

A CASE STUDY OF RISK MANAGEMENT IN ARABLE AGRICULTURE IN BOTSWANA.

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ABSTRACT

This study investigates the risks facing arable Farmers in Botswana and the risk management strategies used to mitigate against such risks. The study used exploratory case studies of a group of Farmers in an area called Mosisedi Farms located in the Southern part of the Country. Data was collected mainly through semi-structured interviews with the farm Owner-Managers. Data from the study revealed that Farmers were largely aware of and could well articulate the various risks they faced. The major risks faced by Famers were crop damage/loss due to adverse weather conditions, crop damage by wild animals and pests, input and output commodity price risk as well as losses due to unreliable labour. The methods and strategies used to manage the risks were largely similar to generic ones used elsewhere. There were however, three areas where the findings were different. First was the use of a strategy we termed risk financing through capital injection and the second was the use of a strategy we termed hazard substitution. Another key finding was that the Botswana Agricultural Marketing Board (a State-Owned Entity) was a major contributor to the financial risks faced by Farmers. The study concludes that Farmers need to improve on their risk management strategies because some still used passive risk retention for many risks.

Keywords: Risk, Risk Management, Arable Farmers, Case Study, Botswana Agricultural Marketing Board.

INTRODUCTION

Conventional wisdom has it that risk is inherent in every business. Further, it is known that failure to manage risk may lead to the collapse of a business (Balcan and Ooghe, 2006). As a business, farming faces unique risks which are additional to normal business risks (Sulewski and Kloczko-Gajewska, 2014). Risk management is therefore crucial in farming.

The main objective of this study is to investigate the risks and agricultural risk management strategies that are used by arable farmers in Botswana. Botswana is chosen as the research site because of its low agriculture production and resultant food security status. In 1966 when Botswana attained independence, agriculture was the main economic activity and the population depended on agriculture for their livelihood (Mbulawa, 2017). According to the Ministry of Finance and Development Planning (1997), agriculture's contribution to the gross domestic product was over 40%. The sector started to experience decline during the period of discovery of minerals during the period late 1960s to late 1970s (Seleka, 1999). By the financial year 2000/01 the contribution of the agricultural sector to the gross domestic products had plummeted to below 3% (Ministry of Finance and Development Planning, 1997).

The net effect of this decline is that food production in the Country is not sufficient to meet the demand. The production of food in the Country is skewed towards beef which constitutes 80% of the total food production. This means that the bulk non-beef products (e.g. dairy, grains, fruits and vegetables) have to be sourced externally. By the year 2014, the Country was importing up to 90% of its food from neighboring Countries, mainly South Africa (Bahta, et al 2017, Competition Authority, 2014). Several reasons have been advanced for this low output. The first reason is that Botswana's climate is largely arid and semi-arid, hence making it not conducive for agriculture (Gumbo, 2016). In addition to the climate not being conducive, crop production is largely traditional, and rain fed though rainfall is erratic and tends to be low (Batisani and Yarnal, 2010). Botswana soils are also generally poor, and the environment is characterized by the presence of pests and diseases. To be productive under such circumstances, farmers need to adopt modern farming techniques, methods and strategies.

In addition to production challenges, the changing retail landscape in Botswana also suppresses farming. The early 1990's saw the increase of South African based franchise Supermarkets and food outlets in Botswana (Competition Authority, 2014). This trend led to the collapse of the small general Dealers which used to buy and sell produce from Farmers. The franchise Supermarkets tend to import most of their food products as opposed to buying from local Farmers and this created market access challenges for Farmers. The Botswana Agricultural Marketing Board (BAMB, established by an Act of Parliament in 1974) remains the major market for both agricultural inputs and outputs in the Country. This apparent monopoly presents a different challenge to Farmers in that the prices for both inputs and outputs are determined solely by BAMB.

The environment in Botswana as outlined above, clearly identifies arable farming as a risky business in Botswana. The major risks appear to be those imposed by climate, soil, diseases, markets access, and product pricing. The success of the farming enterprise clearly depends on the extent to which the farmer is able to manage the identified risks. This paper therefore explores the risks faced by farmers and the strategies they employ to manage such risks.

LITERATURE REVIEW

As an activity, agriculture is subject to a variety of risks which if not managed can lead to food insecurity, hunger, malnutrition and economic downturns and even wars. The risks though originating from a variety of sources and conditions are often intertwined and hence complex for

Farmers to manage. The key sources of risk in agriculture are attributable to weather conditions/natural disasters and human action (Duong, et al., 2019).

Risks of Crop Failure Due to Unfavorable Weather Conditions and Natural Disasters

A contemporary case in risk of loss due to natural disasters is the changed weather patterns in East Africa in the early months of 2020. These changed patterns were unfavorable to both production crops and wild vegetation, a factor which led to poor yields and also negatively affected livestock because there was not enough to graze. The weather patterns also led to the outbreak of the desert locust which destroyed crops and vegetation. The destruction of crops worsened the already poor harvest whilst the destruction of other vegetation led to loss of livestock because of reduced grazing opportunities. The emergence of the locust was attributed to changed weather conditions which favored their rapid reproduction. These weather conditions were also unfavorable for crops and also led to poor crop yield and poor vegetation for livestock (Food and Agricultural Organization, 2020). Many Farmers did not have any pre-determined strategies to avert or minimize losses from locust attacks. Instead, Farmers adopted a somewhat passive risk retention strategy and looked up to Government and aid Agencies to help minimize losses after the locust had already begun to attack. Risks from other natural disasters such as extended droughts, floods, mudslides and strong winds also tend to be “managed” through retention in a similar way. Another common risk of damage to crops is related to extreme temperatures;

..any given crop species will achieve its highest yields, with lowest risk of failure, when it is cultivated as close as possible to the specific temperature optimum for each of the plant’s developmental stages in the course of the growing season (Greaves, 1996: 307).

The main staple crops in Botswana namely maize and sorghum require temperatures of 30 degrees celcius (Greaves, 1996; Miedana, et al 1987; Prasaad et al 2015). The temperatures in Botswana during the growing season are however known to reach as high as 38 degrees Celsius (Botswana Tourism Organisation, 2020).

Mitigation measures were mostly loss prevention strategies ranging from complex scientific methods such as growing plants in temperature controlled artificial chambers to less complex approaches such as erecting canopies and shade nets over plants (Mahan, et al., 1995) as well as the use of greenhouse technology. These methods however, are capital intensive and hence not common particularly among smaller farmers in Africa.

Other prevention strategies include using hybrid seeds which can withstand high temperatures and increase yield by up to 25% (Cairns and Prasanna, 2018). The use of hybrids is popular in Africa as the seeds are made accessible to Farmers through Governmental and Non-Governmental Organizations (Cairns and Prasanna, *ibid*).

For Africa and Sub-Saharan Africa in particular, unreliable or variable rainfall is another risk in arable farming. Sub Sharan African Farmers largely practice rain-fed agriculture, but rainfall is variable (Mukavaro, et al, 2017), hence posing a major production risk. For managing both high and low rainfall, Framers relied on rain forecast to determine whether to plant drought resistant varieties or plants that required high rainfall, a strategy that is reported as being very

effective (Kurukulasiriya and Mendhelson, 2008). Farmers also varied the amounts of fertilizers used in accordance with anticipated rainfall levels. Other effective scientific methods included varying planting times (Mabula and Angassa, 2020) and soil moisture conservation practices such as mulching (Iqbal et al, 2020). Other perhaps less reported methods include holding traditional rituals and ceremonies as well as praying for rain and good harvests (Mukavaro, *et al*, 2017). The extent to which these methods are effective is yet to be reported.

Another emerging method is the use of agricultural insurance which provides for cover against losses arising out of weather- related risks. Zougmore et al (2018) reported that the development and use of such weather-related agricultural insurance in on the increase in Africa. However, the uptake of agricultural insurance, especially among smallholder Farmers remains low (Food and Agricultural Organization, 2016).

Risk of Crop Destruction by Animals, Birds and Pests

Most farming activity takes place in areas also populated by wildlife and birds. In Botswana, the human-wildlife conflict has been topical for some time both in academia and international forums. Elephants in particular, have been known to destroy large fields especially in the Northern parts of the Country (Gupta, 2013; Jackson et, al., 2008). In such instances, Farmers are known to use loss prevention methods known to scare animals or limit their access to the farms. A popular strategy is the erection of high-quality fences to stop animals accessing their farms, although the approach offered limited success against elephants (Mayberry et al, 2017). Other common methods used to limit animal damage include using noise and lights scare tactics, as well as killing problem animals and birds (Gilsdorf et al, 2002; Mwamidi et al, 2012; Mekonen, 2020) . Others are known to have chosen risk avoidance by completely abandoning crop farming (Gupta, 2013). Other pests such as insects and locusts are commonly controlled through the use of insecticides often with the assistance of Government and aid Organizations.

Risk of Loss Due to Human Action and Government Policies

Farmers also have to contend with risks emanating from human actions. Wars and conflicts are known to have interrupted agricultural activities as Farmers stayed away from farming activities and abandoned ploughed fields due to fearing for their lives. In instances where some Farmers attempted to be productive, they met with challenges in sourcing inputs and Labour due to limitations brought in by the conflict. In 2019 for example, the worst yielding agricultural ventures were recorded in conflict zones such as Afghanistan and Syria (Food Security Information Network, 2019). No evidence was found of Farmers engaging specific strategies to manage such risks. Instead, it would appear that when the risks materialized, Farmers depended on International aid Organizations and Governments to help minimize the effects of the losses suffered. The bulk of the literature points to post war recovery and relief assistance offered by aid Agencies (Giodarno, 2011; Muscat, 2005; International Food Policy Research Institute 2002).

Another contemporary case in point is the COVID 19 pandemic which affected virtually all sectors of the economy including agriculture. As populations succumbed to the disease, productivity in the economy suffered because of increased absenteeism due to travel and movement restrictions, Employees falling sick and being on isolation and quarantine. This resulted

in the reduced supply of labour to the farms as well as disruptions in other parts of the supply chain including input supply and output demand (OECD, 2020). In both the Republic of South Africa and the United States of America, in addition to receiving Government relief, Farmers are reported to have responded in various ways to minimize losses and these included changing market channels and diversifying crop output (Wegerif, 2022, Durant et al, 2023).

Farming especially in sub-Saharan Africa is traditionally labour intensive and therefore inherently exposed to risks associated with labour. A key labour risk is absenteeism due to reasons such as sickness (Duong, et, al, 2019: Lobos, et al, 2018), engagement in non-farm activities and labour unrest (Devereux, 2020). Absenteeism due to sickness not only affects agriculture but all sectors of the economy in Sub Saharan Africa reached its peak during the HIV-AIDS pandemic peak in the 1990s and early 2000s. In the same period in Botswana, many Companies reported significant increases in turnover, forced retirement and deaths due to HIV-AIDS related sicknesses (Rajaraman et al, 2007). Farmers have largely relied on Government programs to manage HIV-AIDS related issues.

In sub-Saharan Africa and South Africa in particular, farm Workers are mostly unskilled, paid lowly wages and often work and live under poor conditions (Devereux, 2020). As a result, disputes between Workers and Farmers are common and lead to farm losses. Framers try to manage this risk by improving conditions and having formal contracts for Workers, but the strategy often does not work as some of the reasons for the unrests are beyond the Farmers' control. Other Farmers resorted to employing migrant Workers, who are believed to be more "cooperative" and productive than Locals (Devereux, 2020).

Another inherent risk relates to the reported low farm labour productivity in Africa. Ibidunni et al, (2019) reported that labour productivity in the agricultural sector in Sub Saharan Africa was very low and had in fact dropped between 2014 and 2017. They further reported that this low productivity is also coupled with the increased reluctance of the youth and women to willingly work in farms.

Crime is another increasing risk especially livestock theft and theft of produce and farming implements. In Botswana, livestock theft is a much bigger risk than theft of produce as evidenced by the high number of stock theft cases tried in the Courts. In South Africa, violent criminal attacks on especially white Farmers are also common (Strydom and Schutte, 2005). Such attacks result in theft of a variety of assets and even loss of life.

Other human action related risks are linked to Government regulations and policies. Government policies and interventions just like laws in most cases leave Farmers with very little room for choice but to adopt risk retention and avoidance strategies. The land reforms in Zimbabwe in 1998 and in the Republic of South Africa in 1994 (Rusenga, 2020) are case examples where affected Farmers had no choice but to lose all or part of their farms as a result of the new policy. In the Republic of South Africa, a similar policy "forced Farmers to accept the losses whilst a small number are reported to have sold their farms or diversified from farming in anticipation of the unfavorable reforms.

Financial Risks

Financial risk is defined as the added variability of net returns that results from the financial obligation associated with debt financing (Gabriel and Baker, 1980). This risk results primarily from the use of debt as reflected by leverage (Boehlje, 2012). Uncertainty associated with the cost and availability of debt is reflected partly in interest rate fluctuations for loans and partly through non-price sources. Non-price sources, a type of institutional uncertainty, include differing loan limits, security requirements, and maturities, depending on the availability of loan funds over time, thus, financial risk also includes uncertain interest rates and uncertain loan availability (Miller et al, 2004). Barry, Baker and Sanint (1980) reported that Farmers' reliance on credit as a source of liquidity leaves their financial control subject to lenders' decisions. A study in India discovered that due to interest rates on loans, farmers default on the loan to moneylenders if market prices fall below expectations and many families end up resorting to the distressed sale of fixed assets including live trees of mango, jackfruit, and mahua that are subsequently harvested for wood planks (Shee and Turvey, 2012). In Africa, the major reason for default was cash flow challenges (Jefferis et al, 2012) due to mainly crop failure and market challenges and to manage the risk Farmers engaged in other activities to supplement income (Awunyo-Vitor, 2012).

The situation of credit in Botswana has progressed from the late 1980's when Government used to bail out Farmers for defaulting on loans from the national Development Bank (NDB) to one where Farmers have to deal with the risks on their own. Though several Farmer "friendly" loans are available through institutions like the Citizen Entrepreneurial Development Agency (CEDA) and the NDB, liquidation and foreclosure of defaulting Farmers remains a major risk. The reasons for such risk materializing are varied but are believed to include poor management. There is no evidence to suggest that Farmers are managing this risk, though crop insurance exists in Botswana.

Market Risk and Price Risk

Arguably the biggest market risks facing arable Farmers are market access, produce price fluctuations between planting and sale (White and Dawson, 2005) and the cost of inputs such as seeds, pesticides and fertilizers. Selling produce in formal markets is often difficult because Buyers require certain standards which small scale Farmers in particular, often struggle to meet. Prices are heavily influenced by demand and supply patterns and Government Policies. In Africa in particular, Farmers are largely price -takers and struggle to access formal markets such as chain Supermarkets due to barriers such as lack of information and failure to meet quality standards (Gyau, et al 2014). In Botswana for example, BAMB remains the largest single Buyer of produce and they dictate the price as well as standards. The Government also purchases produce directly from Farmers for its school feeding program but also dictates the prices (Botswana Institute of Development Policy Analysis, 2013).

For managing produce price risks, Farmers especially those in large scale production often resort to contract farming (Otsuka, et al, 2016) and hedging through the use of derivatives such as forward contracts (Hasan, et al, 2018). However, the use of hedging by small scale Farmers is rare, particularly in developing economies. In fact, in Botswana, there is no record of hedging by small scale Farmers. Though small-scale Farmers are also known to engage in contract farming,

the prices are still heavily influenced if not controlled by the Buyers. Other Farmers store their produce in reserve and await suitable prices. Others are reported to study the price movements and ensure that their harvest is ready when market prices increase (Kahan, 2008) Small scale Farmers tend not to manage this risk but rather practice risk retention.

Regarding input price risks, Farmers buy in bulk when prices are favorable and hold in reserve to use in the future. But the majority simply do not manage this risk.

RESEARCH METHODS

Case Study Design and Data Collection

The study used a case study (Yin, 2003 and Stake 1995) to understand the risks faced by Farmers in Mosisili farms and the practices employed to manage the risks. According to Baxter and Jack, (2008) case study is referred to as an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources. Stake (1995) argued that this method ensures that the issue is not explored through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood. Hartley (1994) also stated that case studies are specifically appropriate for exploring new processes or behaviours or ones that are little understood. Yin, (2003) further stated that case study builds an in-depth, contextual understanding of the case, with reference to various data sources. The research objective in this study is to understand the risks faced by Farmers and the methods they used to manage the risks. Though literature about risk management in agriculture maybe abundant, very little about Botswana is available, hence making the topic a less understood one. This justifies the choice of case study.

According to stake (1995) qualitative case study is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources. Creswell (2007) explained that the method guarantees that the topic in question is not reconnoitred through one lens, but many selections of different lenses which allows for multiple facets of these occurrence to be revealed and explained further. Yin (2003) states that the case study methodology; allows research participants to freely express in their own words perceptions, opinions, and points of views the research questions and study. The method is best suited for the current study on risk management practices in agribusiness in Botswana and is hence adopted. The method will aid in acquiring in depth knowledge on the diverse risk that Farmers face in Botswana and thereby also identify high risk factors in agribusiness hence the decision to employ a qualitative case study approach. The sort of data that was required for the current study was the data that could only be solicited through a qualitative enquiry. It needed the participants to express in their own views and reflect on their past experiences and even current risk they face and their level of understanding on risk management practices.

Data for the study was collected through semi-structured interviews from eight out of the twenty-five Farmers in the area. The initial target was to interview all twenty-five Farmers but

because of access limitation and time constraints, only eight were interviewed. The Researchers contacted the Farmers through their (Farmers) Association and requested their participation. Though all Farmers indicated their willingness to participate in the research, the difficulty in matching the availability of some Farmers and that of the Researchers led to only eight being interviewed. Only one Farmer was interviewed at the farm whilst seven were interviewed at the city, again because of timing constraints. appropriate as all Farmers in the region planted similar crops and were likely exposed to similar risks.

Data Analysis

The data collected was analysed using the thematic content analysis method (Aderson, 2007). The method enables the Researcher find common patterns across within the data (Rucker, 2016). And finally, the write-up which was done by creating a coherent narrative that includes quotes from the interviewees. The quotes from the interviews are used in the write up for emphasis of point.

RISKS AND RISK MANAGEMENT AT MOSISEDI FARMS

The Case Setting: Mosisedi Farms

The Moses Idi farms are located in the Southern District of Botswana. They are a body representing 25 commercial farmers in the Ngwaketse South, and are the second largest commercial Farmers Association after the Pandamatenga Commercial Farmers Association. Mosisedi commercial Farmers Association covers over 25 000 hectares of farmland and grow crops such as maize, sorghum and sunflower. Mosesidi Farmers engage in dry land farming and hence depend heavily on rainfall. The rainy season in Botswana starts in October and ends in March, and rainfall varies by locality. The exact time the rains starts is never known and therefore rainfall periods are unpredictable and unreliable (Statistics Botswana, 2010). According to Botswana Environment Statistics (2015), the average annual precipitation for the Southern District sub-region is between 350 mm and 550 mm. The area is home to a variety of wildlife excluding the elephant, which is notoriously known for destroying crops in other regions of the Country. The Mosesidi Farmers use both old and new methods of farming. The new methods of farming include usage of improved drought and heat resistant seeds and plant spacing. They use state of the art machinery including tractors, planters and harvesters. On average they produce over 100 metric tonnes of Sorghum and Maize per season. The association sources their farm inputs mainly from BAMB, South Africa and other local Suppliers. The main customer is BAMB and local Millers and Breweries. A small portion of their produce is exported to neighboring South Africa.

Risks and Risk Management Strategies

Environmental Risks

Environmental risks emerged as a major risk faced by all Farmers. Three environmental risks mainly inadequate rainfall, extreme heat and destruction by wild animals and birds were identified by all Farmers.

Inadequate Rainfall

Farmers lamented that the unpredictability and inadequacy of rainfall was a major threat.

“Even though I have adopted other forms of irrigation, the farm is also dependent on the presence of rainwater for irrigation. Of late there has not been any rainfall and this is proving to be a very big challenge. Crops die and we only harvest the little that we can. This is really bad for the farm and there is really nothing we can do about it” [Farmer 1].

“Water has always been a challenge. Water scarcity does not only affect the quantity but the quality of our produce. It has not rained in a long time, and this poses a big threat. Unless we come up with other new ways of irrigation, we are facing a big risk indeed” [Farmer 2].

To manage this risk, some Farmers have drilled boreholes in an attempt to venture into irrigation farming which they are yet to fully utilize. Even with boreholes, the water is insufficient, and they have to rely on rainfall forecasts to influence how much to plant;

When drought is forecasted we plant less” [Farmer 3].

Another strategy which is more effective is the use of hybrid seeds.

“We buy drought resistance and early maturing seeds from SEEDCO and the harvest is much better than the traditional seeds of maize” [Farmer 6].

Extreme Heat

The second most cited environmental risk was the possibility of extreme heat which damaged crops. Farmers reported that to avoid loss of crops due to heat stress, they again relied on the weather forecast and planted crops and seeds that cope with the predicted temperature ranges;

“We have studied the current change in weather patterns so as to plant the right crops at the right time. We have realised that there are crops which perform well during the hot season and others that thrive during the cold weathers. We then therefore plant accordingly. This strategy makes a lot of difference” [Farmer 1].

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Another option available to all Farmers is the Government insurance program which only provides cover against drought. Farmers however lamented that the program was not very effective since it only paid out upon Government declaring the area as being drought stricken.

Wild animals and birds and pests

The farms are located in areas populated by insects, wildlife and birds, which eat and damage crops if not controlled. Weeds which also grow in the field suffocate crops. With pests, Farmers used chemicals to control and eradicate them, a method deemed highly effective;

“Pesticides are very useful in the sense that they increase farm profits by helping me save money on labour costs because by pesticides I reduce the amount of time required to manually remove weeds and pests from the fields” [Farmer 7].

Qualia birds and baboons were reported as the most destructive wildlife. These are managed through the use of various scare tactics such as noise bombs and cannons and more mundane methods such as scare crows and personally scaring away the wildlife.

Market Risks and Price Risks

Farmers reported market access and price fluctuations as the major market risks. The market in Botswana, they reported is monopolized by the BAMB who control market access, input and produce prices;

“Currently, Botswana Agricultural Marketing Board is the only existing body that regulates market for Agricultural produce. This means that the agricultural market including price changes are regulated by them. There is no competition for market” [Farmer 8].

“When we take our products to the market, they are returned because they are reported not to be of the required quality” [Farmer 6].

To manage the risks of products being rejected by BAMB, Farmers reported that they self-grade products and only deliver to BAMB those that meet the standards and sell the rest to local Consumers including livestock Farmers. That way, the losses arising from transporting rejected products from BAMB is minimized. Farmers however lamented that selling to local Consumers was not the best option since individual Consumers only purchased small quantities, which often results in cash flow challenges. Regarding input prices, Farmers sought favorable prices from Suppliers in the neighboring Republic of South Africa. Farmers also sold produce to Customers outside Botswana provided logistics costs are also favorable.

Financial Risks

Farmers reported two major financial risks namely rising input prices and interest rates. Farmers lamented that costs of machinery and spares and inputs such as fertilizers and pesticides increase frequently. They explained that they have no control over input costs as prices they are “controlled” by the Supplier.

“Prices [of inputs] are regulated by BAMB and our efforts to negotiate price changes have come to no fruition” [Farmer 8].

“So much money is spent on input costs that the profits are reduced” [Farmer 6].

To manage the challenges imposed by rising prices, Farmers often took personal (not business) loans to balance out the cash flows. The loans bring in the additional risk of rising interest rates as Financial Institutions sometimes revise their interest rates in line with the pronouncements by the Central Bank;

“So much money is spent on input costs that the profits are reduced. I have spent so much money on buying farm equipment which most of it was acquired as a loan. Now it looks like most of the earning I get from the farm go straight to paying the loan off because of the interest rate. This has proven to be a very difficult business” [Farmer 6].

To manage, interest rate risk, all Farmers reported that they relied on income from other sources to support the farming operations. These included income from other employment, personal loans and livestock sales.

“Myself I am a fulltime employee at the bank. I use my salary to support my farming business I use it to pay employees and buy input especially during the planting season. I have learnt that I should always have a plan B” [Farmers 7].

Human Action and Government Policies

Two major risks were reported in this category, namely poor labour productivity and Government’s immigration and labour policies and laws. Farmers reported that more often than not, locals employed in the farms tended to have low productivity largely because of poor work ethic, absenteeism and high turnover.

Farmers reported that majority of their Employees were unreliable and often went absent without leave or even absconded. They also lamented the unpredictable productivity of local Employees. To deal with the unpredictable productivity some Farmers resorted to employing Foreigners, mainly Zimbabweans but they also were unreliable and prone to absconding. Another problem was posed by the laws governing the employment of foreign labour. According to Farmers, the amount of time required to get a work permit was unpredictable.

“I tried to get labour by hiring Zimbabweans but the process of acquiring permits is difficult, unclear and long and sometimes you give up along the way” [Farmer 5].

In cases where acquiring permits was successful, an additional risk was that of desertion;

“When Zimbabweans go home on holiday, you are just never sure if they will return either because of immigration issues or simply because they no longer want to work for you. The painful thing is there is nothing you can do about this” [Farmer 5].

CRITICAL REFLECTION AND COMMENTARY

A key emerging conjecture from the data is that Farmers were aware of most of the key risks facing their operations. All Farmers clearly identified and articulated environmental risks (mainly weather, animal and pests), market, finance and human action related risks as the key risks they faced. These risks were in general similar to those faced by Farmers both within and outside the Southern African region (e.g., Kurukalasuriya and Mendeson, 2008; Mahan *et al*, 1995; Zougmore, et al, 2018). A total of eleven major risks were identified by Famers in four different categories of environmental, market, financial and human action/ Government policy related risks. Environmental risks were the most common (four) followed by market and human action/Government policy risks (three each) and only one financial risk was identified. The

identified risks were managed through risk financing, retention, loss reduction and loss prevention, with retention and prevention the popular strategies. Three further findings however warrant further reflection. These are reflected on below.

The BAMB Factor

BAMB emerged as a key organization in risks faced by the Farmers. Two risks, namely commodity price risk and market risk were directly traceable to the organisation whilst interest rate risk was indirectly traceable. These risks were also intertwined not only because of the “BAMB factor” but partially because of the market structure.

Farmers faced the risk of unfavourable action by BAMB, an Organisation who controlled commodity prices of both farm produce and farm inputs and implements. The double-edged price risk was that prices of inputs and implements could be hiked while those of produce dropped. The input price risk is pre- production whilst the output price risk is post -production. Another post-production risk was market risk emanating from the possibility that BAMB could “reject” or decline to buy the produce on grounds that it is not of the required quality level. A major issue with rejection is that it often took place upon delivery to BAMB hence resulting in extra costs of returning the produce to the farm or selling it to BAMB on the cheap.

Though the finding about the input and output price risks and risk of produce being rejected by Buyers is consistent with literature (e.g., White and Dawson, 2005; Gyau, et al 2014), it is less common in that in this case study, all these risks were associated with one Organization. This therefore meant three separate and possibly independent strategies were required to manage these interrelated risks arising from associating with one Organization.

The strategies devised, were not inconsistent with literature but differences in detail existed. Regarding price risk, some Farmers bought some items, especially fertilizers in advance of price announcements for the new ploughing season. This strategy offered Farmers ‘protection’ from anticipated price increases whilst at the same time also denying them savings from any price reductions the same way a forward contract (Bessembinder, 1991) would. On paper, this appeared a sound strategy if only because it guaranteed that the Farmer would not have to transact at any higher future price. Others simply practiced passive retention and hoped prices for the next season would be favourable. On the issue of price of produce, some Farmers practiced loss reduction in that they would look for Buyers who offered better prices. This was because they only knew about BAMB prices after planting and sometimes after harvesting.

The financial risk identified by Mosisedi Farmers were also largely linked to BAMB. Because of the input price risks, Farmers had to contend with financing cashflow shortfalls for their overall operations. Whenever, the risk materialized, Farmers responded by injecting funds from non-farming activities. In particular, one Farmer reported having to uptake formal full-time employment specifically to support his farming operations. This somewhat unique strategy represents a different type of risk financing where the risk is retained but financing sourced from a “third party”. This raised questions regarding the status of farming as a formal full-time employment or business venture, which requires further research.

Hazard Substitution?

One of the risks identified was that of poor labour productivity, reliability and availability of locals. The strategy used by some Farmers to manage the risk of losses due to unproductive and unreliable local labour was to engage migrant labour from Zimbabwe. This practice however appeared to reduce only the risks of losses associated with poor productivity but not necessarily addressing those associated with unreliability and unavailability. Farmers reported that with migrant labour, there were always risks that they would not return from holidays and travels to their home Country, a risk which they passively retained. This is consistent with the general objecting of risk management which is to reduce the risk/loss as opposed to completely eliminating it. This can further be understood within the concept of hazard substitution as used in the natural sciences, particularly in chemistry. According to the European Agency Safety and Health at Work (2003) hazard substitution refers to the act minimizing or reducing risk by replacing the hazardous with the less hazardous or the dangerous with the less dangerous. This can be used to explain the strategy of replacing of local labour who were deemed unproductive and unreliable (dangerous/hazardous) with migrant labour who were deemed more productive but still unreliable albeit in different ways (less dangerous/hazardous). As with all other strategies observed at Mosisedi, only further research can assess the success of hazard substitution as a strategy for managing labour related risks prevalent at the farms.

Risk Financing Through Capital Injection

Risk Financing involves provision of funds to finance costs of losses (Young, 2022). A somewhat unique strategy was the dependence on funds sourced from off-farm activities to plug cash flow gaps and losses from commodity price and interest rate risks. Despite dependence on “externally sourced funds”, this strategy could not be appropriately described as risk financing because in risk financing, the funds are provided by the business and not by a “third party”. The strategy if anything was somewhat similar to risk retention. But risk retention as a strategy is mainly characterised by the lack of specific measures to either reduce the possibility of the loss occurring or reducing loss size. Despite identifying and recognizing the risk, no specific measures are put in place with the understanding that should the risk materialize, any associated losses will be “absorbed”. This strategy is appropriate when the possibility of the risk materializing, when the loss size is low or when the loss size is too large to be managed in a cost - effective manner. The strategy applied by Mosisedi Farmers however could not be adequately described as risk retention mainly because both loss size and possibility of loss were significant. The loss could not be absorbed and managed by the farming business in a cost-effective manner. The fact that Farmers had to finance the losses using funds from off -farm activities is a clear indicator of the latter. Could the strategy be regarded as a form of risk transfer? Risk transfer would imply that the risk is transferred to a third party in exchange for a fee (Strupczewski, et. al, 2016) but in this case no risk transfer, third party nor fee were involved.

Overall, this “strategy” involving the provision of funds by the business Owner could not be adequately described as any of the formal strategies. Instead, it would appear that the Farmers simply injected capital into the business to help manage risk. This possibly unique strategy could be understood as an extension of the traditional risk financing strategy. We thus term it risk financing through capital injection.

Insurance

A somewhat indirect and inherent finding of this research is the lack of insurance as a risk management strategy adopted by Farmers. Although the focus of the study was not on insurance, it became conspicuous in its absence simply because it is one of the most commonly used risk management strategy. This finding is consistent with the situation in the rest of the continent where the uptake of crop insurance is reportedly very low (Nhakira-Rukundo et al, 2021) Although insurance is a common risk financing strategy, none of the Farmers reported taking it up. This is worthy of further research aimed at understanding the underlying reasons.

SUMMARY AND CONCLUDING THOUGHTS

The study identified the main risks facing Mosisedi Farmers and the strategies they employed to manage such risks. It emerged that Farmers were largely aware of the risks they faced and had deliberate strategies of managing them. By and large the strategies used to manage the identified risks were consistent with those used by Farmers elsewhere. Also consistent with findings from other studies, was the indirect finding that crop insurance was not one of the strategies used by Mosisedi Farmers.

Three areas were identified which appeared to be unique to the situation of Botswana. The first was the role played by BAMB as an organization who posed risks at both pre-production and post -production levels. This led to three different but intertwined risks which led to Farmers devising separate strategies for managing them. The second key finding was the implementation of a strategy we described as risk financing through capital injection. This was an extension of the traditional risk financing. Attached to this finding was the key role played by the Farmer's ability to earn other income in order to execute this strategy. The last key finding was the implementation of a strategy we described as hazard substitution to manage labour related risks.

Because of scope limitation, the study identified key areas worthy of further research. The first of these is to explore and understand reasons why Farmers were not taking up insurance as a strategy. The second area is an assessment of the efficacy of the strategies adopted. Only one strategy of planting seeds suitable for expected weather conditions was hailed as being very effective. Regarding other methods, Farmers did not clearly state whether or not they were effective. Lastly is the status of farming as a full-time business venture. This arose from the observation that the strategy of risk financing through capital injection depended on the Farmer having another source of income.

The study also revealed that Farmers used passive risk retention to manage most of the risks identified. Risk retention as a strategy is only effective for risks with small loss sizes and/or loss frequencies. But since the Farmers used it for risks with high loss sizes and frequencies, it can be concluded that the risk management practices were largely ineffective and needed improvement.

Finally, as with all case studies we caution against generalizing these findings. The findings should be understood withing context. Our conclusions remain conjectures and we encourage further research to test them and to develop them into coherent theory.

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