xigamani. This suggests that for the project to be successful, interested investors may have to consider using community based sisal out-grower schemes over and above the current sisal producing areas to increase production whilst spreading the economic costs and benefits of sisal in the communities. The out-grower schemes may also be beneficial in wage related repercussions of the project[2].

Using sensitivity analysis, the study considered what

[2]In South Africa, the minimum wage in agriculture increased from R76/day in 2012 to R105/day in 2013.

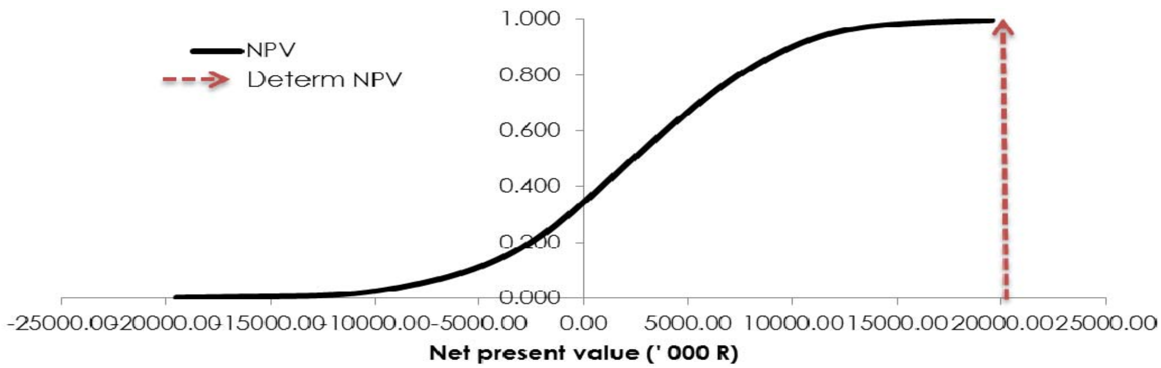

Figure 2. A cumulative Distribution Function (CDF) of NPV of a 212 ha and sisal processing unit in Limpopo Province. The CDF shows that there is a 33.4% chance that the stochastic budget NPV would be less than zero. The NPV from the deterministic budget is about R 20m, which is shown by the red-dotted arrow line.

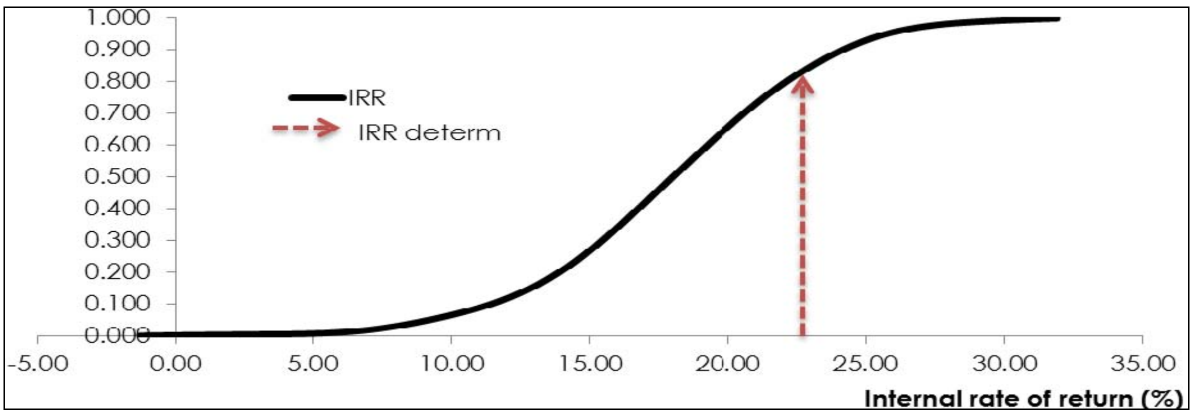

Figure 3. A Cumulative Distribution Function (CDF) of IRR of establishing a 212 ha sisal farm and sisal processing unit in Limpopo Province of South Africa. The brown dotted arrow line shows the determinist budget IRR. The probability that the IRR would be less than zero is 0.3%. There is a 0.5 or 50% chance that the IRR would be equal to 17.5%.

would happen to the project if an increase in the price of labour of 31.25% were to be effected. Shocking the wage rate by 31.25% to the current government gazetted wage rate of R105/day, the project collapses. The IRR as well as the NPV became negative. The jobs became negative. However, a wage increase of below 16% per annum was found to be benevolent on the viability and job creation aspect of the project. When the daily wage rate is decreased by 50%, for example, the NPV of the project increases. The probability that it will be negative decreases to 3.55% (from 33.4%), whilst the IRR improves to 34%.

This suggests that sisal is ideal in areas where the opportunity cost of land and labour is low, which generally excludes a high wage environment. In trying to make sisal production have the desired impacts of creating jobs, it might be helpful for interested investors to introduce the community into the project at its early stages. Continued increases in the cost of labour will have a negative effect on the probability of success of the project. One way of accomplishing this is through community out-grower schemes, where groups of farmers are organised into sisal farmers' cooperatives to supply the main factory. This could help reduce the cost of labour by using the households as key growers and suppliers of sisal to the processing plant.

The model assumed that there was a consistent demand for sisal as documented from the opinion of experts in the industry who cited the annual imports of sisal into South Africa, as an example. If that is the case, capturing and maintaining a growing market share coupled with supply consistency will be crucial for project viability as well.

Secondly, we advise that for the project to be successful; it requires that workers are made owners of the project. This could be achieved by creating a business model that allows the workers to have ownership in the project so as to participate in profit sharing.

Conclusions

The purpose of this paper was to evaluate the feasibility of sisal production in Limpopo province of South Africa, using a stochastic budgeting analysis of a 212 ha sisal farm and processing facility. The Malamulele Sisal project is an initiative of the local community. It is supported by the DTI and is managed as a cooperative that is owned directly by the beneficiaries and indirectly by the local community. Apart from accessible land, the project has one major asset; a sisal processing factory with a value in excess of R25 million. This factory includes a decorticating unit and a mill able to produce 30 tons of twine per month, or 250 kg per hour during a shift of 8 h. The results suggest that sisal production in Limpopo could be a viable investment project. Especially, the financial simulation model shows that 90 jobs could be created via the processing of sisal. Moreover, it was found that if included from the onset farmers could benefit enormously from sisal production. It should, however, be noted that establishing a sisal production and processing unit is a significant investment, especially since harvesting can only commence in the third year. Investors are cautioned to look for ways to manage and reduce the costs of labour, establishment costs, processing equipment and energy in the form of electricity and fuel (diesel) for establishment, maintenance and processing, to get the best out of the project.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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