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"The Viability of a Crop Insurance Scheme; A Case Study - Guyana"

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Abstract

Guyana is a developing tropical country on the Atlantic coast of South America and a member of the Caribbean Community (CARICOM). Guyana has a land mass of 214,970 sq. km and the current estimated population is 772,298 with approximately 90% living on the coastal land of the country. This is a narrow strip of land which constitutes only 10% of the total land mass, but provided 90% of its cultivation land. Guyana 's coastal plain is below sea level and its muddy and clay soil texture makes it ideal for rice cultivation. The cultivation and export of sugar, rice along with gold, bauxite, shrimp and timber contributes to the country approximately 60% of its Gross Domestic Product. Guyana has two major rainy seasons per year- May to August and November to January, which can result in overflow of rivers causing the agriculture sector to suffer losses mainly from flooding, especially flash floods.

This research aims to investigate the viability of a crop insurance scheme in Guyana. This is because the current system by the government to provide relief to farmers affected by crop failure for whatever reason is not sufficient to compensate them for full extent of the losses suffered. Current data obtained Windward Island Crop Insurance Limited suggest that there are crop insurance in other CARICOM countries providing significant assistance to farmers especially in the Windward Islands which are prone to hurricane of increasing magnitude.

Keywords*: Crop Insurance, Government Aid & Windward Island Crop Insurance Limited.*

Introduction

This paper looks at the sustainability of the implementation of crop insurance in Guyana. A comparative analysis is undertaken comparing the type of crop failure relief available to farmers, in Guyana (Government intervention/ aid) in the event of natural disasters, to that of the crop insurance scheme available to farmers other Caribbean countries and in particular that in the Windward Islands (Windward Island Crop Insurance Limited)

According to Wenner (2005), the effects of natural disasters are as follows:

- Decrease in income for farmers and their workers due to a corresponding decrease in employment.
- An increase in the prices of food items due to decrease in local produce.
- A decrease in exports and export income.
- An increase in loan/ credit defaults to financial intermediaries and suppliers by farmers due to their decrease in income.

Crop insurance is a valuable risk management tool that allows to farmers to insure against losses due to adverse weather conditions, fire, insects, disease and wildlife[1] .There has not been a published feasibility study for crop insurance in Guyana to date , nor critical review of the existing system whereby government continually bailout farmers when there is a disaster . There are, however, efforts by international lending agencies such as the Inter-American Bank looking at the feasibility of crop insurance in the wider Caribbean already in existence is The Caribbean Catastrophe Risk Insurance Facility, which is the 'Caribbean's Government Insurance Fund for Earthquake and Hurricane Catastrophes'; however, Guyana is not a member of this Facility.

This paper investigated the model of Government aid in Guyana, and compared it to the crop insurance scheme WINCROP, while also investigating the sustainability of these schemes in order to

[1] Source: The Pennsylvania State University, 2008.

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identify the feasibility of crop insurance over Government aid and also the possibility of implementing a crop insurance scheme in Guyana against flooding, their major natural disaster.

Research methodology

The main research method used is the 'Explicatory Method' whereby historic data is gathered from people and written sources in order to explain a current or future situation. The explicatory method is not a purely descriptive one but also requires critical evaluation of the results gathered. This method is best suited for this dissertation as we are investigating the current situations in Guyana and Windward Caribbean region with respect to financial relief available to farmers in the event of natural disasters in order to determine the more favorable and sustainable financially and the future opportunities available.

Data gathering techniques

The data collected will be both quantitative and qualitative; however, both types will be analyzed qualitatively using the explicatory method.

Interviews conducted face to face (or telephonic) between the interviewer and interviewee in order to gain information and insight from the latter. This allows for the gathering of primary data which may be more credible and accurate than secondary data as it is straight from the source. It is also advantageous in that there is immediate feedback and an opportunity to clarify or investigate further into a question. Therefore, all data obtained from this research was secondary.

This research looks at the sustainability of the implementation of crop insurance in Guyana. A comparative analysis is undertaken comparing the type of crop failure relief available to farmers, in Guyana (Government intervention/ aid) in the event of natural disasters, to that of the crop insurance scheme available to farmers other Caribbean countries and in particular that in the Windward Islands (Windward Island Crop Insurance Limited).

Identification / defining research problem

The effects of natural disasters are as follows:

- Decrease in income for farmers and their workers due to a corresponding decrease in employment.
- An increase in the prices of food items due to decrease in local produce.
- A decrease in exports and export income.
- An increase in loan/ credit defaults to financial intermediaries and suppliers by farmers due to their decrease in income.

Farmers are particularly affected by the effect of natural disaster. However, because of the interconnectedness of farming to the rest of the economy not the only persons directly affected by natural disasters suffer but the country as a whole. Because of this ripple effect it is pertinent that there is a sustainable and reliable form of relief to compensate farmers in the event of natural disasters. Crop insurance is a valuable risk management tool that allows farmers to insure against losses due to adverse weather conditions, fire, insects, disease and wildlife. There has not been a published feasibility study for crop insurance in Guyana to date, nor critical review of the existing system whereby government continually bailout farmers when there is a disaster. There are, however, efforts by international lending agencies such as the Inter-American Bank looking at the feasibility of crop insurance in the wider Caribbean already in existence is The Caribbean Catastrophe Risk Insurance Facility, which is the 'Caribbean's Government Insurance Fund for Earthquake and Hurricane Catastrophes'; however, Guyana is not a member of this Facility. This research will also investigate the model of Government aid in Guyana, and compared it to the crop insurance scheme WINCROP, while also investigating the sustainability of these schemes in order to identify the feasibility of crop insurance over Government aid and also the possibility of implementing a crop insurance scheme in Guyana against flooding, their major natural disaster.

The main research question that arises based on current research conducted so far is;

'Is Crop Insurance Viable in Guyana?

Expected output

This research is expected to build the capacities of all stakeholders inclusive of government agencies of the potential and extreme cost benefits that exists for the establishment of a crop insurance scheme in Guyana. Further, the Government of Guyana should persistently explore joining with studies currently conducted around the Caribbean and draw from their experience and available resources in order to develop a strong regionally structure of a crop insurance scheme. Guyana should also exploit partnerships agreement or form strategic alliances with other developed countries outside of the region such as China and India to gain insight and resources into their scheme.

Societal and scientific relevance

This study will provide valuable insights on the risk factors prevalent to the rice sector in Guyana and how guaranteed options can mitigate risk and add value to the overall benefits to product value and revenue. Other determinants such as risk appetite of famers, climate change effects and coupled with competitive global markets are facets to be considered. Additionally, with the reduction of aid from developed countries, smaller countries like Guyana need to provide long term protection and financial support to its farmers and this can only be sustained through investment in the appropriate framework and infrastructure preferably with the establishment of a "stabilization or contingency fund." Further, a booming agriculture sector will auger well for strong macro activities and development for Guyana.

Literature review

Crop Insurance vs. Government support. According to the Committee on World Food Security (2003), Dominica and its food security are no longer highly vulnerable to effects of tropical storms due to several factors which includes "Risk spreading" due to the introduction of WINCROP, their compulsory banana crop insurance scheme.

Other supporting evidence for the value of crop insurance schemes throughout the rest of the world is:

- Rickey Bearden (T. Nelson, 2009), Chairman of NCC's Crop Insurance Task Force (USA): "crop insurance must be developed, delivered and administered as an effective risk management tool and innovative policies must be developed to make crop insurance more useful in various and ever-changing production conditions." Bearden, who has been in the agricultural sector for 34 years, considers insurance coverage in Texas as a risk management tool to be as important as any other production input.
- Jerry Moran (S. Kuschmider, 2009), Subcommittee Ranking Member, House Agriculture Committee: "The crop insurance program is of significant importance to farmers across the nation. Farmers often tell me they could not continue to function without it. In a report published by CTA and Inter-American Institute for Co-operation on Agriculture (IICA), it is stated that agricultural insurance is critical for any successful agricultural scheme. They also claim that there is considerable scope for the private sector to be involved in this area and key factors in the successful implementation of such schemes include (CTA, 2007):
- Sound open market criteria
- Appropriate ratings of premiums
- Support from Governments

Here we see that even with the implementation of a crop insurance program, there is still a degree of dependence on the Government.

According to a press release by the Government of Dominica in October 2007, they provided EC$ 2.8 million to banana farmers who sustained losses due to Hurricane Dean. Of course, in any major natural disasters with or without crop insurance schemes, governments will still be required to contribute to the disaster relief due to the disproportionate size between the losses suffered by major disasters and the capacities of insurance companies. Once the Insurance Company has not come to the point where they depend solely on government subsidies then they will reduce the burden on the government and government funds by a percentage. Also, obviously crop insurance seems to be very sensitive and unsustainable. In Brazil, the Southern neighbor of Guyana, the crop insurance market declined 50% from 2003 to 2005 due to prolonged droughts. Even with this occurrence, it is thought

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that an increase in crop insurance along with sustainable farming practice and state subsidy are tools that will help Brazil deal with the effects of drought (Candel, 2007). However, with the decline in crop insurance due to these conditions how can they re-implement the scheme and make it flourish.

Other risks to the insurance scheme are (Department for International Development, 2004):

- Past climate patterns are not a viable predictor for the future due to our changing climate.
- Reluctance of farmers to take up insurance unless it is mandatory

There is a lack in the crop insurance market and a need for international insurance companies to share their experience and technical skills in developing such. It is also vital that there is cooperation among countries facing the same threats and access to international reinsurers (Candel, 2007).

With all these factors acting as a deterrent to the successful implementation of crop insurance, the alternative of depending on support through Government aid seems to be the more attractive option. However, government support is costly to the country and has serious effects on their monetary and fiscal policies (Skees et al, 1999). This brings about a need for an alternative self-sustaining program. This is seconded by Wenner (2005) who states that a lack of crop insurance leading to ad hoc, post interventions can have 4 major effects on the government and country:

- Interfering with budget plans and administration due to funds having to be reallocated to these disasters from other planned areas. In developing countries especially this can result in deficit financing leading to an increase in bank interest rates which in turns affects the farming industry again by making much needed lending too costly.
- The creation of 'moral hazard' in which farmers rely on the fact that they will receive government relief and as such do not make an effort to reduce their susceptibility to disasters. As such the government will forever have to be providing aid to the agricultural industry as there is no incentive to fix the situation. Also, this deters the attractiveness for insurance companies to enter and offer a potentially costly scheme as farmers would prefer receiving tax-free aid rather than paying premiums.
- Due to lobbying by an influential group of farmers, government may be requested to provide aid. In some cases, the influential group of farmers may not the ones who are in most need of aid. Wenner (2005) suggested that to counteract this, government should only provide aid in instances where insurance companies do not.

The provision of government aid may result in utilization of debt forgiveness of agricultural loans which affects banks' solvency, etc. and discourages them from offering financial facilities in the future hindering the expansion of the agricultural sector. Only larger scaled farmers who are more stable will be able to access financial facilities thereby increasing the gap between the small/poor and larger scaled/well off farmers.

Government aid in guyana and the possibility of crop insurance

In Guyana in 2005, there was the worst flood in a century which caused approximately 59.5% damage to the country's GDP due to Guyana being an agriculture-based economy. In Armendariz and others' report on 'Identifying Binding Constraints to Growth in Guyana' (2007).

It was highlighted that the agricultural industry has suffered due to current climatic changes and a lack of crop insurance to mitigate the risk of such natural disasters among other factors. This idea of the need for crop insurance in Guyana in order to improve security in the agricultural sector has been around for some time now, for example, in 2001, in a political candidate's manifesto, one of the methods planned in order to 'resuscitate the rice industry and secure its future' was to implement a crop insurance scheme (Peoples National Congress, 2001).

The Guyana Ministry of Agriculture has also suggested that in order to compensate for the risks of climatic disasters to the agricultural industry there is a need for crop insurance. However, it has also been pointed out that insurance companies are not interested in such insurance schemes and as such alternatives will have to be developed. An alternative suggestion was to develop a self-insurance scheme which would require an initial contribution by the Government into a fund to be maintained for

farmers for utilization in the event of natural disasters writing off the implementation of a local crop insurance scheme[2] .

CARICOM, of which Guyana is a member, is investigating the development of a disaster relief program in the form of agricultural insurance which would include relief for flooding, etc. It is unclear if and to what extent Governments will have to provide financial support to such a program. So far, there has been no definitive decision on such a program[3]

Further, the Government of Guyana is promoting its 'Grow More' campaign to encourage the agricultural industry to produce more locally and help to mitigate the rising food costs in Guyana. However, to sustain this campaign, there needs to be improved security in the industry against unpredictable, adverse climatic conditions. One subsequent consequence of the lack of security which is also a deterrent in the industry to the farmers is difficulty in obtaining financing.

This difficulty is shown in the limited funds set aside for banks in their budgets for this industry and also their high interest rates which farmers may not be able to afford. The Government stated that in order to overcome this, government intervention may be needed here again. Also, crop insurance is needed as well (Government Information Agency, 2008). However, as said before, local insurance companies are not open to this scheme, therefore it seems there will be a prolonged reliance on government intervention. The question arises, why is there reluctance for local insurance companies to develop a crop insurance scheme.

Windward island crop insurance limited (W INCROP)

According to a report by Benson and Clay in 2001, WINCROP has been successful due to the following factors:

- A well-defined market
- A straightforward and reliable structure for collecting premiums, assessing losses and Paying out.
- The company is owned by well-developed and invested organizations and boards within

The island making reinsurance easier to access.

Even though banana plants are very susceptible to damage by winds of and over 40 mph, the recovery of the industry is fairly swift partially due to farmers being encouraged to re-enter the industry due to financial compensation and protection from WINCROP[4].Hurricane David (1979), Frederick (1979) and Allen (1980) all caused severe damage for the banana farmers in Dominica; however this subsequently increased their share in the banana market globally. This is reflected in the diagram shown below (Benson, Clay, 2003). A similar situation is predicted to occur in Guyana where the Guyana Rice Development Board is predicting an increase in the demand for rice exports due to the major climatic disasters which occurred recently and the continuing unpredictability of weather worldwide. The banana industry was able to meet this demand even after the natural disasters due to the presence of WINCROP among other factors.

However, the sustainability of this scheme is being threatened due to (Benson, Clay, 2003):

(1) Risk being insufficiently widely spread when all the islands are affected the same time by natural disasters.

(2) A decline in the banana industry due to a decrease in its profitability. To overcome this, an option would be to diversify, however this is restricted due to legislation and high reinsurance premiums.

Also, in another report by Mechler and others in 2006, other issues arising with WINCROP are as follows:

- There are complaints by farmers that the premiums are too high while the payouts are too low.
- Farmers are against having mandatory insurance.
- As a result, at the end of 2004, there were 20% of the premiums being in arrears affecting the company's liquidity.

[2] Ministry of Agriculture, 2007

[3] Government Information Agency, 2008.

[4] Note: WINCROP was largely responsible for the re-development of the industry after Hurricane Hugo (Benson, Clay, 2003).

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In the event of continued disaster, this scheme would not be sustainable and in the event of its collapse, government intervention would have to be sought.

Insurance model parametric

The Inter-American Development Bank is also performing a study on the feasibility of an agricultural insurance scheme in Jamaica using the parametric insurance model. Parametric insurance is "a type of insurance that uses a model to calculate damage post-catastrophe. This means that unlike traditional insurance, loss adjusters do not need to tally damage after catastrophe occurs, which can take months or even years. It is the estimated loss, calculated totally objectively, which dictates whether or not a policy triggers and how much the payout will be."[5] EU funded All ACP Agricultural Commodities Program, noted problems relating to traditional agricultural insurance as being moral hazard and high costs.

Reinsurance

For insurance schemes to be profitable, the total premiums paid by farmers need to be in excess of their total claims. As this does not occur every year due to increased number of disaster events or administration costs, international reinsurers have to step in.

Without reinsurance and government subsidies, crop insurance would fail and the cost of the risk would be passed on to the farmers making it too expensive.[6] Conversely in the current economic

In developed countries utilizing traditional crop insurance, government largely subsidies this e.g. Government in USA pays 100% of the premiums for Catastrophic Crop Insurance. In Guyana, the only aid to farmers affected by flooding is Government relief. Therefore, the question arises, should the insurance companies implement this crop insurance or should the existing system of Government relief prevail as it is too risky in the current environment?

The rest of the world

Such insurance is important in developing countries due to the domino effect of uninsured farmers adapting low risk strategies, yielding lower returns, an economic disadvantage for the already disadvantaged, and in a disaster losing their produce casting them further into a spiral of destitution. This was repeated by Wenner (2005) in his report in which he states that due to a lack of insurance farmers continue to produce inside its production possibility curve and increases its chances of remaining below or close to the poverty line. The frequency and intensity of disasters are predicted to increase as there has been an 87% increase in hydro-meteorological global hazards in the last 20 years to 2007. Therefore, there is a growing need to find ways to mitigate the effect of the resultant losses.

There have been new government initiatives set up to deal with mitigating the losses[7]:

- Pooling cash reserves – This is prevalent in the Eastern Caribbean Bank. However, as the cash used for loss relief is in terms of a loan, it has not been utilized.
- Indemnifying debts - This was set up by the Commonwealth Disaster Management Agency to provide affordable insurance to government.
- Pooled insurance
- Catastrophe financing instruments e.g. catastrophe bonds
- Calamity Funds – As seen in Mexico where the Fund for National Disasters was developed with the support of international agencies.
- Micro-insurance

There seems to be a trend to find alternatives other than crop insurance because of the high risks involved. In the Caribbean, there is the Caribbean Catastrophe Risk Insurance Facility where payouts are based on the intensity of the disaster rather than the actual damage. Guyana is not a member of this facility and it also does not cover agricultural losses specifically therefore in 2006 when Hurricane Dean hit the Caribbean community causing tremendous losses to the agricultural industry, there were no

[5] The Caribbean Catastrophe Risk Insurance Facility, 2009
[6] Miranda, Glauber, 1997.
[7] Department for International Development -2004 Adaptation to Climate Change.

payouts from this facility. The AACP also does not believe that this facility will be beneficial to small scaled farmers and appropriate for covering agricultural losses due to natural disasters.[8]

Findings and discussion

Guyana's coastal plain is below sea level and this makes it ideal for rice cultivation. The cultivation and export of sugar, rice along with gold, bauxite, shrimp and timber earns the country approximately 60% of its Gross Domestic Product[9].Guyana has two major rainy seasons per year- May to August and November to January, which can result in overflow of rivers causing the agriculture sector to suffer losses mainly from flooding, especially flash floods as shown in Figure 1, January, November and December rainfall amounted to approximately 200 mm and the heaviest between May to July to approximately 300mm. In January 2005, rainfall was 1108.2mm, almost six times the 30-year average.

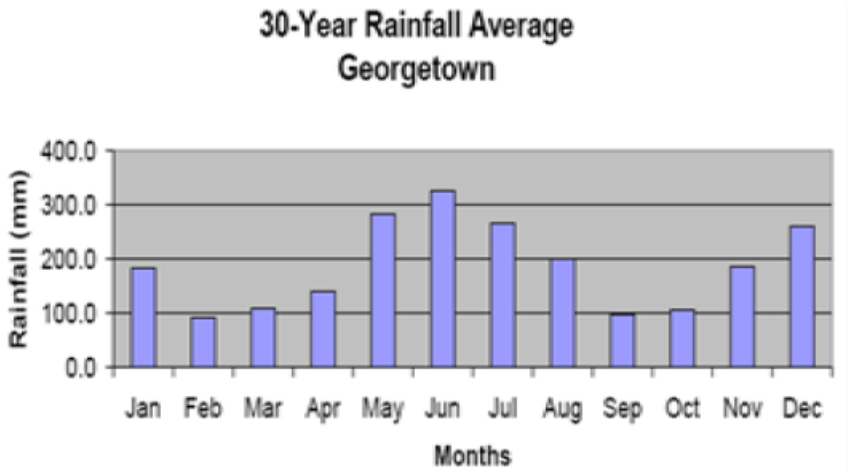

Figure 1. Column chart depicting one year's rainfall average in georgetown (ECLAC, 2005)

Source: Economic Commission for Latin America and the Caribbean -2005**.**

Guyana has 16 registered insurance companies, none of which offer insurance to farmers for loss of crops due to flooding[10].Therefore the Government and Non-Governmental Organizations usually come to their aid with financial or other relief. An example of the amount of relief given to the entire country as result of the floods in December 2004/ January, 2005 by NGO's and other supporting countries is shown in the table 1.

Classes of Insurance Business are defined in Schedules 1 and 2 of the Insurance Act 1998.			
Classes:	**Long-Term Insurance**	**Classes:**	**General Insurance**
1	General Life	1	Accident and Liability
2	Health	2	Auto
3	Annuities and Pensions	3	Marine and Aviation
4	N/A	4	Fire

[8] (Erin Bryla, World Bank, 2008).
[9] Source: Central Intelligence Agency(2009)
[10] Source: Bank of Guyana Website www.bankofguyana.org.com

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Table 1. Table of relief assistance for flooding in 2005 (ECLAC, *2005*.) relief assistance by agency and amount as at february 25.2005.

Donor	**Amount (USD$)**
U.S. Government	50,000.00
USAID	653,000.00
DIFID	263,200.00
IDB	200,000.00
European Union	910,000.00
CIDA	37,240.00
UNDP	100,000.00
UNICEF	116,269.00
PAHO	100,000.00
CDB	50,000.00
France	62, 500.00
China	100,000.00
Alúmina & Bauxite Co.	100,000.00
Japan	120,000.00
OAS	15,000.00
Guyanese in New York	8,573.00
Atlantic Tele Network	50,000.00
GBTI	15,000.00
Others	27,884.00
South Korea	30,000.00
Trinidad & Tobago	384,000.00
Germany	100,000.00
IICA	40,000.00
Total	3,742,666.00

As seen from the table above, the European Union was the highest contributor of $ 910,000 us dollars, followed by USAID with $ 653,000 and Trinidad and Tobago with $ 384,000.00. A total percentage average of approximately 52% of the total contributions received.

Windward islands

The Windward Islands agriculture output consists mainly of bananas, citrus fruits, coconuts and herbal oils and extracts. This contributes up to 10% of the region's Gross Domestic Product.

The region work force is broken down as per 2000 estimates into the following sectors according to the Central Intelligence Agency:

Agriculture: 40%
Industry: 32%
Services: 28 %

Other facts as compared to Guyana are as follows and based on 2008 estimates:

Table 2. Table of average economic comparison of guyana Vs. caribbean region

Item	**Windward Island**	**Guyana.**
GDP- Purchasing Power Party	USD $ 719.8 million	USD $ 3.01 billion
GDP- Official Exchange rate	USD $ 365 million	USD $ 1.134 billion
GDP- Per Capital (PPP)	USD $ 9,900	USD $ 3,900
GDP- Real Growth Rate	2.6%	3.2%
Comparison to world	150	133
GDP- Agriculture	17.7% (est.)	31.9%
GDP –Services	49.5% (2004 EST.)	47.2%

Source: Central Intelligence Agency, 2009.

The table above indicates that Guyana's GDP- Agriculture accounts for 31.9% of its total Gross Domestic Product as compared with Windward Island at 17.7%. Also, Guyana's GDP in Purchasing Power Party and Official Exchange rate are at higher values.

The major agriculture produce is bananas. The banana industry thrived in the 1970's and 1980's peaking at 70% of export earnings. However, partially due to subsequent hurricanes this industry is now struggling. The Windward Islands have experienced several major hurricanes and tropical storms which caused considerable damage to their banana production.

Table 3. Table of examples of damages caused by hurricanes/ storms.

Hurricane/ Storm	**Damaged Caused**.
Tropical Storm Debbie (1994)	25% of banana plants.
	(Dominica- European Community, 2007.)
Hurricane Luis (1995)	95% of banana plants.
	(Encyclopedia of the Nations, 2008.)
Hurricane Dean (2007)	85 % of banana plants.
	(Wind ward's Bananas, 2009).

In 1995 Hurricane Luis accounted for almost a total 100 % loss. As a result of disasters, Windward Crop Insurance Limited (1988) Ltd was formed on August 22, 1988 with the head office in Dominica. Its objective is to carry out business of crop insurance and to maintain reinsurance against any and all insurance risks assumed. It provides mandatory insurance and optional contractual insurance against loss of banana plantings by windstorm and volcanic eruption. Currently, farmers are covered for 80% of the damages to their crops. The company calculated damages to the crop on a random sampling basis. They also covered by international reinsurers. WINCROP does not depend on subsidies from the government, however as there is a decline in the banana industry in the Caribbean region and this is causing serious financial difficulties to the company. They have incurred consecutive losses in the last eight years due to current world financial crisis and also that more farmers are abandoning the banana industry due to increasing operational cost.

Conclusion and recommendations

This dissertation set out to investigate whether crop insurance was financially viable and sustainable in Guyana over Government aid. The paper examined the structure and current situation of a developed crop insurance scheme (WINCROP) in Dominica and compared that to the current type of relief offered in Guyana, Government aid. From data analyzed, we can conclude that due to the relatively small proportion of relief given to losses incurred, Government aid relief is not as attractive as crop insurance coverage and the only types of farmers to derive any benefit from this scheme would-be small-scale farmers. Larger scale farmers are not covered and they are the ones to stand greater losses and thus require protection as well.

The current scheme of government aid, while partially beneficial to small scale farmers seems to have an overall adverse effect on the country's financial situation as there are no contingency funds for these situations and this affects revenues, reserves or international aid or financing. This means that funds are taken on an ad hoc basis from monies that were allocated for or could have been used for other

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development projects for the country. The cost of the relief, G$ 253 million and G$ 400 million in 2004/2005 and 2005/2006 respectively, is too immense to be sustainable on a consistent basis. Also, with the current unpredictability of and increasing natural disasters globally, affecting the agricultural industry and Guyana being largely dependent on this, the costs of these disasters increasing correspondingly and government aid would not be sufficient to cover these losses and encourage rapid rehabilitation of the agricultural industry. With the sustained implementation of Government aid, Guyana would not be able to exploit its full potential in the agricultural industry.

The Government of Guyana now appears to ready to expand its attention to other agricultural products thus possibly causing reduced attention and resources on the rice industry in the future. At the same time, the GRDB is hopeful that the rice industry will improve its viability based on increases in revenues from rice exported in the last three years. The question is whether a crop insurance scheme would be a sustainable alternative. From the investigation of WINCROP, the answer is yes provided that a prudent framework is built for Guyana. This should include defined parameters for claim settlements, scope to monitor and measure rainfall within all regions in Guyana and educational development practices drafted and implemented so farmers can be aware of the technical facets that must be administered in the daily agricultural activities. Never the less certain polices, framework and organizational structures can be examined and quantified to ensure best practices are adopted and implemented. WINCROP is a unique crop insurance scheme as it has not had to rely on Government subsidies unlike crop insurance schemes in the developed world such as the US and has still been able to survive for as long as it did when other schemes have withered away as in Brazil. Some best practices or facets under examination that have made WINCROP successful in the past that should be replicated in a crop insurance scheme in Guyana to be sustainable are as follows;

Mandatory Insurance – With the implementation of a crop insurance scheme there may be some request to understand whether it will provide maximized returns to all participants inclusive of the current insurance companies in Guyana. Also, small scale farmers may hold the view that they cannot afford the premiums given their operational scale. Further, to enhance sustainability of the scheme and also to aid in preventing adverse selection and a portfolio of clients to spread the risks efficiently and effectively, mandatory insurance should be adopted in Guyana to attract both large- and small-scale farmers. This will also require legislative support.

Additionally, this can enable the financial institutions in Guyana who are lenders into the agricultural sector to ease on lending requirement since cash flow will be covered with insurance. It may also reduce the risk premium attached to interest rates for these types of products. Incrementally the default risk factors in these loans is reduced by the financial protection of an insurance scheme then rates will decrease and financing will be affordable.

Structure of the Scheme – The method of calculating premiums in WINCROP should be transferred to Guyana as it is a fair and easy method which makes this scheme affordable and also deters adverse selection. The method of farmers paying a set rate per the amount they export ensures that farmers only pay for what they produced and exported. Therefore, small scale farmers can afford the premiums as well as larger scale farmers and the scheme will be able to attract both types to develop their portfolio of clients. The structure of assessing losses and payouts are also attractive as these assessments are made quickly and objectively, reducing moral hazard and will be cost efficient rather than the costlier traditional methods. Even though the loss is estimated on a random sampling basis and the payout is only a proportion of this, we see that the percentage of payout to loss suffered is significantly higher than that of the Government aid given to loss suffered in Guyana.

Reduction of Moral Hazard – As Guyana is larger than the islands; each area in the country is not always affected at the same time or to the same extent by natural disasters. Therefore, it would be easier to offer incentives to farmers in the event that they do not make claims. This would be in order to reduce their complacency at having financial protection.

Shareholders – The shareholders of the scheme should be vested members in the rice industry such as GRPA and GRDB along with large rice farmers as these members would have more to gain from just the company alone but from also the success of the scheme within the rice industry itself. This would hold their loyalty to the company and ensure their support, skills, and resources.

WINCROP, although successful for over twenty years, is now facing severe liquidity problems. Investigation of their financial position gives us insight on how to improve the situation, opportunities that need to be explored and lessons to be learned when implementing a crop insurance scheme in Guyana.

These are as follows:

Bundling with other crops or products – We see that the declined of the banana industry is a significant factor in the declined of WINCROP's liquidity. Therefore, the scheme should not be solely dependent on one crop; once developed the scheme should immediately investigate the inclusion of other crops to diversify its portfolio.

In order to survive, WINCROP needs to diversify into a more lucrative crop or into a more lucrative island. This diversification is slow in prevailing due to legislations and a threat of an increase in reinsurance premiums. Therefore, in developing a new scheme, these matters should be taken into consideration at the inception. When assessing a potential reinsurance company attention should not only be given to the current chargeable premiums but premiums in case of an expansion should be negotiated. A scheme in Guyana should take account of WINCROP's difficulties and be able to find ways of mitigating the same. As with a regional scheme, this would offer the opportunity to have a range of crops insured therefore with the decline of one industry, it would not be a detriment to the entire scheme.

Available Experience, Skills, and Resources – As said before, the Government in Guyana should persistently explore joining the studies currently conducted around the Caribbean and draw from their experience and available resources in order to develop a strong regionally structure of a crop insurance scheme. Guyana should also engineer partnerships or bilateral agreement / strategic alliances with other developed countries outside of the region such as China and India to gain insight and resources into their scheme. Further, we see that for WINCROP, having branches in different countries has benefits which outweigh the disadvantage and as such it would be beneficial for Guyana to join a regional crop insurance scheme as being piloted by CARICOM rather than to have a local insurance company enter the field alone. Local insurance companies are currently struggling in the light of the current economic crisis and may not have the resources to take on a riskier project, let alone to diversify this project regionally or over a number of different crops, therefore Guyana joining a regional scheme would be the ideal solution. Thereafter, Guyana can build on exposure and increase local content skills and knowledge. This would also make reinsurance more accessible and more affordable. With the backing of a strong regional body with knowledge, experience and resources the risks may be decreased and reinsurers may be more willing. Reinsurance is imperative for the sustainability of the scheme and its independence from government intervention. Finally, the findings of this dissertation are limited due to the fact that one significant factor which was not investigated in detail for this research;

Farmers attitudes and financial capabilities – An investigation including interviews with farmers in order to obtain their thoughts on the aspect of implementing crop insurance, the benefits they perceive to be derived from the same and their opinions on the current situation of local Government aid was not carried out. This was not considered due to the fact there is no:

- Defined structure for crop insurance in Guyana, hence farmers may not be aware of such.
- Poor infrastructure to measure climatic conditions which is pivotal in a crop insurance scheme.
- No guidelines/ mechanism to measure farmer's technical agricultural applications and its correlation to crop insurance.

Further research into this area should be done as they are key players in the crop insurance scheme; farmers are the clients and without them no scheme would survive and the Government may need to task the Ministry Of Agriculture to appoint a new independent body to administer local insurance companies to partake in the administration of the regional crop insurance scheme or allow one of the local insurance bodies to administer the crop insurance directly in the Guyana.

I believe that the current research done firmly indicates that Government aid is more financially feasible than a crop insurance scheme. However, we see the insufficiency of Government aid to farmers and the unfavorable burdens on the country and also that a crop insurance scheme once managed prudently is able to survive for a long period of time without Government intervention thus reducing the

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burden on the country's fiscal payments in the event of natural disaster. Notwithstanding for crop insurance to be implemented effectively in Guyana, the following must be satisfied:

- Defined structure for crop insurance in Guyana.
- Development of infrastructure to measure climatic conditions.
- Drafting and implementation of guidelines/ mechanism to measure farmer's technical agricultural applications and its correlation to crop insurance.
- Institutional support from financial institutions such as insurance companies and commercial banks.
- Availability of technical skills and resources in startup phases.

In the interim a stabilization funds should be established to support farmers which should include defined pay out mechanisms inclusive of qualifying criteria, benchmark payment amounts along with prudent segregation of internal checks and balances for disbursements officers. Future research on the areas mentioned must be taken into context in order to strengthen this decision and also to derive additional opportunities available to the scheme where this dissertation has not.

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