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GUYANA
THE IMPACT ON SUSTAINABLE LIVELIHOODS
CAUSED BY THE DECEMBER 2005 – FEBRUARY 2006 FLOODING

In collaboration with the Inter-American Institute for Cooperation and Agriculture (IICA)

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PREFACE

This report was prepared at the request of the Government of Guyana following the rainfall from December 2005 until February 2006 and the subsequent flooding that affected, in particular, Regions 2 and 5. The implications of the flooding posed the need, beyond the immediate humanitarian response, for a rapid assessment of the damages (impacts of assets) and losses (effects on economic and social flows) to determine at the more general level the implications on macroeconomic and fiscal performance and the social and environmental consequences.¹ More specifically, the document examines the effects of the impact for the sustainable livelihood of the affected households and provides possible strategic interventions serving as inputs for the development of programmes and projects to mitigate the impact of flooding on the affected population.

The assessment was carried out following the Economic Commission for Latin America and the Caribbean (ECLAC) disaster assessment methodology as elaborated in the Handbook for Estimating the Socio-economic and Environmental Effects of Disasters (ECLAC, 2004, www.eclac.cl/mexico). The results of the assessment were also interpreted within the context of a sustainable livelihood analysis (SLA) framework.

The SLA framework combines the concept of sustainability understood as comprising of four elements (environmental, economic, social and institutional) with that of livelihoods which in turn refer to the capabilities, assets and activities required for a means of living. In a nutshell the SLA brings sustainability to the center stage and views it through economic, social, institutional and environmental lenses. Fundamental to developing the SLA framework is to identify the elements of the ‘vulnerability context’ which are present prior to a natural hazard and those that are highlighted by the disaster and during its aftermath. The ‘vulnerability context’ refers to those factors (such as natural hazards) that are not susceptible of direct control by people but which have a direct bearing on people’s livelihoods.

This assessment will complement and expand on the emergency and humanitarian needs identified previously by the government of Guyana. The result of such an assessment provides a quantitative approximation to the overall damage and as it impacts on the livelihoods of the affected population.

The Government of Guyana requested ECLAC to carry out the assessment for Regions 2 and 5, although the floods also affected other Regions. Therefore the assessment of damages and losses is not fully comprehensive, even though the impact of the floods on rice and on drainage and infrastructure covered the whole country. The total impact of the floods on Guyana will be higher than the ECLAC estimates.

Prior to the start of the assessment the ECLAC mission conducted a brief training session in the ECLAC damage assessment and needs analysis with the objective to facilitate the collection of information.

¹ The assessment figures are expressed in the majority of cases in G\$. When expressed in United Dollars an exchange rate of exchange of 199.81 G\$ per one US\$ dollars was used throughout the document.

It is quite evident, even before an assessment is made, that additional needs and more emphasis should be put on the cross-cutting theme of disaster risk management and risk reduction, in the face of the country's exposure and vulnerability to natural hazards and in particular floods.

Mission components

The ECLAC mission was supported financially and logistically by the United Nations Development Programme (UNDP) with technical inputs from the Inter American Institute for Cooperation on Agriculture (IICA). The ECLAC mission coincided with an UNDP mission on drainage and irrigation. Both missions aimed to integrate the various aspects of their reports because drainage and irrigation is intertwined with livelihoods.

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This report was made possible by the cooperation, coordination and support provided by the relevant government authorities. The national counterparts were coordinated by Dr. Coby Frimpong, coordinator of the Policy Coordination and Management Unit of the Office of the President and Ms. Carla Khammer, Deputy Resident Representative, UNDP, coordinated support for the donor community and the UNDP mission. The mission expresses its gratitude and acknowledges that the assessment would not have been possible without this support. Special thanks are due to Ms. Amanda Phillips and Mr. Wayne Forbes for their invaluable assistance with logistics.

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I. Background

1. Description of the event

Beginning in December 2005, many areas in Guyana experienced flooding. Regions that were affected included Regions 1, 2, 3, 4, 5 and 6. The floods were most severe in Regions 2 (Pomeroon/Supenaam) and 5 (Mahaica/Berbice) and on 28th January the Government of Guyana declared those two regions disaster areas (See Figure 1 below).

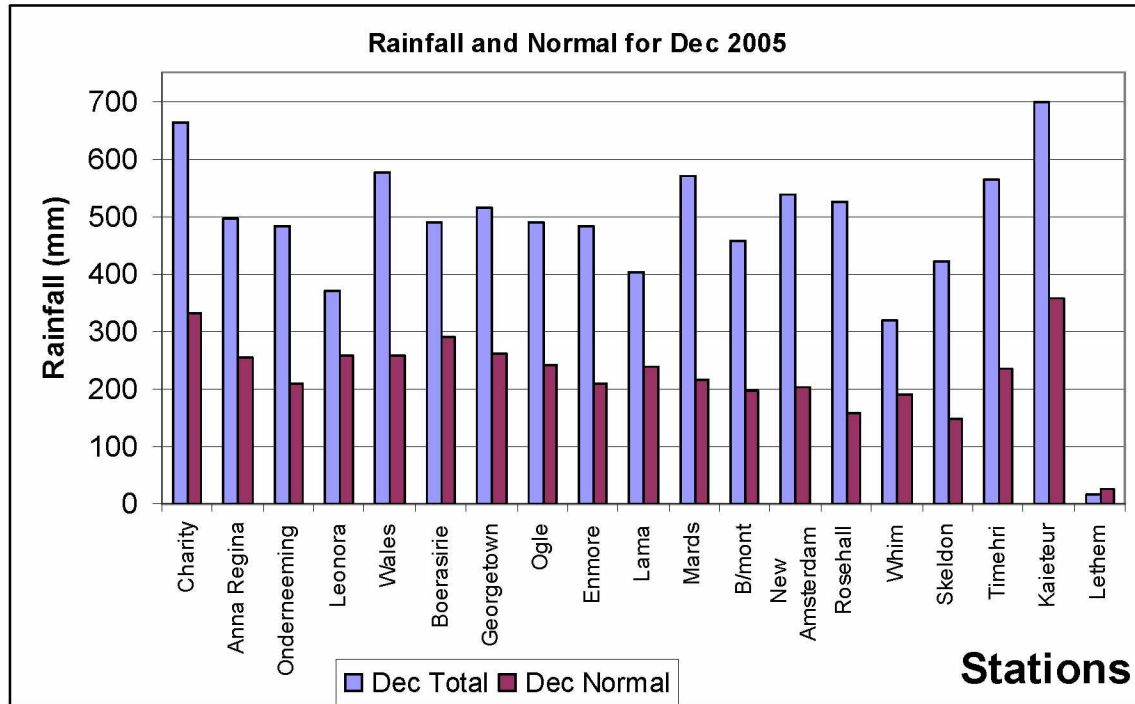
Region 2 covers an area of approximately 6,195 km² and has a population of approximately 49,253 persons. There are approximately 11,220 households in the area, with an average size of 4.4 persons per household and with average monthly household income of approximately G\$45,239 (US\$226). The region is predominantly an agricultural one in which the main crops produced are rice, coconuts, citrus, fruits, cereals and legumes, ground provisions, and a wide range of vegetables. The farmers may be classified as small to medium, based on farm size and area cultivated, with some very few large farmers operating in the area.

Region 5 has a land area of 4,190 km² and is inhabited by 52,428 persons, resulting in a population intensity of 12.5 persons per km². There are approximately 12,774 households in the region, with an average household size of 4.1 persons. Average monthly household income is put at G\$44,729 (US\$224). The region is also predominantly an agricultural one with rice, livestock, coconuts, vegetables, spices and seasonings and to a lesser extent fruits, the major commodities produced.

The section below draws from the UNDP report which describes the flooding in more detail.

Figure 2 shows that in December 2005 rainfall was well above normal throughout Guyana with the exception of Lethem.

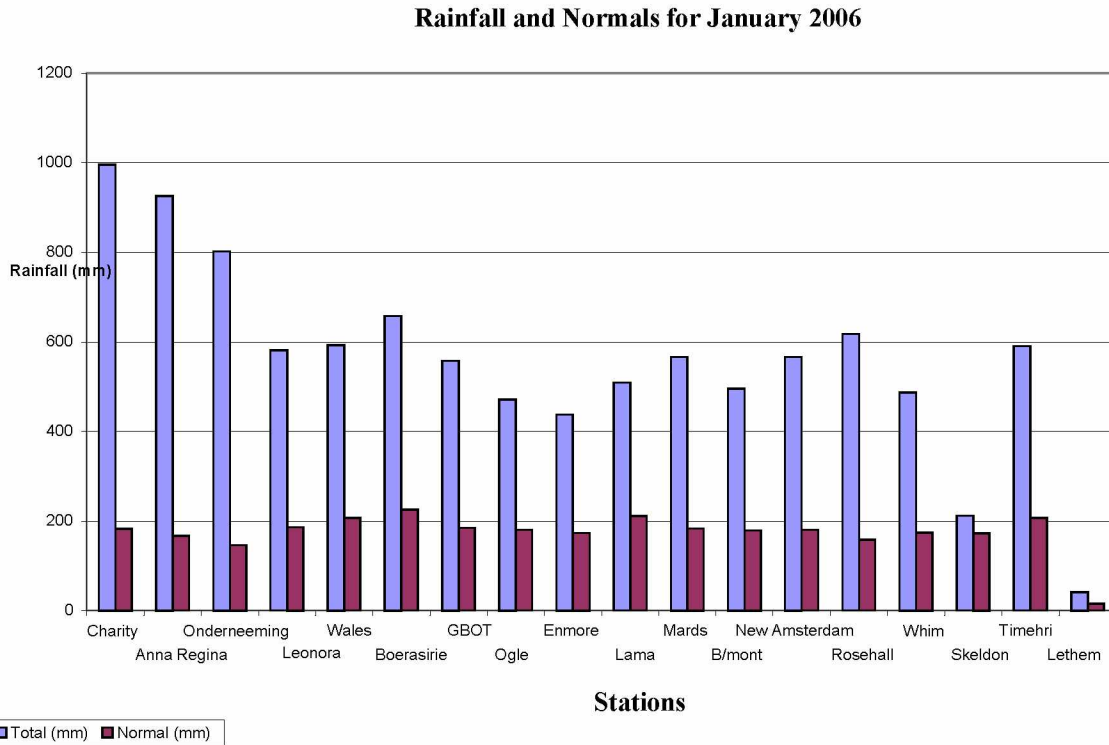
Figure 2
Total and normal rainfall recorded for December 2005 for some stations along the coast



Source: Hydromet

Rainfall in January 2006 was again well above normal as indicated in figure 3 below and was particularly pronounced in Region 2. As a consequence flooding occurred in regions 1, 2, 4, 5 and 6 but was most severe in Regions 5, (Mahaica – Berbice) and 2 (Pomeroon - Supenaam).

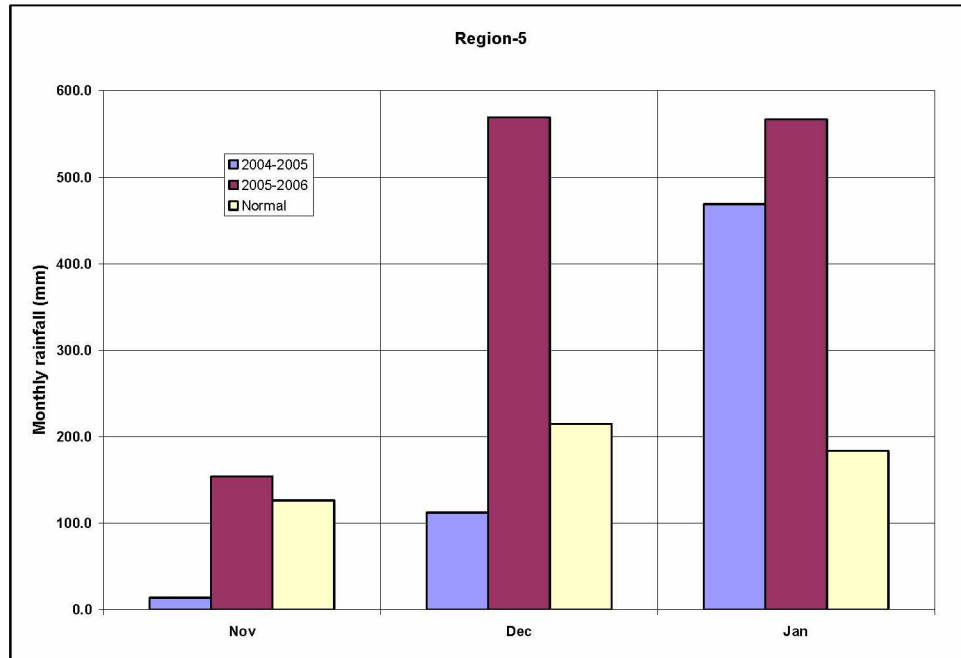
Figure 3
Total and normal rainfall recorded for January 2006 for some stations along the coast



Source: Hydromet

In Region 2 the November 2005 rains were about normal but the December 2005 rainfall was about twice the normal and the January 2006 rainfall even 5.5 times normal levels (see figure 4 below). Farmers reported that flooding in the Pomeroun area began in December 2005 which was likely caused by poor drainage and an influx of waters from the backlands. However, in January 2006 the water levels of the Pomeroun River exceeded the levees and the river and its tributaries flooded low lying areas along its banks. The heavy rains of the first half of December 2005 apparently saturated the soil so that a large percentage of the January rainfall immediately came to a runoff to the river. This flooding pattern was the reverse from the January - February 2005 floods since during that period the Pomeroun River did not flood but in contrast the coastal area was subjected to flooding. Nevertheless it was the second year in succession that Region 2 experienced floods that were detrimental to its development.

Figure 4
Monthly rainfall in Region 2 from November 2004 to January 2006
Compared with previous year and normal

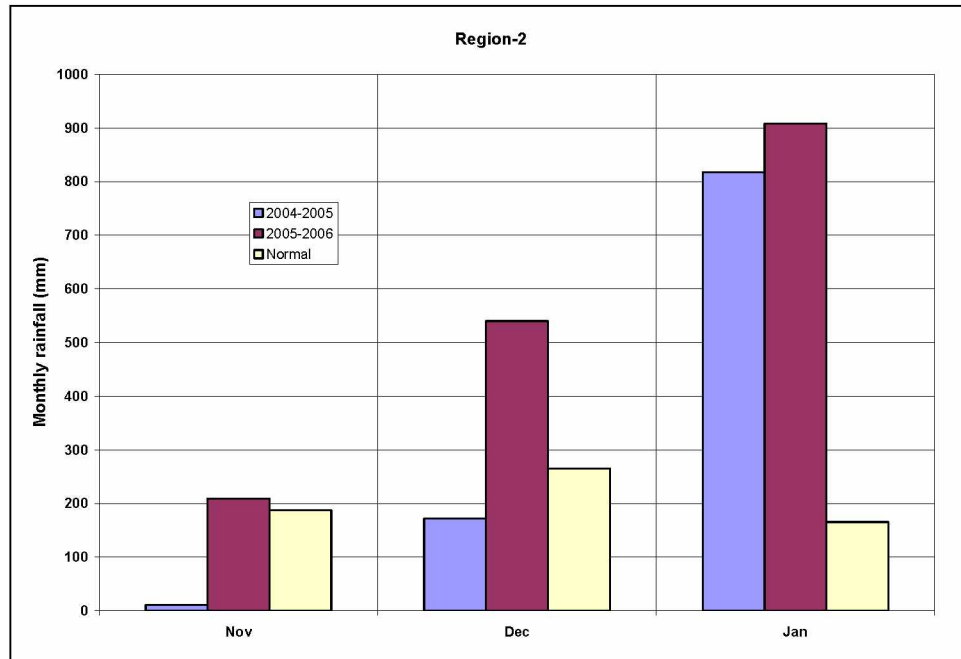


Source: UNDP report

In Region 5 rainfall in November was 22% above normal. However rainfall in December 2005 and January 2006 was 2.5 and 3 times respectively above normal as shown in figure 5. Contributing to the effect were also high rainfall levels further inland. Flooding in the Region began in the middle of December and Government ceased discharging water from the EWDC via the Maduni sluice on the 12 December 2005 and the Abary spill weir was discharging water in the Berbice River. However because of rising water levels in the EWDC conservancy which was nearing its critical level of 59 GD, the Maduni and Lama sluices had to be opened on 17 January, thereby contributing to the flooding in Region 5. Following a fall of the water level in the WDCD the Lama sluices were closed off on 26 January and the Maduni sluice on 27 January.

As of the middle of February flood waters have largely receded from the Pomeroon River area although part of the savannah is still flooded. Region 5, however, is still flooded and Government may wish to consider a worst case scenario whereby the area will still be flooded at the beginning of each rainy season.

Figure 5
Monthly rainfall in Region 5 from November 2004 to January 2006
Compared with previous year and normal



Source: Source: UNDP Report

2. Emergency actions

Government declared Regions 2 and 5 disaster areas on 28th January. During the floods the Government of Guyana provided emergency transfers to affected households and farmers (50,000 and 100,000 G\$ respectively) to the amount of G\$ 223.1 million already spent and G\$ 254.8 million committed, resulting in total transfers of G\$ 477.8 million. These transfer payments covered 3,696 and 6,135 households.

The Government is still assessing the number of affected households in Berbice and the total amount of transfers may increase by another G\$ 250 million resulting in a possible expenditure of G\$ 727.8 million for a possible 5,000 additional households. This after the Government had spent G\$ 1.3 billion on income support payments in 2005 to 73,242 households, 1,731 rice farmers, 8,031 other farmers and 1,535 small businesses (see table 1 below).

Apart from the income support to the affected household the Government also provided an estimated G\$ 20 million to the CDC for emergency relief and operating shelters.

Area	Region	Amount G\$ million	Number of Households
Already spent			
Pomeroon	2	68.8	1375
Canal 1	3	13.3	265
Canal 2	3	20.6	412
Add Canal 1&2	3	6.8	135
Black Bush	6	37.2	744
Mahaica	5	49.6	496
Mahaicony	5	22.9	229
Morakobai	5	4.0	40
Subtotal		223.1	3696
Supplemental			
Pomeroon	2	15.9	318
Rupenuni	9	22.5	1500
Berbice	5	216.4	4,327
		254.8	
		477.8	9,841

Source: ECLAC, based on Government data.

II. The methodological approach

The present assessment provides estimates of damage and losses to the economy as a whole: Damage refers to the impact of the natural hazard on assets and stocks at the time of the disaster. Losses are defined as flows (income and production flows following the occurrence of the disaster). Their magnitude is evaluated in relation to macroeconomic aggregates. The overall assessment of the damage also includes a detailed macro-economic assessment of the situation prior to the disaster, the expected situation without the disaster, and the estimated performance of the economy with the passage of the hurricane. The information presented is based on data that was available and on evidence collected through field visits and interviews.

The assessment employed was in accordance with the methodology that has been developed by ECLAC². The focus of this methodology is on the valuation of the damage on the society, economy and environment of the affected country so that appropriate mitigation strategies can be formulated during the reconstruction phase.

² See, ECLAC (2003) *Handbook for Estimating the Socio-Economic and Environmental Effects of Disasters*. LC/MEX/G.5.LC/L.1874.

ECLAC (2004) *Disaster Assessment Training Manual for SIDS*. LC/CAR/L.12.

The quantitative assessment is interpreted in light of the Sustainable Livelihoods Approach (SLA). The SLA is a tool that allows people to improve their livelihoods, that is, their capabilities, assets, and activities, required for a means of living, in a permanent manner and in line with their possibilities. The SLA views the sustainability of livelihoods through social, economic, institutional and environmental lenses.

The Sustainable Livelihood Approach understands that people's livelihoods are shaped by 'the vulnerability context.' The 'vulnerability context' refers to those factors (such as natural hazards) that are not susceptible of direct control by people but which have a direct bearing on people's livelihoods. The extent to which people are prone to being vulnerable depends however, on a series of factors some of which are under the control of people.

1. Sustainable Livelihoods Approach (SLA)

The Sustainable Livelihoods Approach (SLA) is based on two concepts, sustainability and livelihoods. Livelihoods refer to the capabilities, assets and activities required for a means of living. It is understood that for livelihoods to be considered sustainable, they should demonstrate:

- (a) Resilience in the face of external shocks and stresses;
- (b) Capacity to maintain the long-term productivity of natural resources; and
- (c) Ability not to undermine the livelihoods of, or compromise the livelihood options open to others.

The goal of the SLA is to eradicate poverty through six objectives. These are:

- (a) Improved access and management to natural resources;
- (b) Improved access to high quality education, technology, nutrition and health;
- (c) A more supportive and cohesive social environment;
- (d) Improved access to infrastructure;
- (e) Improved access to financial resources; and
- (f) A policy and institutional environment to promote multiple livelihood strategies and equitable access to competitive markets.

The disaster assessment using the SLA seeks to ascertain:

- (a) Where were the affected communities located?
- (b) Which households were affected (how many and to what extent);

- (c) What were the damage and losses suffered by each household with regard to their assets;
- (d) How was their income earning activities affected?
- (e) What would it take to get them back up and running;
- (f) What assistance is required to build resilience and reduce future risk; and
- (g) What will it take to make the affected households livelihoods' sustainable?

The unit of analysis for the SLA is the household. To ensure a rigorous undertaking, sound household data that is disaggregated by the basic demographic characteristics of age, sex of the head of the household, family structure, education levels, health status, livelihoods/income streams and expenditures, are required. The sources of baseline data continue to be the country's most recent population and housing census and the survey of living conditions. The livelihoods analysis seeks to gain an accurate and realistic understanding of the strength's (assets or capital endowments) of households and how they endeavour to convert these assets into positive livelihood outcomes.

In undertaking a rapid assessment of livelihoods, as needs to be done following a natural disaster, the methodology involves key informant interviews and group interviews which seek to ascertain the processes of the primary, secondary and tertiary income earning activities of the households in the affected areas; and the structures, contributors and beneficiaries of the household's current livelihoods. Such an assessment seeks also to understand how each activity has been affected by the recent disaster. Finally, a gender analysis is applied to understand the differential impact of the disaster on the livelihoods of men and women. From such a comprehensive analysis recommendations that will support sustainable livelihoods follow.

2. The vulnerability context

At the center stage of the SLA, and most important for the analysis of the impact of natural hazards, is the Sustainable Livelihood Framework (SLF) (See Figure 6 below). The SLF shows people having access to livelihood assets (human, physical, social and financial capital) and operating within a context of vulnerability. In turn the vulnerability context provides the 'context' within which people have access to assets. It also shapes and determines the livelihood strategies that people can pursue to achieve livelihood outcomes.

Vulnerability has been defined by the recently concluded World Conference on Disaster Reduction, convened in Kobe, Japan, in December 2005, as the "conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards". As the recent history of Guyana has shown the country remains highly vulnerable to shocks, whether generated internally, externally, by natural or made man factors.

Central to the concept of vulnerability and the vulnerability context is the analysis of two issues: the elements that comprise vulnerability and the extent to which an external shock, such as a natural disaster, has a similar or differentiated impact on the affected population. The rest of this section provides the overall background to the analysis of both issues and the following section focuses more in depth on the second issue with specific references to Regions 2 and 5.

The vulnerability of the communities that reside in Regions 2 and 5 of Guyana, which have been affected by the December to January 2006 floods, can be attributed to a combination of the above factors which increased their susceptibility to natural disasters, resulting in the Government of Guyana declaring their areas disaster zones. These factors are identified in the vulnerability matrix in table 2 below.

The columns and rows of the matrix enumerate the different factors which determine the conditions which increase the susceptibility of a community to the impact of hazards. The contents of the matrix show the elements corresponding to each of the conditions that generate the vulnerability and which are present in Regions 2 and 5.

The matrix should be read by columns and the corresponding pairs of columns and rows highlights the multifaceted aspect of vulnerability. Any component of any one column of the above elements, whether physical, social economic and environmental, can also be a component of any other element. That is, for example a component of the geographical element such as remoteness and isolation can also be a component of the physical element. In the same way, the concentration of poverty in rural areas which is mainly social is also part of the geographical element. The blank spaces in the matrix denote the absence of a relation between different vulnerability components.

Table 2 The vulnerability matrix for Guyana's Regions 2 and 5					
	Physical	Geographical	Social	Economic	Environmental
Physical	Weak waterways and drainage and irrigation infrastructure.	Remoteness Isolation		Large number of small and very small farmers	Region 5 subject to frequent flooding.
Geographical			Concentration of poverty in rural areas. High Transportation costs. Geographic distribution of people.	High transportation costs	
Social			Uneven combinations of human capital and strong social capital Access to water, land, And transportation. Low levels of education. High level of female head households relative to males.	Low levels of profitability and viability in the farming systems. Conflict between small and large farmer. Limited employment opportunities. Self sufficiency and self security. Limited information and communications systems. Limited income earning capacity of mothers.	Flooding causes increased health problems and reduced school attendance.
Economic				High debt levels High budget deficit High current account deficit. High Poverty Levels. Inequality	Flood negatively impacts on income.
Environmental					Poor solid waste management.

Regions 2 and 5 share similar characteristics that increase the susceptibility to the impact of hazards such as remoteness and isolation. Both of these are particularly present in Region 2.

However, not all households in Regions 2 and 5 found themselves susceptible, or uniformly susceptible to the December to January flooding. As table 1 indicates, some 22 percent and 40 percent of households in Regions 2 and 5 respectively, were affected by the flooding. Of those, 38 percent in Region 2, and 18 percent of Region 5, were severely affected as further detailed in table 3 below.

Region	Population	Households	Number of households affected	% of Households affected within each region
Region 2	49,253	11,220	2,464	22
Region 5	52,428	12,774	5,092	40
Totals	101,681	23,994	7,556	62
National Total	751,223	182,615		
Source: ECLAC estimates based on GOG Population and Housing Census 2002; and Reports from Regional Administrations				

Moreover, it should be taken into account that extensive floods such as the 2005 and 2006 floods are only part of the problem as these are accompanied by numerous smaller floods that affect “only” parts of a region. The cumulative impact of such minor events on livelihoods, however, can cause more disruption because support mechanisms that come into play during a large flood would not necessarily be available during a small flood.

For example during the 2005 flood the Environmental Protection Agency (EPA) indicated that 30% of the households in Georgetown experienced run-off flooding at least once per year with a further 30% experience occasional flooding.

The Government acknowledges that the geographic distribution of the population, particularly as it relates to access to social services and the generation of economic opportunity, in rural and isolated communities is one of the main factors that impact on their vulnerability. There are also differences found in the stock of human and social capital, in poverty levels, in education, in health and also in the gender and infant composition of the household.

Highlighting and clarifying these differences improves the chances of developing programmes and projects that can lead specifically to the reduction of risk and the increase of resilience to future hazards.

An additional significant factor affecting the vulnerability of these communities is the operation, management of the waterways and drainage and irrigation infrastructure and its

financing within which the livelihoods of these communities are embedded and upon which they are dependent.

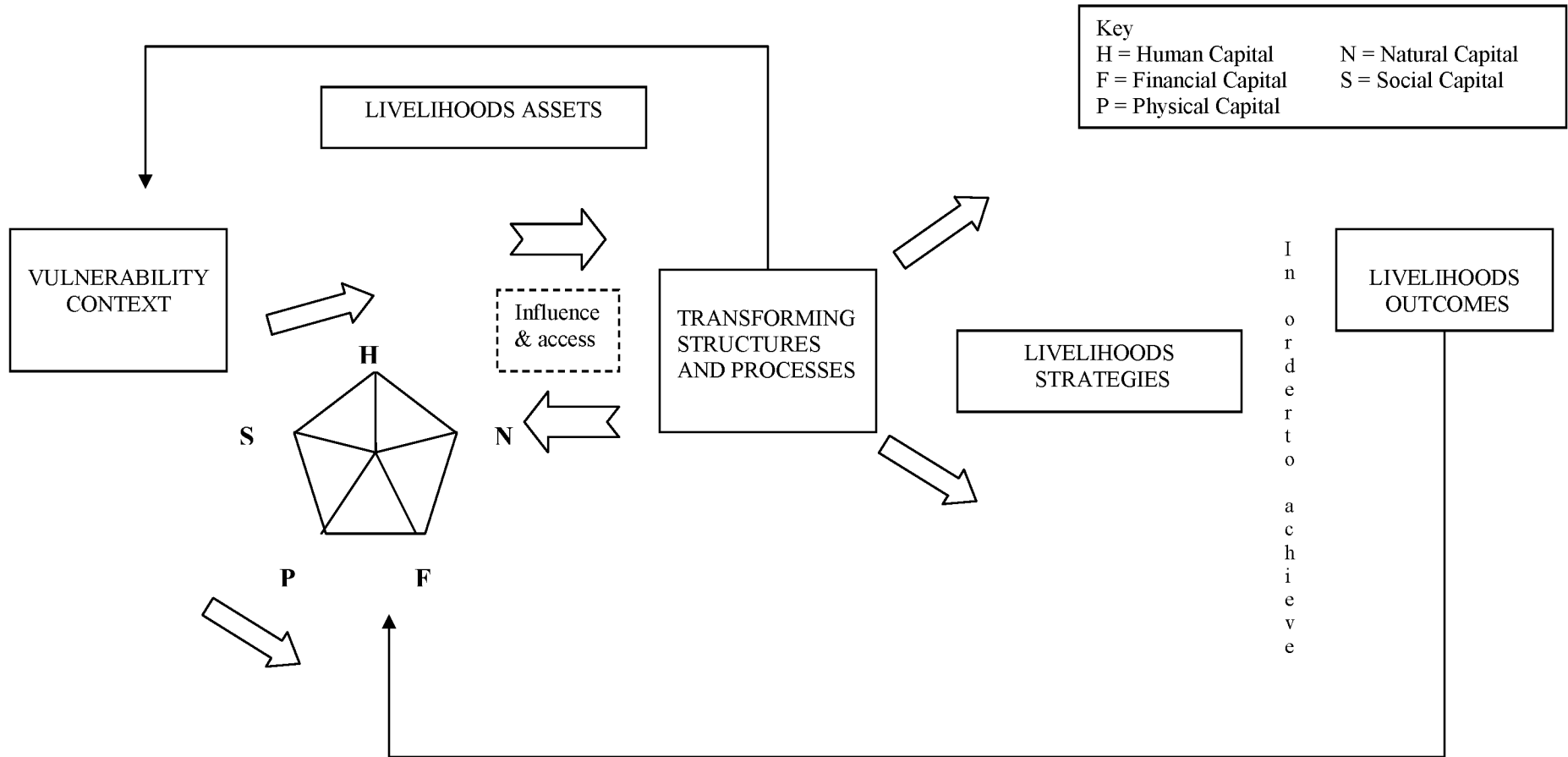
As the 2005 progress report of the Guyana Poverty Reduction Strategy states “The disruption of economic activities and dislocation of people as a result of the recent flooding has brought into sharp focus the challenges of increasing public and private resources for routine and regular maintenance of roads, for drainage and irrigation systems and the conservancy dams, for designing and implementing improved standards in roads, for revising and upgrading building codes and for establishing and strengthening disaster management systems to mitigate the impact of future disasters.”

Finally the differences in social structures and cultural patterns of livelihoods, both within regions and between them are also factors explaining the differences in their susceptibility to natural hazards. Region 2 as an example has an Amerindian population of some 16.3 percent, as indicated in table 4. Their presence in the Region increases the differentiation in household size within the region, because of their tendency to large families. It is possible to encounter, within the region single households of the elderly and families of four or five in the coastal areas, and in the interior, families of seven to ten. Region 5 on the other hand has a livelihood structure that results in households on very large land holdings and others on very small holdings. Indeed Amerindians in Region 2, were present in affected Communities such as Wakapau, Abrams creek/Warapana, Akawini, Tapakuma, St. Monica/Karawab and Betany.

Background	Region 2	Region 5
African/Black	13.4	32.5
Amerindian	16.3	2.0
Chinese	0.1	0.1
East Indian	47.9	57.8
Mixed	22.1	7.6
Portuguese	0.2	0
White	0	0
Other	0	0

Source: Guyana Population and Housing Census 2002 , Table 12

Figure 6
Sustainable livelihoods framework



3. The elements of vulnerability present in Regions 2 and 5

3.1 Human and social capital

Human capital represents the skills, knowledge, ability to work and good health that together enable people to pursue different livelihood strategies; and the term social capital has been used to refer to the social resources upon which people draw in pursuit of their livelihood objectives.³

The regions declared a disaster zone have in common that their populations reside in what has been defined as the rural coastal and rural interior parts of the country. It is in these rural environments that one often finds the paradox of strong social capital coupled with weak human capital. Many rural communities are deeply rooted and maintain strong bonds and trust between household members and among households. These characteristics prove useful in preserving lives and sharing the burden of a natural disaster. Unfortunately the weak human capital may mean that persons possess a narrow skill base that is not easily mobile, or low levels of educational attainment may be evident in heads of households. Such uneven combinations of social and human capital may challenge the best capacities for resilience of a people.

From the population pyramids produced for Regions 2 and 5 it is evident that there is not much out migration and that both regions are fairly stable. This can be seen more clearly when compared to another administrative Region, such as Region 1. In figure 7 below, Region 1 displays steep sides, evident from the 15–19 age group until the 50-54 age group. The Guyana Population and Housing Census, 2002, suggests that such steepness as displayed in figure 7, indicates that young persons and those comprising the productive age group 25-49 are not remaining in these regions and appear to be leaving as soon as they are finished with secondary school. As can be seen, this is not the pattern evident in the fuller pyramids displayed in figures 8 and 9, which represent Regions 2 and 5 respectively.

³ DFID Sustainable Livelihoods Guidance Sheets 1999

Figure 7
Population Distribution Region 1

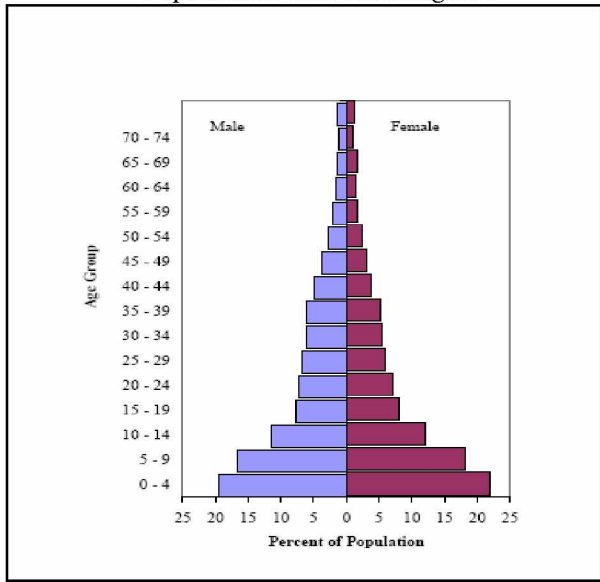


Figure 8
Population Distribution Region 2

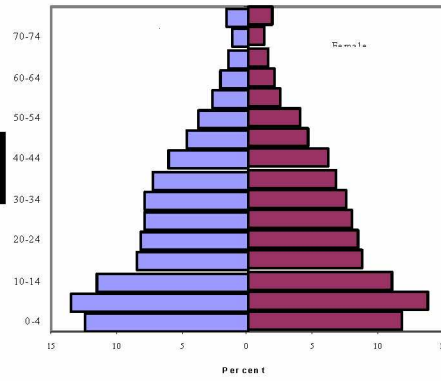
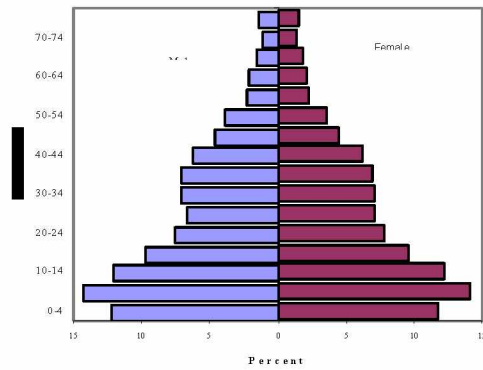


Figure 9
Population Distribution Region 5



3.2 Poverty

Among the indicators most often correlated with vulnerability is poverty. Examining poverty can often lead to an analysis of the strength or weakness of the human capital in a household or a community. The poorest have been found to be the least able to rebound from the effects of a natural disaster as they possess the least assets and often those assets are not of a diverse enough nature that would allow them to spread the risk during difficult times. Although the data on poverty for Guyana indicates a reduction in absolute poverty from 43.2 percent in 1992/93 to 36.3 percent in 1999, among the rural inhabitants, particularly in the interior, there has not been significant change. Some 68 percent of the households living in the rural interior and 30 percent in the rural coastal areas of Guyana have been found to be living in absolute poverty and 59 percent and 12 percent in the rural coastal areas in critical poverty according to the GSLC, as detailed in table 5. The GSLC, 1999 set the absolute poverty line, which took into consideration food and non- food expenditure, at G\$7,639 per month (US\$550. per year or US. \$1.40 per day). The critical poverty line, below which people could not afford food to survive, was set at G\$5,463 per person per month or (US\$364 per year or US\$1 per day).

Area/Region	Percentage of Households in Absolute Poverty	Percentage of Households in Critical poverty
All Guyana	26.7	12.7
Urban Georgetown	10.2	4.7
Urban other	10.5	1.9
Rural coastal	30.7	12.3
Rural Interior	67.7	55.8
Source: GSLC, 1999 Table 16		

The GSLC also noted that among the critically poor, 72 percent of those households had 5 or more members. It was found that a number of households in Region 2, that were located in the interior and who indicated that they were hard hit by the rains, also reported that they were single mothers with as many as ten children. In the main they were planters of cassava and processed the cassava into a range of products for their livelihoods. The GSLC, 1999, reminds us that the working poor represent a major category of poor persons in Guyana.

It must be remembered that not all households were as susceptible to the disaster and this may have to do with the differences in their asset base. The Gini coefficient provides an indication of the extent of the relative size of difference in income distribution. Despite its known inadequacies as a measure of inequality in income distribution, it is still considered one of the most useful measures available. Latin American and the Caribbean region as a whole is considered to have the highest inequality in comparison to other regions in the world. In Latin America the Gini Co-efficient ranges from 0.42 (Uruguay) to 0.59 in Brazil. Although a Gini

coefficient was not available for the Guyana' Regions, Guyana's Gini 0.413 fell just below the mid point of selected Caribbean countries for which data was available (as indicated in table 6).

Another measure of inequality is the distribution of consumption shares by quintile. Once again, although the information is not available by region, it is safe to assume than many of the poorest can be found in Regions 2 and 5. Data from the GSLC 1999 indicated that although there was some improvement in difference between the consumption share of the poorest quintile and the richest, as table 4 indicates, the difference is still some four times greater. A rural /urban distribution of households by consumption quintiles, as represented in table 8, indicates that over 80 percent of households in quintile one and two, which represents the poorest quintiles are rural based.

Indicators	Barbados	Be	Grenada	Guy	JA	SKN	SL	SVG	T&T
Life Expectancy at Birth	76.9	71.7	65.3	65.5	75.5	70.0	72.2	73.8	71.5
Adult Literacy	99.7	93.4	94.4	98.6	87.3	97.8	90.2	88.9	98.4
Gini Index	0.39	0.40	0.45	0.413	0.399	0.397	0.50	0.56	0.393

Source: ECLAC CSSDBs; Guyana Survey of Living Conditions (2000); 2002 Census of Population and Housing of Guyana

Quintiles	Consumption share % 1992/93	Consumption share % 1999
Lowest Quintile	4.1	9.2
Second Quintile	8.2	13.6
Third Quintile	13.3	17.3
Fourth Quintile	19.3	21
Highest Quintile	55.1	39.2

Source: GSLC Table 23

Area	Consumption Quintiles				
	1	2	3	4	5
Urban	12	19	30	38	56
Rural	88	81	70	62	44
Total	100	100	100	100	100
Source: GSLC 1999, Table 31					

3.3 Education

There is little disagreement that education is not only a tool of development but one of its key goals. The difficulty in assessing education's significance within a vulnerability context is in seeking to measure the impact of the deprivation of education on the increasing susceptibility of a household or a community.

Much of the available data speaks to student enrollment rates and student teacher ratio which has not changed significantly in Guyana from 2001 to 2004 according to the Guyana Poverty Reduction Strategy Review, 2005 progress Report. Guyana national educational statistics speak well, to Government's striving to achieve its goals of, "reducing illiteracy rates, reducing drop-out and repetition rates, especially at the primary level and increase secondary school enrollment, and improve the quality and relevance of education for all Guyanese, especially children"⁴. The Guyana Population and Housing census 2002 reported that on average; about 65 percent of the school age persons interviewed reported that they were currently in school. This proportion was highest among the 5-9 and 10 – 14 year age groups (90%) and declined for the advanced age groups, 15-19 (41%) and 20 – 24 (9%).

In the two affected Regions, 2 and 5, participation is determined by access to water and land transportation. Cost of fuel is high so many children paddle to and from school particularly in Region 2. Those who attend secondary school far away from home may be forced to stay with extended family during the week and return home only on weekends. In Region 5, land transportation is the more common form of transportation, for children attending school.

The highest level of education attained, by the head of the household, is an important indicator of the capacity of the household to support student performance in the education system. This is so based on the assumption that the higher the level of education attained the higher would be the economic returns to education. Table 9, taken from the GSLC, 1999, suggests that roughly 60 percent of male headed households and 56 percent of female headed households had attained only primary education. Another indicator of capacity of a household to support the education of the children is the employment status of the mother. A study conducted

⁴ Guyana Poverty Reduction Strategy Paper. p36

in Jamaica,⁵ on intra-allocation of household resources, concluded that children of working mothers stayed in the education system longer and performed better than children of non working mothers. The main factor being that working mothers had income which they applied to their children's education.

Table 9
Head of Household by Highest level of Education, 1999

Highest level of Education	Male and Female as a Percentage of all Households	Male as a Percentage of male headed Households	Female as a percentage of female headed households
Pre-primary	8	8	9
Primary	59	60	56
Secondary	22	23	22
Tertiary	7	6	7
Other	0.5	0.3	0.8
None	2	2	4
Not Selected	0.2	0.3	0.2

Source: GSLC Table 11

3.4 Health

Assessing the vulnerability of the populations in Region 2 and 5 based on their health status is a difficult task as much of the available data on health status is presented at the national level with little disaggregation at the sub national level. In addition the Ministry of Health, National Health Plan 2003 – 2007 highlights the difficulty with data validation. The Plan presents the key national mortality indicators and suggests the necessity for adjusting the indicators for an estimated 30 percent underreporting due to data problems.

The 2002 Population and Housing census survival rates, pointed to low survival rates in the 0- 4 age group and onwards. It suggested that this phenomenon maybe explained by a number of factors, possible high infant and child mortality rates; emigration of very young children; or other causes. This obviously is an area which requires further examination, in order to ascertain the degree and causes of susceptibility of infants and children in the affected regions.

The MICS (2001) indicated that 27 percent of all Guyanese children were at least moderately anemic, There were differences observed for the prevalence rate in the moderate-to-severe malnutrition in children in the interior rural areas, which was only 4 percent, while coastal rural areas suffered 13 percent and costal urban areas suffered 9 percent.

3.5 Vulnerability of women and children

⁵ Sudhanshu Handa. World Development Vol 22 # 10 pg 1539

In the two Regions affected, women comprise approximately one-quarter of the heads of households, as detailed in table 10. It has been argued that this may be an underestimation, as many male heads leave home in search of alternative income earning activity, and are still reported as household head. This is particularly so, in Region 2, among the Amerindian households, whose male heads, may go into the interior in order to seek better opportunities that may become available through the logging or mining activities, and may not return to the home.

Table 10
Distribution of Heads of Household by Region and Sex, 2002

Regions	Total No of Households	Number of Female-Headed Households	Number of Male-Headed Households	Percentage Female-Headed Households	Average Household size
Region 2	11,220	2,655	8,806	24	4.4
Region 5	12,774	3,186	9,454	25	4.1
Totals	23,994				
National	182,615				4.1
Percentage of national total	13				

Source: Guyana Population and Housing Census 2002, Table 27 and Table 29

The 2002 Population and Housing Census suggests that as much as 66 percent of the females of working age are not engaged in any type of activity to earn an income compared to 22 percent of the male working age population. The high proportion of women in what has been called non-economic activity is generally misleading as many women who reported doing home duties, are in fact involved in home-based income earning activities. Women who were interviewed in Region 5 along the Abrey creek, as an example, were quick to tell of loss income due to loss of chickens, inability to milk their cows and sell the milk and from sale of extra crops from their back yard gardens, caused by the flooding. In the Pomeroon, in Region 2, women told of loss of cash crops from back yard gardens, and loss of income from the sale of processed goods such as pepper sauce, casareep, cassava bread and other cassava products.

It is safe to assume, that in Region 2 and 5, as in other parts of the agriculture producing Caribbean, women's back-yard gardens provide a substantial portion of the basic family meals. The loss of this subsistence farming, can have an impact on the real hunger among families and if not hunger, then possibly on their nutritional status.

One of the factors which increase women's vulnerability is their high burden of care. By this is meant not only the number of persons in the household for whom the woman has direct responsibility, but from her multidimensional roles derived from her productive and reproductive roles. The GSLC indicated that 86 percent of male heads of household were married or in common-law relations, whereas only 20 percent of female headed households are in a similar situation. Some 80 percent of female headed households are in fact managing households as the

only responsible adult. The GSLC also noted that among households defined as absolutely poor, some 60 per cent had six or more members while , among those defined as critically poor, some 72 percent had five or more members.

3.6 Physical capital and housing

Housing quality is a good indicator of the susceptibility or resilience of a household or community to a natural disaster. Housing is also one of the most valuable physical assets which a household possesses. This is followed by the tools which are in use for their livelihoods. In the Caribbean, housing has also been found to be under insured for the impact of natural disasters, if insured at all. On average not more than 30 percent of households in the Caribbean have been found to be insured. This means that poor home owners have little or nothing to fall back on should their major asset, their home, be damaged or destroyed by a natural disaster.

Housing construction in Regions 2 and 5 are by and large suitable to their environment. According to data from the 1990/91 population and Housing Census, 86 percent of houses in Region 2 and a larger proportion, 91.8 in Region 5, are constructed with wood. It is clear that households build their homes well above the expected two to three feet rise in water level caused by annual flooding. There are exceptions of course, where housing structures are particularly vulnerable to flooding, such as in Region 5, in the Mahaicony creeks, due to the embankments reportedly being placed behind the housing areas in order to protect the farm lands, thus leaving housing structures exposed to the rise in creek level. There are also instances in both Regions, where the 'bottom house' or down stairs area, has been enclosed to support extended family or additional family members, thereby increasing the susceptibility of those living in that area of the house and their belongings to the ravages of flood. Housing tenure according to the 1990/91 Population and Housing Census is 76 percent owned in Region 2 and marginally less, 74 percent in region 5. More current data is unavailable but this pattern of home ownership was not expected to have changed significantly, since that period.

There are other issues of housing quality which speak to overcrowding and the sanitation facilities that the household has at its disposal. Overcrowding or congestion is a function of the number of persons in the household and the size of the actual physical size facility. Region 2 has a larger average household size, 4.4, than that found in Region 5, 4.1. The GSLC 1999, indicated that 60 percent of the population and 48 percent of households, defined as living in housing with less than 115 sq ft per person, were living in "congested circumstances".

The Guyana population and Housing Census 2002, reported that over one half of households still use pit latrines, as presented in table 11, and a little over 60 percent had public piped water into their dwelling or yard. A Regional distribution of the data was unavailable.

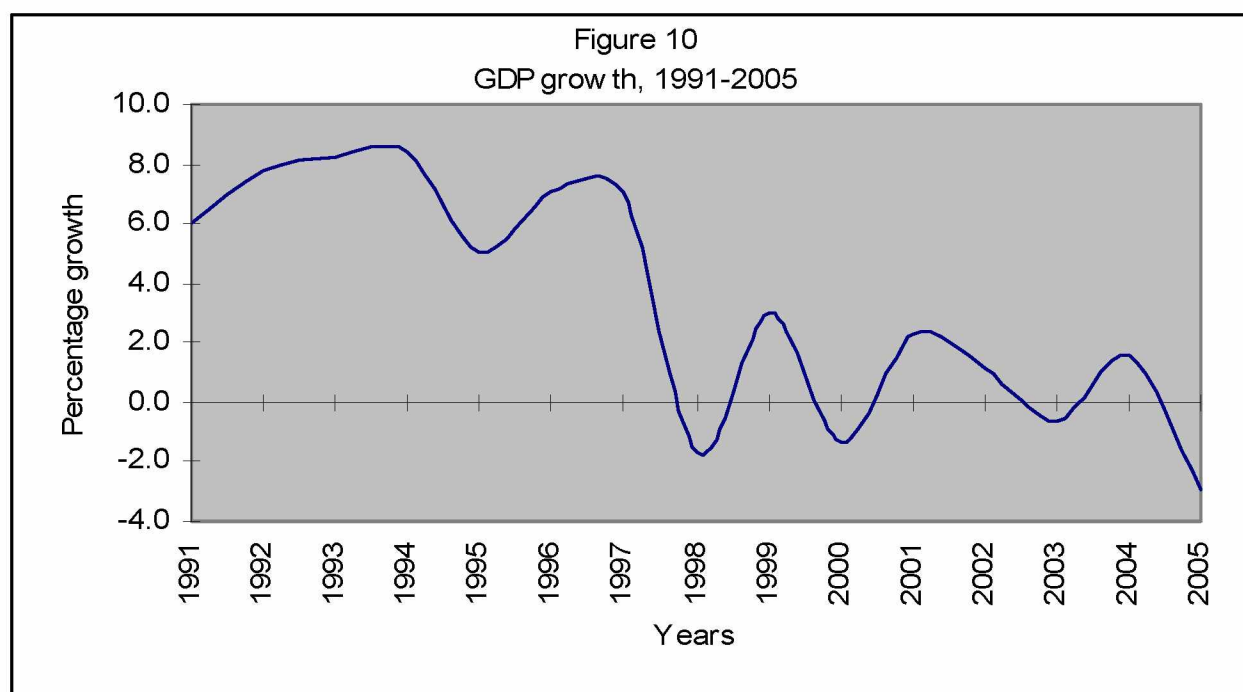
Facility	2002		1999	
	Number	Percent	Number	Percent
W.C. Linked to Sewer	10,435	5.7	10,930	7.1
W.C. Cesspit or Septic tank	62,815	34.4	36,043	23.4
Pit Latrine	105,661	57.9	102,437	66.5
Other	207	0.1	2,408	1.6
None	3,497	1.9	2,335	1.5
Total	182,615	100	154,153	100

Guyana Population and Housing Census 2002, table 30

3.7 Economic factors and vulnerability

At the level of the economic factors the components that increase Guyana's susceptibility to natural disasters include, the high levels of debt, the overall average poor growth performance, and the impending macroeconomic disequilibria.

Guyana is one of the most indebted emerging market economies in the world. In 2004, its total public external debt stock equaled 140% of GDP. In the same year the net present value of its public external debt stock reached 209% of central government revenue. The debt service is equivalent to 8% of its exports of goods and non-factor services and to 17% of central government revenue.



	2002	2003	2004	2005
GDP growth	1.1	-0.7	1.6	-3.0
GDP per capita growth	0.4	-1.2	1.2	-3.1
Public sector debt	194	173	166	180.0
Public sector balance	-5.9	-8.7	-4.5	-13.4
Current account balance	-15.2	-11.8	-9.5	-22.6
Source: On the basis of official data				

The country has also exhibited low and highly volatile rates of growth since 1998 (See figure 10 above). This poor growth performance has been accompanied by significant deficits in the fiscal accounts and balance of payments. The country has exhibited on average no growth since 2000. The public deficit has increased from -6% of GDP in 2002 to -13% in 2005. For its part the current account imbalance has widened from -15% to -23% for the same period (See table 12).

These disequilibria make it very difficult for the country to engage in policies other than those associated with adjustment and stabilization. These policies can have significant social consequences.

At the sectoral level the factors which make Regions 2 and 5 susceptible to the impact of natural disasters include:

- Low levels of profitability and viability of the farming systems

Because of the low levels of profitability and viability of the farming systems farmers in Regions 2 and 5 most farmers have limited financial resources and are forced to engage in farming systems with few adaptive technological opportunities to limit or reverse the effects of the floods. In this case many suffered significant disruption and financial losses.

- Limited employment opportunities.

The lack of economic diversification in the region, both within and outside of the agricultural sector. There were few employment alternatives available for dislocated farmers as a result of the flood disaster.

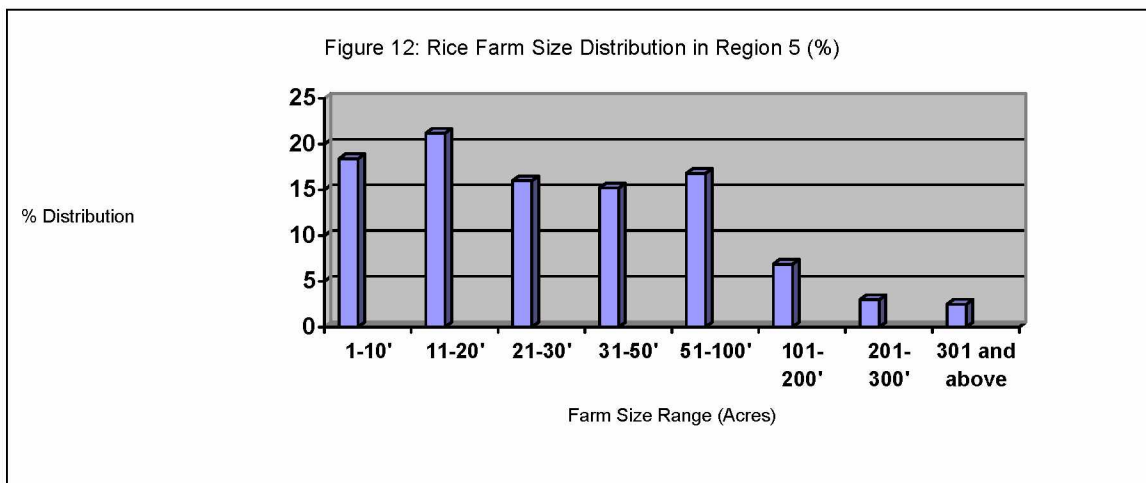
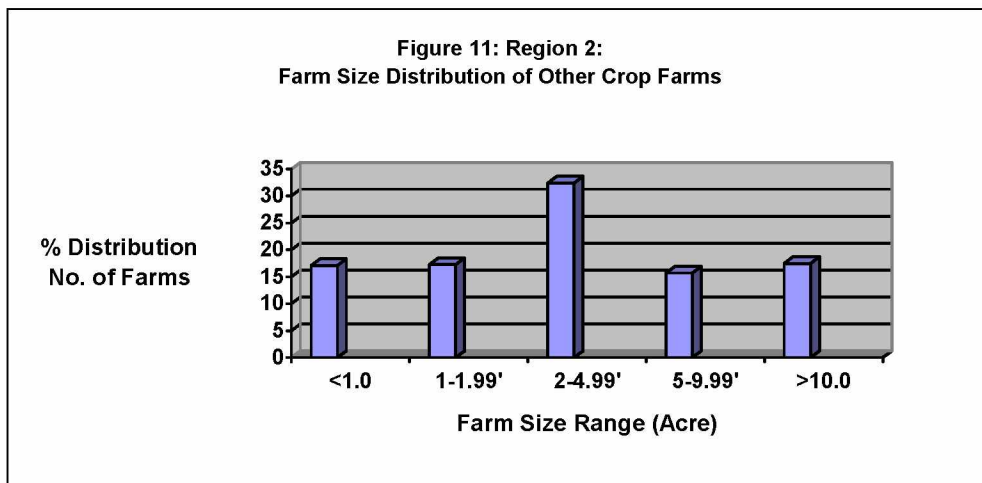
- Self sufficiency and food security.

Farmers in both regions, especially the small farmers that produce “other crops” utilize a substantial portion of their production for home consumption. This provides an element of self-sufficiency and food security. The impact of the flood therefore exposed the farming population to hunger and predisposed it to its consequences.

- Lack of a range of measures to cover disasters such as micro savings schemes and agricultural insurance.

Access to finance is covered by different institutions. There is the formal banking sector comprising of the commercial banks and then there are those institutions that focus on small and micro loans. The latter include the Institute of Private Enterprise Development (IPED), the Small Business Development Finance and also credit unions. Less formal organizations include hire purchase and for rice farmers, working capital credit obtained from rice millers.

In 2004 IPED funded 5,518 loans and at the end of the year had 3,797 loan clients. In Region 2 IPED had 253 loans per 10,000 people, while for Region 5, this number stood at 100 loans per 10,000 people. In 2004, 2,040 loans were issued to women, 2,554 loans to men and 924 loans jointly to men and women. Included in these loans are the loans focussed at Region 2 and 3 under the IFAD/CDB/GoG “Poor Rural Communities Support Services Project”.



The cost of accessing loans particularly in the isolated areas of Region 2 may be very high relative to the size of the loan. Furthermore the repayment cycle may not coincide with the crop cycle thereby putting additional strain on already poor finances.

Region 5 is not so isolated but many farmers and households had to rely on loan restructuring following the January February 2005 floods and have had little time or opportunity to recover. While existing lending organizations are restructuring loans again the current flood reinforces and increases loan obligations. Also many rice farmers depend on tied arrangements with rice millers for access to working capital during the crop cycle.

In both Regions farm size tend to be small as Figures 11, 12 and 21 indicate. Indeed there is a question, whether these farm sizes represent economic viable units. The very small farms (less than 1 acre) in particular, are often used to supplement income or food for household consumption.

3.8 Environmental factors

In both the Pomeroon and the flood affected areas of Region 5 people and communities depend primarily on river water for their water supply as there is no regular water supply and 430 gallon tanks are perhaps beyond the budget of many families.

In region 5, 65% of the households use septic tanks and 35% pit latrines, with the poorer strata and more isolated households using pit latrines. In region 2 the percentage of households that use of septic tanks and for pit latrines was not available. In both regions solid waste management is poor with no systematic collection of garbage.

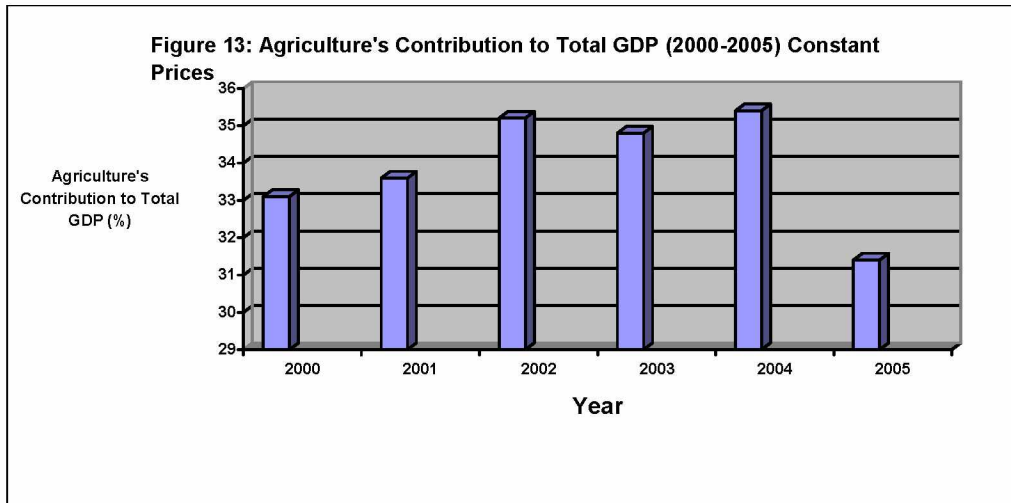
III. Description of damage and losses by sector

3.1 Productive sectors: Agriculture and livestock

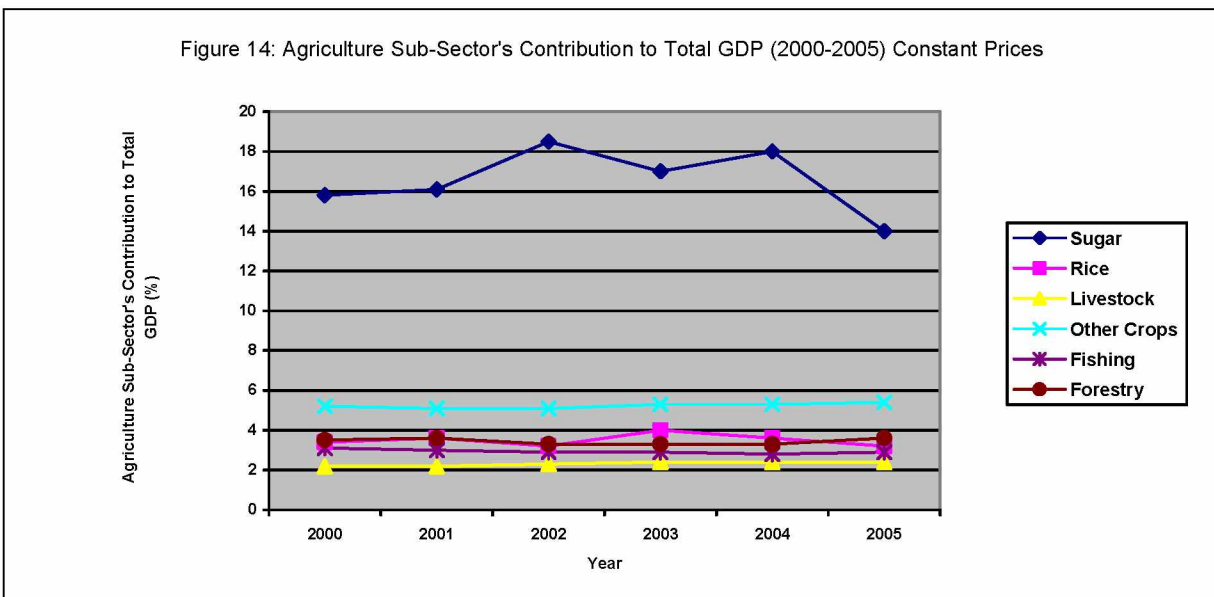
3.1.1 Overview

Agriculture is the most important sector of Guyana's economy and continues to play a significant, though fluctuating, role in the country's economic development process. The importance of the sector is underscored by its contribution to foreign exchange earnings, employment and Gross Domestic Product (GDP).

In 2000, for instance, the agricultural sector accounted for 33.1% of GDP, compared with a corresponding 35.4% in 2004. The sector's contribution to GDP declined in 2005, due mainly to the negative impact on the sector of the January – February 2005 flood. Agriculture's contribution to total GDP for the period 2000 to 2005 is presented in Figure 13.

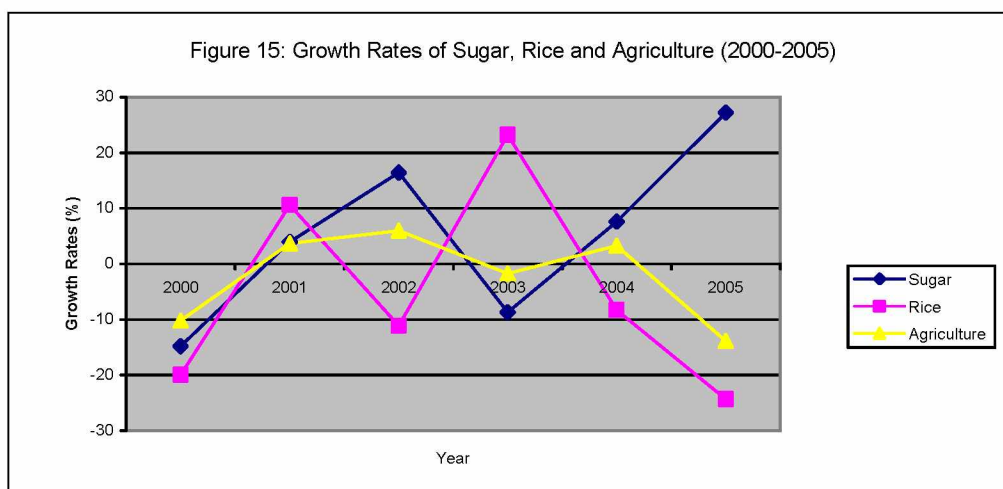


The sugar industry is by far the major sub-sector contributing to agricultural GDP, followed by other crops, rice, forestry, fishing and livestock, in that order. The relative contribution of the various agricultural sub-sectors to total GDP is presented in Figure 14.



The performance of the sector for the period 2000 to 2005 maybe described as mixed. The negative growth rate of 10.2% returned in 2000 was followed by two consecutive years of positive growth rates (2001 and 2002). This short period of positive growth was, however, followed by a negative growth rate of 0.6% in 2003. In 2004, the sector recovered and registered a positive growth of 1.6%. The sector's growth path was, again, interrupted in 2005 as a result of January-February floods which significantly impacted the sector. The changes in the sector's

rate of growth over the period under review are closely related to the fortunes and output of the principal crops: sugar cane and rice. The agricultural sector's growth rate as well as the growth rates of the two main commodities for the period 2000 to 2005 and presented in Figure 15.



Growth in the livestock and other crops sub-sectors had been fairly steady since 2000, but was negative in 2005 as a result of the impact of the January-February floods. Growth in the fishing industry fluctuated over the period under review with negative rates of growth recorded in 2002 (-3.6%), 2004 (-1.3%), and 2005 (-5.4%). Growth in the forestry sub-sector has also fluctuated over the period under review; however, this sector was the only sub-sector to record a positive growth rate in 2005.

In addition to its significant contribution to GDP, the agricultural sector accounts for approximately 30% of total employment and 40% of export earnings.

Agriculture occupies approximately 400,000 acres of irrigated land in Guyana. Sugar and rice are the most important crops in terms of area, value of production, employment creation, and contribution to export earnings.

A wide range of non-traditional crops is grown in Guyana. These range from fruits and vegetables, roots and tubers, herbs and spices, legumes and cereals to oil seeds. These non-traditional commodities play a significant role in ensuring some element of food security in the country.

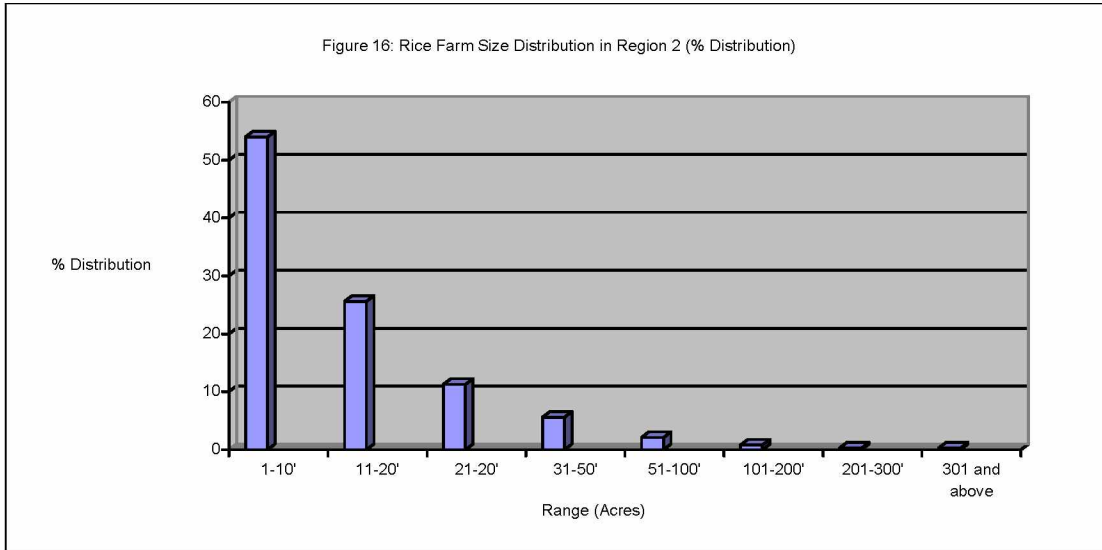
3.1.2 Characteristics of agriculture in affected areas

3.1.2.1 Agricultural profile of Region 2

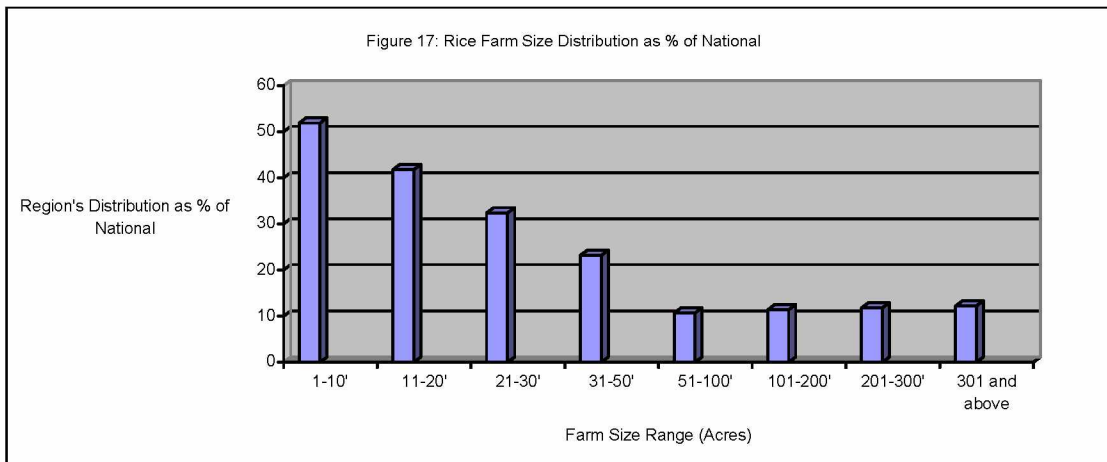
The region is predominately an agricultural one in which the main crops produced are rice, coconuts, citrus, fruits, cereals and legumes, ground provisions, and a wide range of

vegetables. The farmers may be classified as small to medium, based on farm size and area cultivated, with very few large farmers operating in the area.

There are approximately 1,945 rice farmers operating in Region 2, which represents 39.1% of total active rice farmers in Guyana. These rice farmers produce an average of about 120,213 metric tonnes of rice per paddy annum, which represents 28.6% of national paddy production. Most of the rice farmers are small farmers, with 54.0% of rice farmers in the region operating on ten or less acres and on a cumulative 79.6% of these farmers operating on a farm size of 1-20 acres. (See Figure 16 for details).



It is significant to note that 51.9% of all rice farms in Guyana of farm size 1-10 acres are located in Region 2, and 41.8% of all rice farms of 11-20 acres are also located in Region 2 (Figure 17).

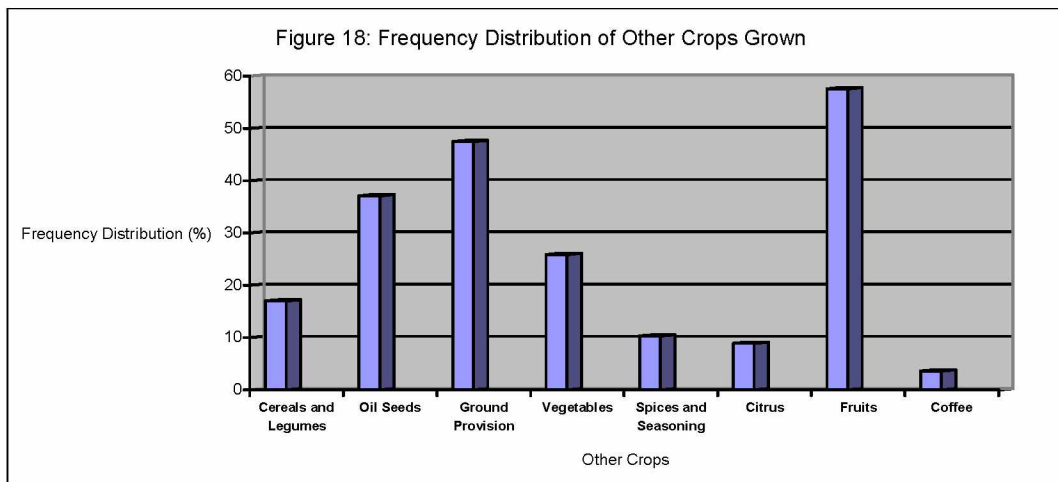


Rice is produced mainly in the Essequibo area of the region on approximately 32,330 acres or an average farm size of 16.60 acres.

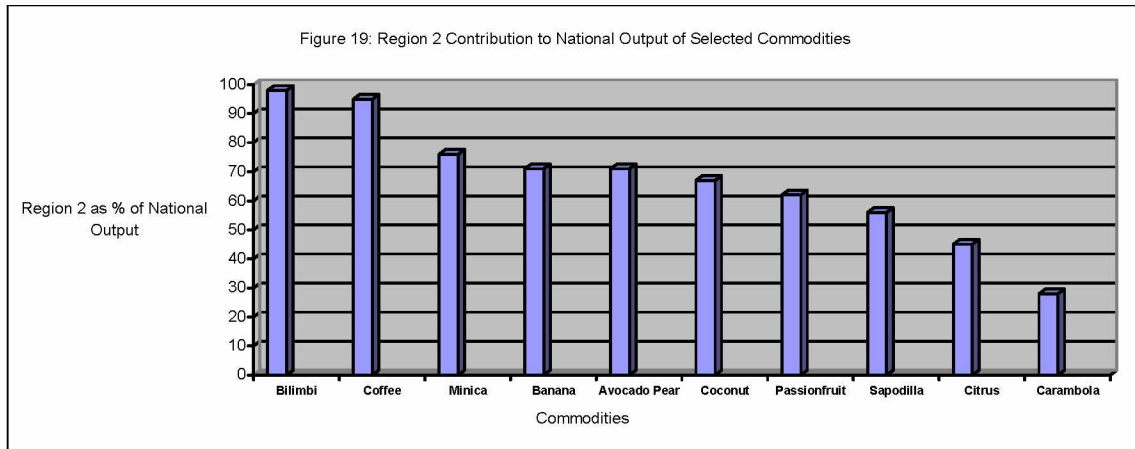
The other major agricultural activities conducted in the area include the production of other crops (except rice and sugar), fishing and forestry. The region is a major national production area for a wide range of crops in the “other crops” category. There are approximately 552 active other crop farmers operating on 3,452 acres, with an average farm size of 6.25 acres. The actual cultivated/harvested area is 1,909 acres or 3.46 acres per active farmer.

The distribution of other crop farms by farm size in Region 2 is presented in Figure 18. The figure clearly demonstrates that the Region consists mainly of small to medium farmers, as only 17.5% of all other crops farmers in the area are operating on farm size of over ten (10) acres and 66.8% of these farms are less than five (5) acres.

The system of production is mainly mixed cropping with each farmer on the average cultivating 2.1 different crops at the same time. The frequency distribution of major crops (groups) grown is presented in Figure 18. The figure shows that 57.6% of all farmers produced fruits and 47.5% produced ground provision, while only 3.6% produced coffee.



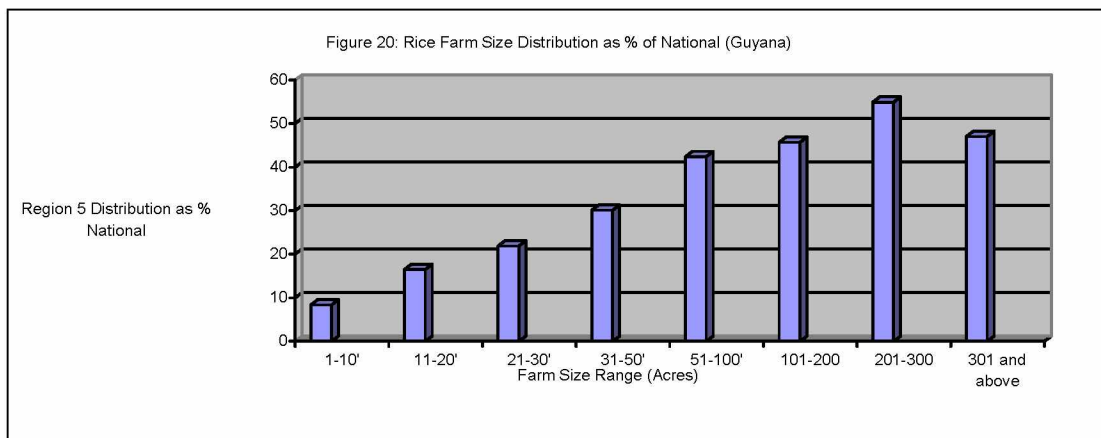
Region 2 is a significant national production area of some of the major commodities in Guyana. The region’s contribution to total national output of some of these commodities over the last two years is presented in Figure 19.



3.1.2.2 Agricultural profile of Region 5

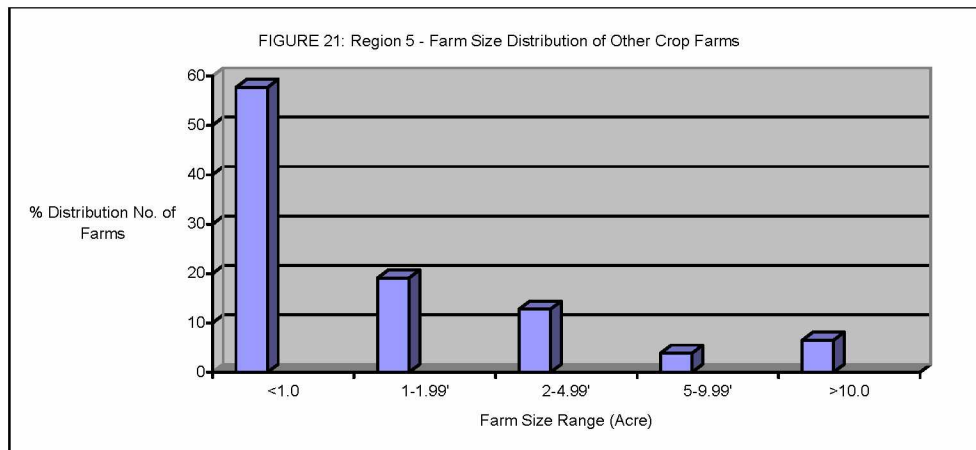
There are approximately 929 rice farmers operating in the region, which represents 18.7% of total active rice farmers in the country. These rice farmers produce an average of about 150,106 metric tonnes of paddy rice per annum, which represents 32.6% of national paddy rice output. Until the situation in Region 2, most of the rice farmers in the region operate on medium to large farms. In fact, farms size 1-20 acres represent only 39.6% of total number of farmers, compared to 79.6% in Region 2. See Figure 20 for details.

In addition, approximately 50.0% of all national rice farms greater than 100 acres are located in Region 2 (Figure 11). Of the 929 rice farms in Region 5, 377 (40.6%) are located in the Frontlands, 224 (24.1%) are located in Mahaica, 218 (23.5%) are located in Mahaicony and 110 (11.8%) are located in Abary. The rice is produced on approximately 61,178 acres or on farm lands with an average farm size of 65.9 acres.



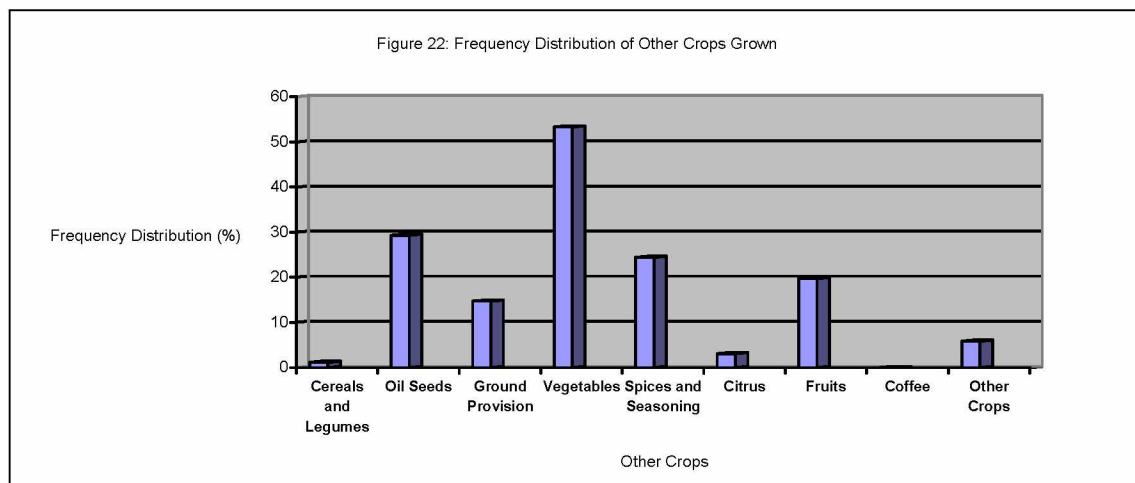
Region 5 is also a major producer of crops in the “other crop” category. There are approximately 945 active “other crop” farmers operating on 11,539 acres, with an average farm size of 12.21 acres. The actual cultivated/harvested area is 10,273 acres or 10.9 acres per active

farmer. The distribution of the “other crops” farms by farm size for Region 5 is presented in Figure 21.



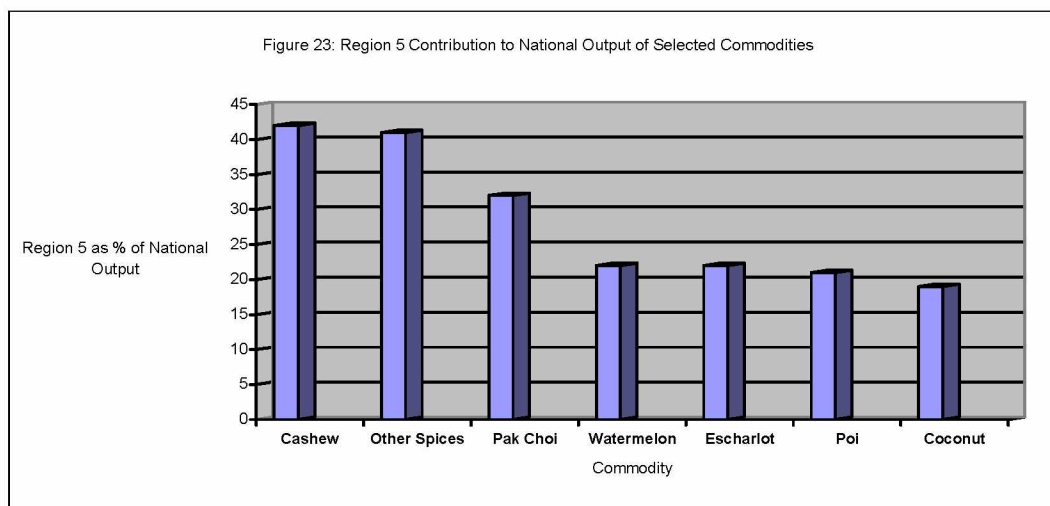
The figure clearly demonstrates that there are also a fairly large number of small farmers involved in subsistence agricultural production in Region 5. This represents a dual agricultural system in the Region.

Unlike Region 2, the level of crop diversification is not as great in Region 5, with each farmer planning on the average 1.6 different crop per holding. The frequency distribution of major crops grown is presented in Figure 22.



The figure shows that 53.3% of all active “other crops” farmers produced vegetables, while only 1.2% produced cereals and legumes.

Region 5 is a significant producer of some major “other crops” in Guyana. The region’s average contribution to total national output of some of these commodities over the last two years is presented in Figure 23.



3.1.3 Analysis and estimated impact

3.1.3.1 Overview of damage and losses

The effects on the agricultural sector were most severe in Region 5, which accounted for 72.6% of total impact, with Region 2 accounting for 19.7%. While the agricultural sector of Regions 3, 4 and 6 was impacted, the effects on the sector in those regions were limited and thus they were not included in the impact assessment, except in the case of the rice industry.

Table 13 provides a summary of the damage, losses and total impact of the flood to the sugar, rice, other crops and livestock sub-sectors, as well as to farm roads.

Table 13 Total Impact to Agricultural Sector by Region and Sub-Sectors (G\$ million)						
Region	Sugar	Rice	Other Crops	Livestock	Farm Roads	Total
DAMAGE						
2	-	29.2	811.6	1	5.5	847.3
3 and 4	-	53.	-	-	-	53.0
5	20	1,262.6	781.6	694.8	86.9	2,845.9
6	-	270	-	-	-	270
Sub-Total	20	1,614.9	1,593.2	695.7	92.4	4,016.2
LOSSES						
2	-	3.9	34.8	0.2	-	39.0
3 and 4	-	9.4	-	-	-	9.4
5	4	185.7	34.2	204.30	-	428.2
6	-	15.1	-	-	-	15.1
Total	4	214.1	69.0	204.5	-	491.6
TOTAL IMPACT						
2	-	33.1	846.4	1.2	5.5	886.2
3 and 4	-	62.4	-	-	-	62.4
5	24	1,448.3	815.8	899.1	86.9	3,274.1
6	-	285.1	-	-	-	285.1
Total	24	1,829	1,662.2	900.2	92.4	4,507.8

3.1.3.3 The sugar industry

The sugar industry, from a socio-economic context, is the most important agricultural activity in Guyana. It accounts for approximately 14.0% of total GDP (2005), 25% of foreign exchange earnings and affects the lives of over 10% of the country's population directly and indirectly. The total impact of the December 2005 – February 2006 flood on the industry was considered not severe, with total impact put at \$24.0 million. Of the total impact, crop damage is estimated at \$20.0 million and losses put at \$4.0 million. Losses are estimated for crop rehabilitation (\$3.0 million) and drainage cost (\$1.0 million). Only Region 5 was impacted by the flood to any degree. The total impact estimate of \$24.0 million represents only 5.15% of sugar industry GDP at constant prices. It should be noted that the January 2005 floods resulted in a total impact on the sugar industry estimated at 16.4% of that sub-sector's GDP. Details on total impact of the floods on the sugar industry are Table 14.

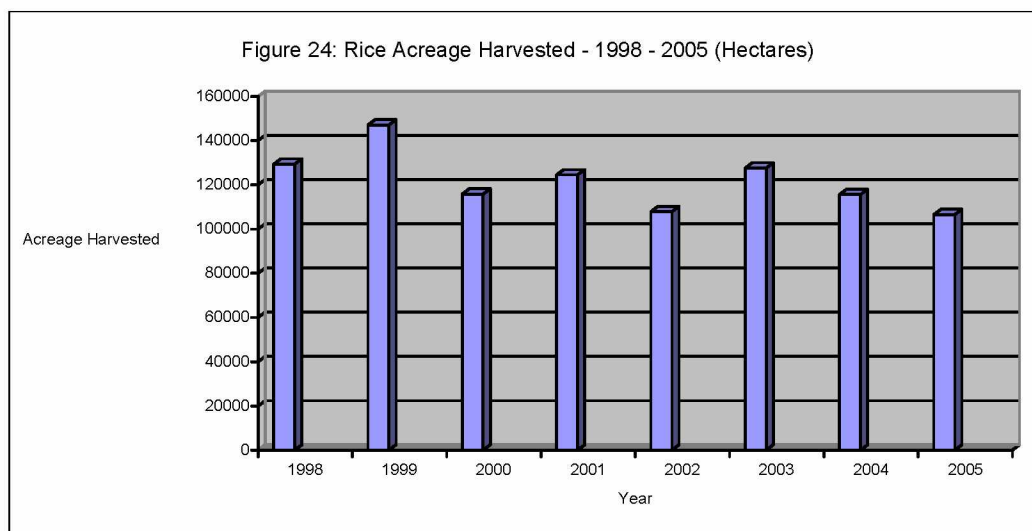
Item	Region		Total
	2	5	
Damage - Crop loss	-	20.0	20.0
Losses			
- Crop rehabilitation	-	3.0	3.0
- Drainage Cost	-	1.0	1.0
Total Losses	-	4.0	4.0
Total Impact	-	24.0	24.0

3.1.3.4 The rice industry

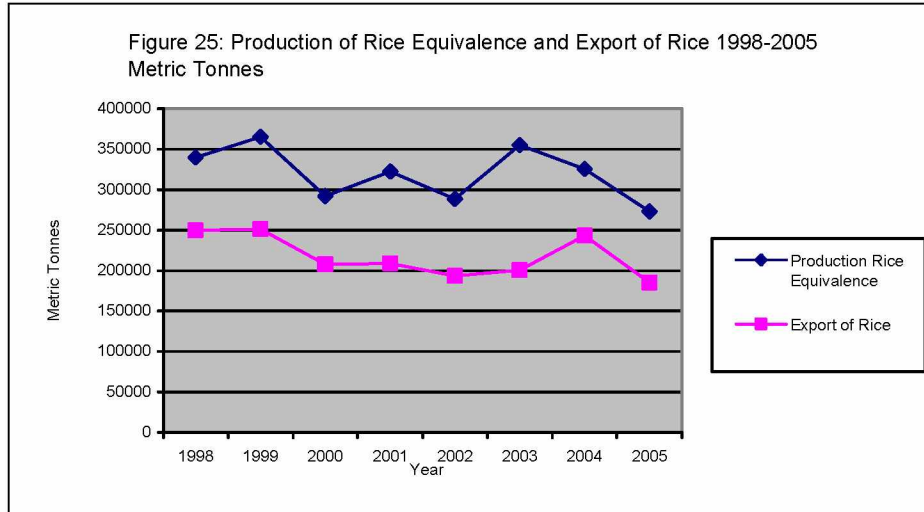
The rice industry is the second most important agricultural industry in Guyana. It contributes 3.2% of total GDP, employs approximately 25,000 workers, and provides about 10% of the country's total export earnings.

In the late eighties, production of paddy rice fell 25% from the levels that had been achieved in the early sixties. Exports of rice at the same time were about 50% of the levels attained in the mid sixties. In 1988, rice marketing and input supply services which were government monopolies were eliminated, and rice mills were privatized. These actions resulted in a positive response by the industry. By 1992, rice production and exports were almost double the late 1980 level and by 1996 almost tripled. The new policies instituted in the 1990s benefited from European Union preferred market conditions. Between 1992 and 1997, rice exports averaged 10% of total country exports. However, both production and exports showed a downward trend for the period 1998-2005, decreasing by 26%.

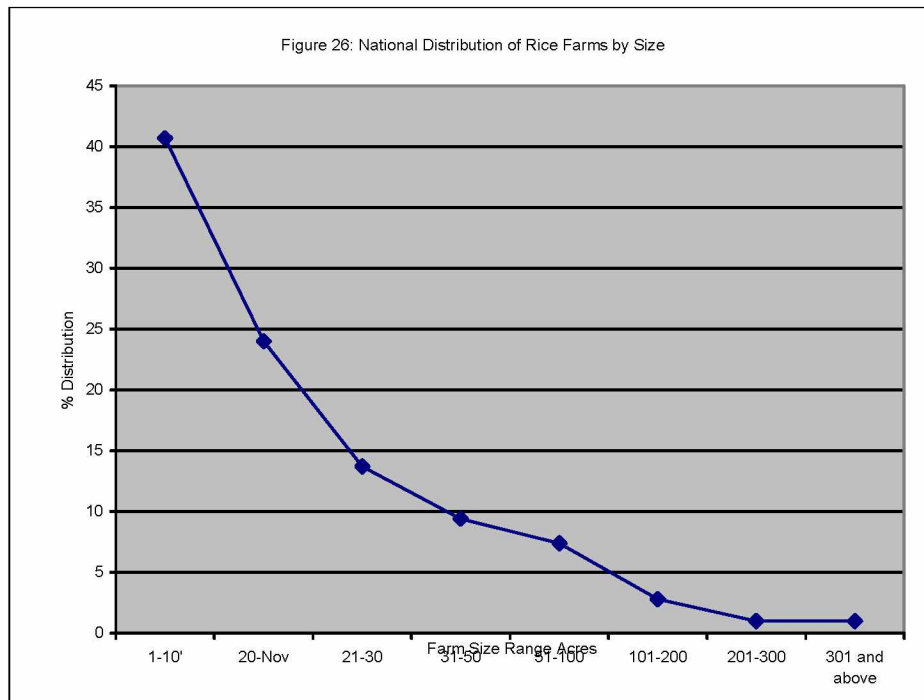
Rice acreage harvested for the period 1998-2005 is presented in Figure 22, while production and exports for the same period are presented in Figure 24.

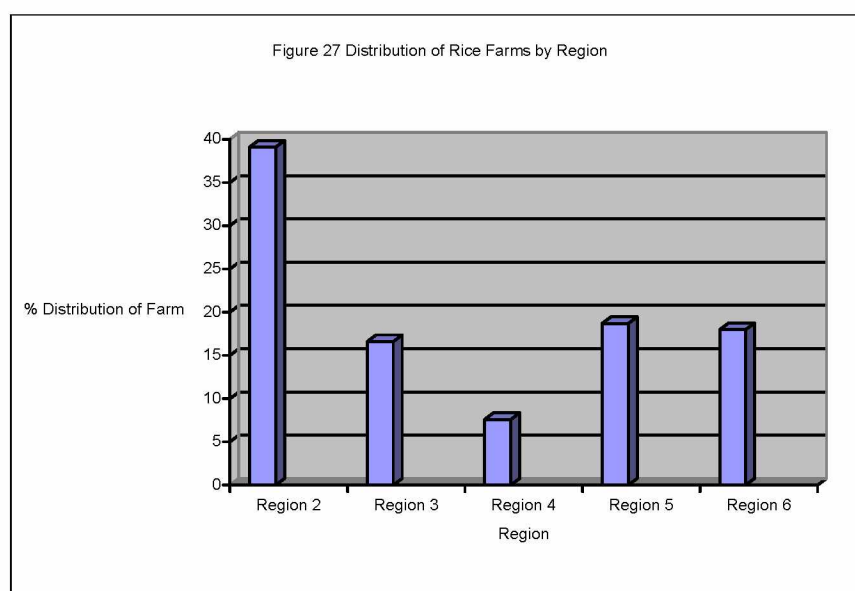


It is obvious from Figure 25 that the January 2006 floods impacted heavily on rice production and export in 2005.



There are about 4,973 active rice farmers operating in Guyana. The distribution of these farmers by farm size and region are presented in Figure 26 and Figure 27, respectively.





The rice industry was heavily impacted by the flood disaster, with some 1,118 farmers occupying 27,583 acres affected.

Total impact of the disaster on the industry is estimated at \$1.9 billion. The impact of the disaster was more pronounced in Region 2, which reported total impact estimate of \$1.5 billion, representing 79.2% of total rice industry impact. The areas of Abary Creek, Mahaicony Creek, and the Mahaica Creek were severely impacted. Approximately 2,300 acres of rice lands in Region 6 were also impacted to varying degrees. The flood disaster also affected rice farmers in Region 2, 3, and 4 to a lesser extent. See Figure 24 for details.

Region/Area	No of Farmers Affected	Acreage affected	Crop Damage estimate	Losses (G\$ million)			Total Impact
				Expenses incurred	Income Losses	Total Loss	
2	30	700	29.3	0.02	3.9	3.9	33.2
3	45	1,100	48.0	0.03	8.5	8.5	56.5
4	17	100	5.0	0.05	0.9	0.9	5.9
5							
Abary Creek	110	7,223	390.0	0.3	55.2	55.5	445.5
Mahaicony Creek	207	8,609	464.9	0.3	68.1	68.4	533.3
Mahaica Creek	225	6,351	342.9	0.2	50.0	50.2	393.1
Front Lands (Mahaica – West Berbice)	382	1,200	64.8	0.05	11.5	11.5	76.3
TOTAL	1,118	27,583	1,614.9	1.04	0.21	214.1	1,829.0

3.1.3.5 Other crops subsector

The Category “other crops” which includes, cereals and legumes, oil seeds, ground provisions, herbs and spices, fruit trees and vegetables suffered severely in Region 2 and 5, with total impact of the flood disaster on this sub-sector estimated at \$1,7 billion. Approximately 5,107 acres of “other crops” lands were impacted, consisting mainly of plantains and bananas (2,750 acres), root crops (637.6 acres), legumes 435 acres, vegetables (353.3 acres) and fruit crops (309 acres). Approximately 290 acres of citrus and 250 acres of coffee were also impacted, although impact estimates were not obtained (Table 16).

Crops Group	Acreage Lost/Affected		
	Region 2	Region 5	Total
1. Plantain/Banana	2,750	-	2,750
2. Root Crops	625	12.55	637.55
3. Corn	10	-	10
4. Bean/Vines	435	-	435
5. Fruit Crop	253	56.25	309.25
6. Citrus	Water logged 290	-	290
7. Coffee	Water logged 250	-	250
8. Vegetables	10	343.3	353.3
9. Herbs and Spice	-	71.9	71.9
	4,623	484	5,107

Region 2 accounted for approximately 50.9% (\$846.4 million) of total “other crops” impact estimates, while Region 5 accounted for the remaining 49.1% (\$815.8 million) of overall impact estimates. A total of 748 “other crop” farmers were affected in Region 2; 445 farmers in the Upper Pomeroun and 303 farmers in the Lower Pomeroun. Information on the number of “other crop” farmers of Region 5 affected by the flood disaster was not available.

Of the total impact estimates of \$1,7 billion for other crops, damages and losses to fruit trees accounted for \$759.6 million (45.7%), while that for vegetables amounted to \$707.9 (42.6%). The plantain/banana industry in Region 2 was severely impacted, with damage and losses for this industry estimated at \$141.0 million, representing 8.5% of overall impact on the “other crops” sub-sector.

Details of acreage impacted and estimates of damages and losses for the category “other crops” are presented in Tables 16 and 17, respectively.

Region	Plantain/ Banana	Root Crops	Corn	Beans/ Vines	Fruit Tree	Citrus	Coffee	Vegetables	Herbs and Spices	TOTAL
DAMAGE										
2	131.1	21.3	0.4	23.0	634.8	-	-	1.0	-	811.6
5	-	1.8	-	-	99.1	-	-	676.5	4.2	781.6
Sub-Total	131.1	23.1	0.4	23.0	733.9	-	-	677.4	4.2	159.2
LOSSES										
2	9.8	1.0	0.02	1.7	22.2	-	-	0.06	-	34.8
5	-	0.09	-	-	3.5	-	-	30.4	0.2	34.2
Sub-total	9.8	1.0	0.02	1.7	25.7	-	-	30.5	0.2	69.0
TOTAL IMPACT										
2		22.2	0.4	24.8	657.0	-	-	1.0	-	846.4
5	-	1.9	-	-	102.6	-	-	706.9	4.4	815.8
Total	141.0	24.2	0.4	24.8	759.6	-	-	707.9	4.4	1,662.2

3.1.3.6 Livestock industry

The livestock industry suffered major damages and losses as a result of the floods. Region 5 was the area severely impacted and an estimated 103,519 animals were lost in that region. These included 8,491 cattle, 4,678 sheep, 3,770 goats, 601 pigs, 87,131 poultry and 148 horses. Of total cattle losses, 6,753 (79.5%) were located in the Abary River area of Region 5. The Ithaca-Mahaicony Branch Road lost 81,441 poultry, representing 93.5% of total poultry lost. This particular area also lost 3,210 sheep and 2,958 goats, representing 68.6% and 78.5% of total sheep and goats lost respectively. (Table 18).

Region/Area	Cattle	Sheep	Goat	Pig	Poultry	Horses	TOTAL
2	0	11	0	0	1,301	0	1,312
5 – Ithaca-Mahaicony Branch Rd	1,116	3,210	2,958	594	81,441	88	89,407
Abary River	6,753	1,224	812	0	665	48	9,502
Mahaicony River	500	180	0	0	3,000	12	3,692
Mahaica River	122	53	0	7	724	0	906
	8,491	4,678	3,770	601	87,131	148	104,819

The overall estimates of damages and losses attributed to the livestock industry are put at \$900 million. As indicated earlier, Region 5 was the area mostly affected, with damages and losses for this area estimated at \$899.1 million. Damages and losses for cattle was put at \$695.4 million, representing 77.3% of total livestock estimates, while that for poultry was estimated at \$100.0 million (11.1%).

A total of approximately 1,196 livestock farmers were impacted by the flood disaster, with 1,160 farmers (97.0%) located in Region 5 and 36 farmers (3.0%) in Region 2.

Details of the damages and losses incurred by the livestock sector as a result of the flood disaster are presented in Table 19.

Region/Area	Cattle	Sheep	Goat	Pig	Poultry	Horses	Total
DAMAGE							
2	0	0.2	0	0	0.8	0	0.9
5 Ithaca-Mahaicony Branch Rd	312.0	16.0	15.8	17.8	69.3	3.1	434.1
Abary River	202.5	13.1	7.5	0	1.1	0.3	224.4
Mahaicony River	24.0	2.5	0	0	1.8	0.7	29.0
Mahaica River	5.9	0.7	0	0.2	0.4	0	7.2
Sub-Total	544.3	32.6	23.4	18.0	73.4	4.1	695.7
LOSSES							
2	0	0.04	0	0	0.2	0	0.2
5 Ithaca-Mahaicony Branch Rd	95.8	6.6	6.6	6.1	25.7	0.7	141.5
Abary River	48.5	4.0	1.7	0	0.2	0.06	54.5
Mahaicony River	5.5	0.6	0	0	0.4	0.2	6.6
Mahaica River	1.3	0.2	0	0	0.005	0.1	1.6
Sub-Total	151.1	11.4	8.3	6.1	26.7	0.9	204.5
TOTAL IMPACT							
2	0	0.2	0	0	1.0	0	1.2
5	695.4	43.8	31.6	24.1	99.1	5.1	899.1
TOTAL	695.4	43.9	31.6	24.1	100.3	5.1	900.2

3.1.3.7 Other sectors

The impact of the flood disaster on the fishing and forestry industry was considered quite limited and therefore no estimates are provided in this assessment.

The impact of the disaster on farm roads is estimated at \$92.4 million and is discussed under infrastructure in another section of this report.

3.2 Infrastructure

Not all infrastructure was equally affected. Like 2005 the impact of the flood on electricity and telecommunications was minimal. This was valid even more so in 2006 since affected areas were largely rural. Given the constraints of time and the focus on sustainable livelihoods the impacts on electricity and telecommunications were therefore not included in the analysis.

3.2.1. Drainage and irrigation

Emergency actions during the flood were initiated by the National Drainage and Irrigation Authority (formerly the National Drainage and Irrigation Board), Regional Councils and Neighbourhood Democratic Councils. The drainage and irrigation system did not suffer major damages but extensive works had to be carried out in an attempt to control and alleviate the extent of the flooding in the different communities.

In Region 2 emergency works to control and reduce flooding included the pumping of flood waters from the Charity and Amazon areas, desilting of trenches to allow for the free flow of water to sluice and flap-gates and desilting and widening of relief channels.

To reduce the impact of flooding on the Southern side of the public roadway in Region 5, villages between Eldorado and Golden Fleece were empoldered (Eldorado, Belladrum, Paradise and Golden Fleece). Similarly villages on the Northern side of the public roadway. The empoldering included the building of dams or levees and pumping out of flood waters. Other works carried out in Region 5 included empoldering of the MARDs Scheme, East of the Mahaicony River; empoldering of farmlands within the MMA scheme; cleaning excavation and raising of embankments and the rehabilitation of canals.

Apart from Regions 2 and 5 other regions also suffered losses as a consequence of the floods, or as in the case of region 4, the prevention of floods. The summary of losses is stated in table 20 below.

	Losses
Region 2	16.7
Region 3	27.9
Region 4	58.0
Region 5	148.8
Region 5, MMA/ADA	35.0
Region 6	118.4
Purchase 2 draining pumps	40.4
EDWC	30.0
Farmer Community group	20.0
Farmers	Not available
Total	495.2
Source: D&I, RDC's	

The losses for drainage and irrigation underscore the dependency of Guyana and these Regions in particular, on a well functioning irrigation and drainage system. Indeed a well conceived and implemented flood management plan will reduce vulnerability amongst all strata of the coastal population.

3.2.2 Road transport

Damages to the road network have been limited to Region 5 because the damage to roads in Region 2 was minimal. Like 2005, the technical assessment was carried out by the Work Services Group (WSG) of the Ministry of Public Works and Communications.

In Region 5 the Mahaicony Branch Road, De Hoop Branch Road, Champagne Road, Essau and Jacob Road, Hyde Park to Mora Point Dam, Burma Road and roads in Belladrum were affected. The WSG investigated 35.6 miles of public road that were classified as follows: double bituminous surface –DBST- (11.3 miles); crusher run -CR-(6.5 miles); white sand/sand-clay -WS/SC- (11.8 miles) and mud -M- (6 miles). The WSG found that 14 percent of the investigated roads needed reconstruction while 86 percent was in need of rehabilitation. Rehabilitation entails pothole patching and overlay for DBST roads and grade, shape and re-compact gravel roads (CR, M, WS/SC) to restore the roads to similar condition as before the floods. Reconstruction needs to be carried out on those sections of the roads where structural damage is evident. The damages also include the cost of cleaning drains and regrading of the verges.

Type of road	Length (miles)	Damages
DBST	11.3	126.2
CR	6.5	67.1
WS/SC	11.8	132.5
M	6	18.2
Agricultural roads	na	92.4
Total	35.6	436.4
Source: WSG		

The costs for rehabilitation and reconstruction of the roads in Region 5 are roughly G\$ 9.7 million per mile as compared with a cost for rehabilitation and reconstruction of roads for the East Coast Demerara of G\$ 7.1 million per mile in 2005. This increase is caused by an increase in the price of materials and the adoption, where applicable, of an improved design standard by introducing a 0.75” thick single layer of crushed stone on the white sand sub-base to reduce the vulnerability of roads to flooding.

Damages to secondary and tertiary agricultural roads were not included in the WSG assessment because of time constraints, the inability to assess the status of those roads before the flood and the fact that several of these roads were still flooded. At the ECLAC assessment of the 2005 floods it was estimated that 80.4 miles in Region 5 of earthen agricultural roads were affected by the floods resulting in damages of G\$ 75.6 million (or G\$940,000 per mile). Because the December – March flooding in Region 5 was of longer duration it is estimated that the damages will at least as high as during the 2005 flood. Based on this review ECLAC estimates the damages to agricultural roads at G\$ 86.9 million in Region 5 and at G\$ 5.5 million in Region 2, resulting in total damages of G\$ 92.4 million. This total however could be higher when additional information becomes available (see table 21 above).

Losses would include the cleaning of farm equipment and vehicles, but are assumed to be fairly low because there was more advance warning and people were able to take precautions. An additional cost which was not included in the assessment because of lack of data is the possible increase in transportation costs, particularly for the farming sector. Such an increase, of course would negatively impact on farmers’ incomes.

3.2.3 Water supply and water disposal

The Guyana Water Inc. (GWI) did not suffer damages to assets as a result of the floods. However, they incurred losses because of an increase in operating costs in Regions 2, 4, 5 and 6 (See table 22 below).

The flooding affected the distribution system; therefore, the GWI had to increase the operating hours for pumping stations from 16 to 24 hours in an effort to secure the integrity of the distribution system. This increase in cost affected pumping stations in Anna Regina, Charity, Richmond, Lima and Henrietta in Region 2, Strath Campbell in Region 5 and Black Bush polder in Region 6.

Because of contamination the GWI and CDC had to make water available to communities in Region 4, 5 and 6. The 430 gallon "Black" tanks were made available to affected communities in Regions 4 and 5. Altogether 40 tanks were supplied. The tanks were refilled twice a day on a bi daily basis. No assistance with fresh water was provided in Region 2. Increased costs included the use of contractors, tankers and bowsers to secure the supply.

GWI assessed that its response capacity has increased as a result of the lessons learned from the 2005 floods, the availability of emergency equipment and the initiation of an emergency response plan. However the amount of available black tanks and limited availability of tanker capacity (only 1 contractor with a total of 4 trucks is able to respond) remains a constraint to direct response and relief operations

Despite the increase in the emergency response capacity GWI acknowledged that there was still need for improvement. Specifically there is a need for expanding the emergency stock and supplies and improvements of the emergency response plan and emergency standing operating orders.

The suggested increase in emergency stocks would include the purchase of 100 black tanks, 5 water pumps and 2 tankers/bowsers.

Table 22 Summary of losses in the water sector G\$ million		
Item	Comments	Cost
Increased pumping costs	Pumping stations at Carity, Henrietta, Rosignol, Weldaad, Strath Campbell, Bath, Yakasuri, Johanna and Sheet Anchor	6.9
Emergency water supply,		0.8
Overtime		0.1
Other emergency water supplies		0.9
Total losses		8.6
Source: GWI		

3.3 Social sectors

3.3.1 Housing

Damage to the housing sector was relatively small. It amounts to 86.2 G\$ million, which represents estimates of damages to approximately 7,556 dwellings, or 4 per cent of the national housing stock, and the indirect losses incurred through the cleaning of these homes.

In comparison to last years flood damage which amounted to some 55 million G\$ and affected 44 percent of the housing stock, the difference on the impact of this year's flooding can be attributed to the low population density in Regions 2 and 5, which had been declared a disaster zone by the GOG.

As can be seen in table 23, in comparison to Region 4, in which 72 percent of the damage occurred during last year's flooding and which has a population density of 139.0, the population density of 8.0 and 12.5 for Region 2 and 5 respectively, is very low. The other contributing factor to the reduction in the value of damage to the housing sector may be the fact that most houses in the affected parts of the Regions, coastal and riverain areas, were built off the ground on stilts, thus reducing damage caused by the floods.

Region	Population	Population affected	Population Severely affected	Number of HHs	Number affected HHs	Percentage of affected HHs within each Region	Number of HHs severely Affected	Percentage of HHs Severely Affected
Region 2	49,253	12,824	3,817	11,220	2,464	22	931	38
Region 5	52,428	20,877	3,669	12,774	5,092	40	895	18
Totals	101,681	33,701	7,486	23,994	7,556		1,826	
Percentage		33	22		31		24	
National Total	751,223			182,615				

Source: ECLAC estimates based on official GOG data

The Regional Offices undertook an assessment of the affected Regions and based on their data it could be estimated that some 22 percent of households in Region 2 and 40 percent of households in Region 5, were affected. Severely affected dwellings, adjudged so based on the extent of damage caused by the flood waters to the sanitation facilities, accounted for 38 percent of the affected dwellings in Region 2 and 18 percent in Region 5 as presented in table 23.

	Area Km²	Population	Population Density
Region 2	6195	49253	8.0
Region 3	3,755	104,750	27.5
Region 4	2,232	317,475	139.0
Region 5	4190	52428	12.5
Total	16372	523906	
National Total	214,999	751,223	

Source: Guyana Population and Housing Census, 2002 Table 9

As can be seen in table 25, the total impact on the housing sector is 86,237 G\$ million thousand. Of this sum 93 percent can be attributed to damage to the housing infrastructure and the remaining losses incurred in the cleaning operations accounted for the balance.

Total Impact	86.2
Damage	80.3
Damage to housing	73.3
Imported Component	7.3
Losses	5.9
Cleaning/disinfecting of homes	5.9

Note: the figure for damage is equal to the sum of damage to housing plus the imported component. Total impact is the sum of damage plus losses.
Source: ECLAC estimates based on official GOG data

3.3.2 Education

Damage to the education sector amounted to 1.1 G\$ million. This reflects the minor damage which the December to January Floods inflicted on the Educational sector. Of the 16 schools affected in table 1, two continue to remain closed from Region 2 and nine of Region 5 were used as Shelters. The 16 schools represent 1 per cent of the national stock of educational institutions.

Region	Number of educational institutions	Number of Teachers	Number of Students	Number of Affected institutions
Region 2	148	582	14188	7
Region 5	136	622	16081	9
Totals	284	1204	30269	16
National Totals	1750	9975	211721	
As % of National	16	12	14	1

Source: ECLAC estimates based on official GOG data

Table 27 details the summary of damage to the education sector, for the December to January 2006 flooding. Losses incurred by the additional cost of cleaning schools and by the use of schools as shelters accounted for 79 percent, or 840 thousand G\$ of the total damage.

Table 27	
Summary of Damage to the Education Sector (G\$ million)	
Total Impact	1.1
Damage	0.2
Damage to education	0.2
Imported Component	0.02
Losses	0.84
Cleaning of Schools	0.84
Losses due to use as shelters	
Note: the figure for damage is equal to the sum of damage to education plus the imported component.	
Total impact is the sum of damage plus losses.	
Source: ECLAC estimates based on official GOG data	

Table 28		
Engagement of Medical Personnel by Region		
Region	No of persons	Category of personnel
Region 2 - Pomeroun	5	2 Doctors, 3 medics
Region 5 - Mahaica/ Mahaicony/ Abary	36	2 doctors, 34 medics
Source: ECLAC estimate based on GOG data		

In comparison to the impact of the 2005 flooding, in which the damage to the education sector amounted to some 395.6 G\$ million of which 76% or 280.9 G\$ million was attributed to tertiary level institutions, this year's damage does not include tertiary level institutions and is substantially smaller.

Teachers interviewed in Region 2 were concerned not so much with the immediate impact of the flooding on school participation, as this was felt to be minor, as these children were accustomed to difficulties and would attend school under trying circumstances. Table 28 indicates that between region 2 and 5 some 16 schools were affected. It is important to be reminded that not all schools were affected directly from the flooding, as the 9 in Region 5, were affected as a result of use as shelters. The more noticeable effect of the flooding it was felt

would be on children's future participation. It was suggested, by teachers, particularly in Region 2 that the impact of the flooding would become evident by the empty stomachs of the children and their low attendance, as the devastation caused by the floods, took its toll on their parents' livelihoods.

3.3.3 Health

Damage to the health sector amounted to 71 G\$ million and accounted for 44% of the total damage to the social sector, as presented in table 29. The main damage to the sector arose from the losses incurred through the provision of increased drugs and medical supplies, provision of increased public health services, and losses due to increased use of water and land transportation. As many as 41 health personnel were dispatched into the Regions, as detailed in table 28, which presents the engagement of medical personnel during the floods according to Regions.

In comparison to the 2005 floods, the impact to the health sector of the 2006 flooding has been minor. The damage to health facilities has been very slight and the personal health of the population affected has been efficiently managed and safeguarded, but caused the Ministry of Health to incur losses in the amount of 56 G\$ million.

Summary of Damage to the Health Sector (G\$ millions)	
Total Impact	71
Damage	11
Damage to Health Facilities	10
Imported Component	1
Total Losses	60
Provision of increased drugs and medical supplies	2
Provision of increased Public Health services	55
Losses due to increased use of water and land transportation	3
Note: the figure for damage is equal to the sum of damage to health facilities plus the imported component. Total impact is the sum of damage plus losses.	
Source: ECLAC estimates based on official GOG data	

IV. Summary of damage and losses

The total impact of the 2006 floods on Guyana amounts to 6 billion G\$ or US\$30.0 million, which represents 4.6% of GDP of current GDP for 2005. The expectation is that the total impact will be somewhat higher when the final numbers are in, but this is the total damage

and losses at the time of the assessment. In any event, this represents the bulk of the economic impact of the disaster (see tables 30 and 31 below).

As is typical of similar types and magnitude of disasters, damage which refers to the impact on physical assets and stocks accounted for roughly 74% of the total impact and amounted to 4.4 billion G\$, equivalent to 3.5% of GDP. During the flood last year, at 87% of the total impact, damage was an even greater portion of the total than this year. Losses or the impact of the flood on income flows, both through lost income, or higher spending, totalled 1.6 billion G\$, equivalent to 1.2% of GDP.

Assessing the total impact as percentage of key macroeconomic indicators provides an indication of the scale of a disaster. The total impact of the flood represents:

- (a) 4.8% of GDP;
- (b) 22.0% of agricultural GDP, underscoring the major impact on agriculture;
- (c) 5.5% of exports of goods;
- (d) 11.3% of gross domestic investment;
- (e) 3.8% of consumption; and
- (f) 3.8% of the public external debt stock.

Both the sectoral and geographical impact of this year's flood was different from last year's. Unlike last year, when the housing accounted for over 60% of the damage, agricultural bore brunt of the damage this year-over 74% of the total.

The total impact on the agricultural sector amounted to 4.4 billion G\$, the equivalent of 3.4% of GDP. Of this total, damage and losses in crop sub-sector accounted for almost 80% of the impact on the sector, with the remaining impact falling on the livestock sub-sector.

The social sectors, including housing and health were spared the ravages that they suffered last year. The impact on these sectors amounted to 158 million G\$, less than 3% of the total impact. In the case of housing, this reflects in part, the lower average costs of the housing affected this year and the fact that many houses were built on stilts.

Among the other sectors, infrastructure also suffered damage. Drainage and irrigation suffered losses of 495 million G\$, stemming from the costs of pumping excess water from flooded areas and the repair of embankments and levees. Despite the much smaller cost than last, when the impact on infrastructure amounted to 9,143 million G\$; the impact this year was a greater proportion of the total impact (15% this year compared with 10% last year).

Table 30				
Summary damage and losses				
Sector and subsector	Damage and losses			
	Total Impact	Total impact	Damage	Losses
	Millions of US dollars	G\$ million		
Total	30.1	6,011.4	4,441.9	1,559.7
Productive sectors				
Agriculture	22.1	4,415.4	3,923.8	491.7
Rice	9.2	1,829.0	1,614.9	214.1
Other	8.3	1,662.2	1,593.2	69.0
Sugar	0.1	24.0	20.0	4.0
Livestock	4.5	900.2	695.7	204.5
Social sectors	0.8	158.0	91.6	66.4
Housing	0.4	86.2	80.3	5.9
Education and culture	0.0	1.1	0.2	0.8
Health	0.4	70.7	11.0	59.7
Infrastructure	4.7	940.2	426.5	503.8
Drainage and irrigation	2.5	495.2		495.2
Water supply and water disposal	0.0	8.6	0.0	8.6
Road transport	2.2	436.4	426.5	...
Emergency expenditures	2.5	497.8		497.8
Transfers	2.4	477.8		477.8
Supplement to the CDC	0.1	20.0		20.0

Note: The damage corresponding to farm roads is included infrastructure under Road Transport.

Road transport suffered damage to the tune of 436.5 million G\$, equal to roughly 7% of the total impact. A number of roads were undermined by the being under water for a protracted period.

There was only minimal impact on the commerce and distribution, as the predominantly small businesses in the affected areas had sufficient warning to move their stocks to higher areas out of the reach of the flood waters.

To ameliorate the plight of the affected population, the government undertook significant emergency expenditures of G\$497.8 million, equal to 8.3% of the total impact. Almost all of this assistance was in the form of cash grants to affected persons, while a limited subvention was made to the Civil Defence Commission (CDC).

Table 31			
Summary of damage and losses as a percentage of GDP			
Sector and subsector	Total impact	Damage and losses	
		Damage	Losses
Total	4.63	3.42	1.20
Productive sectors	0.00	0.00	0.00
Agriculture	3.40	3.02	0.38
Rice	1.41	1.24	0.16
Other	1.28	1.23	0.05
Sugar	0.02	0.02	0.00
Livestock	0.69	0.54	0.16
Social sectors	0.12	0.07	0.05
Housing	0.07	0.06	0.00
Education and culture	0.00	0.00	0.00
Health	0.05	0.01	0.05
Infrastructure	0.72	0.33	0.39
Drainage and irrigation	0.38	0.00	0.38
Water supply and water disposal	0.01	0.00	0.01
Road transport	0.34	0.33	...
Emergency expenditures	0.38	0.00	0.38
Transfers	0.37	0.00	0.37
Supplement to the CDC	0.02	0.00	0.02

Note: The damage corresponding to farm roads is included infrastructure under Road Transport.

V. The macroeconomic impact of the floods

1. The pre-disaster macroeconomic performance

1.1 Output and inflation

The economy of Guyana was buffeted by the major flood of 2005 and higher oil prices. As a result, the economy contracted by 3% in 2005, after growth was budgeted at 2.2%. The fall-out in growth as expected impacted adversely on socio-economic welfare, as per capita GDP declined by about 1.3%, following average growth of about 3.8% between 2001 and 2004 (See Table 32).

The floods led to reduced activity in most of the major sectors, including sugar, rice, other agriculture, with the two bright spots being forestry and bauxite. Sugar production contracted by over 24% to 24,6,050 tonnes on account of lower productivity due to reduce sucrose content as a result of the floods. Rice was similarly affected with output falling 14% to 277,531 tonnes, as some important rice fields were flooded. Moreover, the significant decline in

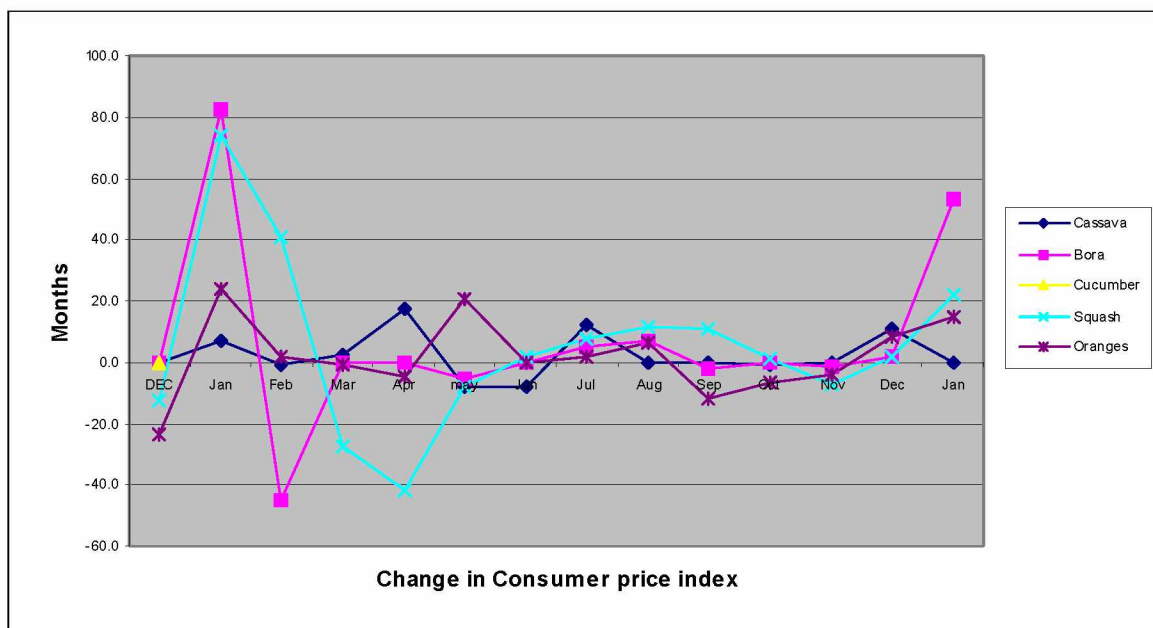
output of cash crops, poultry undermined the welfare of poorer segments of the population, who relied on these commodities for either home consumption or sale in the domestic market. Forestry and bauxite posted growth in production, reflecting new investment and also restructuring in the case of bauxite.

Construction registered strong growth of almost 10%, propelled by rehabilitation and reconstruction in the wake of the flood, dynamic housing demand and the construction of the World Cup Stadium and related investment.

With respect to Gross Domestic Expenditure (GDE), consumption expenditure grew much faster than budgeted, reflecting in part the impact of remittance and other spending to restore citizens welfare in the wake of the floods. Domestic investment increased to about 34% of GDP, relative to 32% in 2004.

Inflation picked up to 8.3%, relative to 5.5% last year, driven by domestic food shortages consequent on the floods and soaring oil prices. Meanwhile, a 7% increase in the minimum wage in December assisted in alleviating the plight of some persons worse affected by the floods. Nevertheless, with relatively faster growth in inflation, real incomes declined in 2006.

Figure 28 below show the changes in the consumer price indices (inflation) for selected domestic food crops in the aftermath of the floods of 2005. The spike in prices around January during the heart of the floods had moderated by February, suggesting that shortages of these crops only had a temporary impact on inflation.

Figure 28: Changes in consumer prices of selected products after the 2005 Floods

1.2 Fiscal performance

Fiscal policy and performance were affected by the contingencies of the year, including the floods and the surge in oil prices. With unprogrammed increased in spending on the floods and higher fuel costs, total expenditure exceeded the budgeted amount by 7% rising to G\$91.8 billion equal to 58.4% of GDP. Capital works (up 10.7%) above budget, drove the increase in expenditure, as growth in current spending was contained at around 5%. Capital outlays centred on rehabilitation and reconstruction works after the floods, including repair of road and bridges, and also ongoing projects such as the World Cup stadium.

1.3 Monetary and exchange rate developments

Monetary developments cushioned the impact of the floods, as with the banking system being quite liquid, private sector credit expanded by 9% in 2006, reversing declines in the previous two years. Importantly, credit to agriculture, which was severely affected by the floods, grew by a dynamic 11.4 %, which should help to restore productive capacity and output in the next year. Credit to manufacturing increased moderately, while credit to the personal and real estate sectors increased substantially, boosting value added in these sectors.

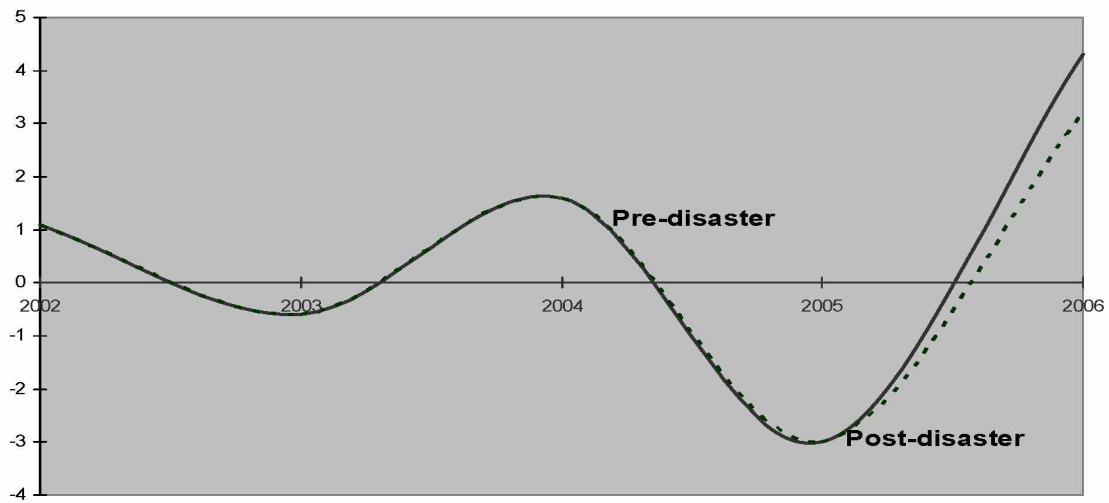
1.4 External sector developments

Balance of payments performance reflected the compensating effect of strong capital inflows, partly for reconstruction and rehabilitation works after the flood, but also for the ongoing World Cup Stadium and infrastructure works. Net capital inflows more than quadrupled to US\$181.2 million. Consequently, the overall balance of payments swung sharply from a deficit of US\$43.1 million, equal to 5.5% of GDP in 2004 to a surplus of US\$8.1 million, equal

to 1.0% of GDP in 2005. The current, however, reflected reduced value added and exports receipts from major commodities. As a result, the current account deficit expanded to US\$156.9 million, equal to 20% of GDP. Merchandise export receipts declined by 7.1% to US\$546.9 million, reflecting contraction in receipts from sugar (13.6%), rice (16.2%), both affected by the floods, and gold (22.9%), associated with the closure of Omai Gold Mines Limited. Merchandise imports, on the other hand, grew robustly by over 21% to US\$787.7 million, reflecting a 31% increase in fuel costs and growth in imports of consumer goods and also construction materials for reconstruction and rehabilitation work in the aftermath of the floods. Crucially, transfers increased by over 125% to US\$166.6 million, reflecting dynamic growth of 135% (to US\$167.5 million) in remittances, as relatives and friends abroad provided increased assistance to flood victims. This helped to cushion the adverse impact of the floods on the livelihoods and welfare of vulnerable segments of the population.

In 2005, Guyana made added steps on the road to medium-term debt sustainability with debt cancellation under the G8 Multilateral Debt Relief Initiative (MDRI), with an expected write-off of 100% of debts owed to the International Monetary Fund (IMF) and the international Development Association (IDA). The impact of the cancellation will take effect in 2006. External debt grew by 2.7% to US\$ 1100.4 million, almost 140% of GDP.

Figure 29: Guyana
Real GDP growth (2002-2006), Pre- and Post-disaster scenarios



2. Expected macroeconomic performance in 2006 without the flood

Consistent with the recovery in economic activity after a natural disaster, economic activity is expected to pick up with growth projected at 4.3% in 2006. Agriculture was projected to rebound as a result of a 28% increase in sugar production to 315,000 tonnes and 4.5% growth in rice output to 290,000 tonnes. Mining and quarrying is projected to contract by over 15%, reflecting cessation of activities by Omai Gold Mines, which will not be compensated for by a sharp increase in bauxite production. Nevertheless, a 4.5% increase in engineering and construction activity will soften the overall impact on GDP.

Inflation is expected to moderate to 6.3%, in keeping with government's reduction of consumption tax on dieselene and the cut in the price of kerosene by 14%. However, higher domestic food crops and meat prices stemming from shortages due to the flood and the international fuel prices might pose upside risks for inflation.

The fiscal position is expected to weaken marginally in 2006, with the overall deficit rising to 14.7% of GDP to \$25.1 billion, from 14.2% of GDP in 2005. This reflects relatively faster growth in current expenditure, compared with current expenditure and would fiscal savings for other activities. Capital expenditure is budgeted to expand by 20% to over 22% of GDP buttressed by spending on the Skeldon Modernisation Project and infrastructure.

The external payments position is expected to deteriorate somewhat with the overall balance shifting from a surplus of 1% to GDP to a deficit of 0.8% of GDP. Merchandise exports are expected to recover to grow by 2.5% to US\$562.7 million, buoyed by strong growth in bauxite and sugar exports, but would be offset by a 4% increase in merchandise imports to US\$817 million. Meanwhile, with the debt write-off initiative, external debt is projected to decline to 104% of GDP in 2006.

Fortuitously, with the MDRI debt write-off, Guyana is expected to maintain momentum towards debt sustainability and the liberation of resources for productive development in 2006. External debt to GDP is projected to decline from 139% in 2005 to 104% in 2006. Importantly, debt service payments as a proportion of exports of goods and non-factor services should decline with debt cancellation.

3. The post-disaster macroeconomic performance post disaster

3.1 Overview

The will lead to a decline in economic growth of 1-1.5 percentage point (4.3% prior to the flood and 3.3% after the flood). Therefore, the full extent of the expected rebound in activity following the flood of last year will not materialise. Whereas last year's flood impacted heavily on the social sectors, particularly housing and education, this year's flood has mainly affected the productive sectors, especially agriculture and livestock, however the impact was largely concentrated in two regions and this limited the fall-out on the economy.

Table 32			
Main Macroeconomic indicators			
	2005	2006	2006
		Pre- flood	Post- flood
Gross Domestic Product	-3	4.3	3.3
Gross domestic product by sector of economic activity			
Agriculture, forestry and fishing	-2.1	0.3	
Sugarcane	-27.2	28	-0.14
Rice Paddy	-24.3	4.1	-12.22
Other crops	-6.7	-4.1	-1.33
Livestock	-7.9	-3.1	-4.01
Fishing	-5.4	1.3	1.3
Forestry	2.1	4.1	0
Mining and quarrying	9.5	-15.5	0
Manufacturing	-2.2	2.2	0
Construction	2.7	4.5	0
Basic services			
Transportation, storage and communication	2.3	4.0	0.7
Other services			
Distribution	2.5	3.9	0.0
Transport and communications	2.3	4.0	-0.7
Rental of dwellings	0.0	1.0	-0.1
Financial services	1.0	2.2	0.0
Government	0.7	0.0	-0.1
Other	3.1	2.2	0.0
Balance of payments			
Balance on current account	-156.9	-199.8	-213.3
Exports of goods and services	546.9	562.7	558.4
Imports of goods and services	-787.7	-817	-833.4
Income account balance	32.8		
Current transfers balance	166.6	140	149.8
Capital and financial account balance f/	181.2	198	208.55
Foreign direct investment			
Other capital			
Global balance	8.1	-6.7	-9.7
Variation in reserve assets g/	-23.9	-10	
Other financing	32	16.7	

Table 32: Main Macroeconomic Indicators ... cont'd			
Other indicators of the external sector			
Gross external debt (millions of US\$)	1,100.4	888.8	...
Gross external debt (% of GDP)	139.9	104.3	...
Prices			
Consumer price index (December to December)	8.3	6.3	
Nominal exchange rate (average)	199.81		
Non-public financial sector			
Current revenue	35.7	34.3	34.3
Current expenditure	36.1	34.8	35.5
Capital account balance	-22.3	-24.6	-25.2
<i>Primary balance</i>	4.3	3.8	3.1
Financial balance	-14.2	-14.7	-15.7
<i>Interest Payments on the Public debt</i>	4.6	4.3	4.3
<i>Internal</i>	1.9	1.7	1.7
<i>External</i>	2.8	2.6	2.6

Source: ECLAC on the basis of official information.

a/ Preliminary figures

b/ On the basis of 1988 constant prices.

c/ Includes electricity, gas, water and transportation, storage and communication.

d/ Includes retail trade, restaurants and hotels, financial establishments, insurance, real estate, social and personal services.

e/ In nominal terms.

f/ Does not include errors and omissions.

g/ The sign (-) indicates a reserve increase.

Central government finances are expected to weaken consequent on growth in unbudgeted expenditure on emergency relief and rehabilitation and reconstruction works to shore up defences in the aftermath of the flood and to prepare for the May-July rains. The overall fiscal deficit is projected to rise to 15.7% of GDP, relative to the projected 14.7% of GDP.

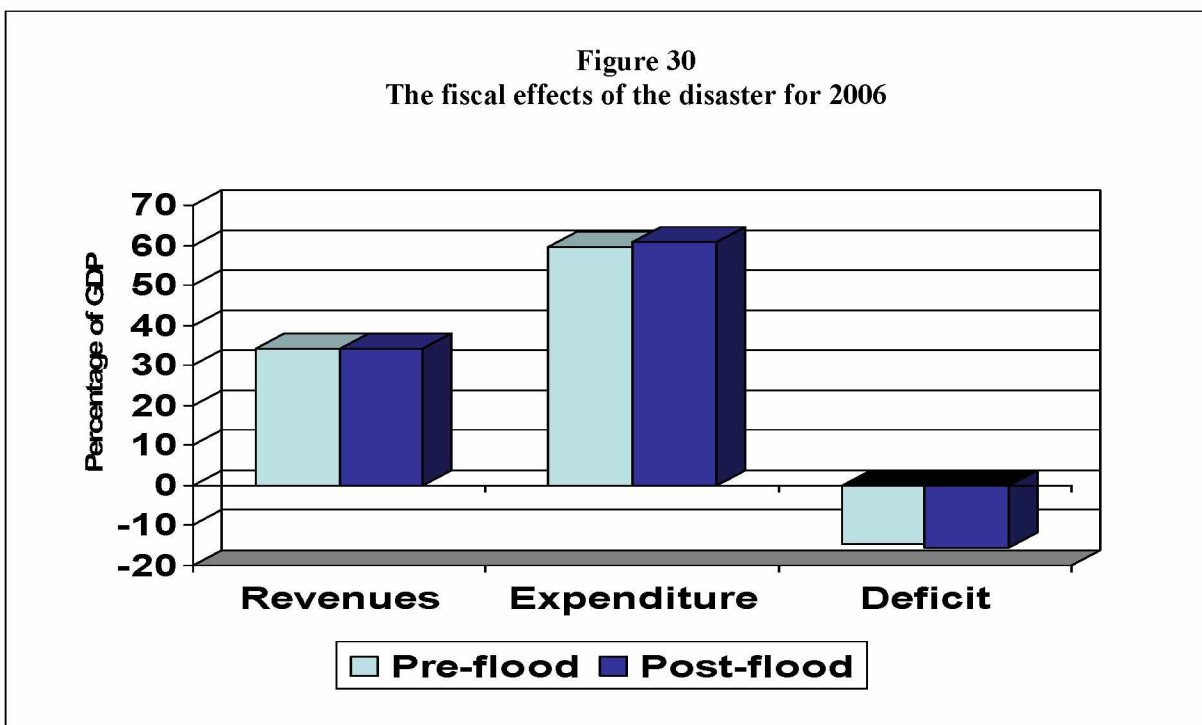
Monetary and exchange rate conditions are expected to remain relatively stable. Broad money is projected to maintain moderate growth in line with inflation and liquidity targets. Similarly, with fairly high levels of excess liquidity in the banking system, domestic credit is expected to expand by about ----% in line with the budgeted target.

The balance of payments current account is forecast to worsen as a result of weakened export performance and growth in imports for reconstruction and rehabilitation work and also consumption. However, with compensating strong capital inflows for major projects the overall balance of payments deficit is projected increase marginally 1.1%, compared with the target of 0.8% of GDP.

3.2 Impact of GDP

The overwhelming fall-out from the flood will be felt by the agricultural sector. Agricultural is expected to suffer an important reversal, with real output contracting by 4.6%, compared with projected growth of 15.1%. Real GDP in the rice sub-sector is expected to fall by over 12%, reflecting the protracted inundation of the rice fields, especially in the major producing areas. This would lead to significant crop loss and a fall in yield from harvested fields with a substantial impact on vulnerability and on livelihoods over the short and medium term as well as on food security.. Other crops, which include most of the food crops for domestic use, were also badly affected by the floods, with almost a total loss in some parts of the Pomeroun and the Mahaica, Mahaicony and Abary region (MMA). Real production in this sub-sector will decline by 4%. Livestock, particularly cattle and small ruminants, including sheep and goats were also fairly badly affected by the flood, and real output in the sub-sector will fall by 1.3%. On the other hand, the sugar crop was spared the worst ravages of the floods, and will only experience a marginal decline in real output. However, when the final assessment is completed, sugar losses might be fairly higher than the initial assessment.

Apart from agriculture, the floods for the most part, only marginally affected the other sectors. Real value added in transport and communications will contract by about 1%, on account of increased pumping cost and fuel for drainage and irrigation (D&I) and spending on the reinforcement of river embankments.



3.3 Prices, wages and employment

The flood impacted heavily on the domestic cash crop economy, leading to significant shortages in local food produce. Output shortages in this sub-sector have led to higher food prices, which would lead to inflation overshooting the budgeted target of 6.3%. In addition, since the agricultural sector account for about 30% of total employment, the flood is expected lead to higher average unemployment for 2006. The duration of unemployment for many persons in the sector would depend on the speed with which production can be brought back on stream.

3.4 Fiscal outlook

The fiscal out-turn is expected to be within the projected targets, in spite of the flood. Similar to the fiscal result in the aftermath of the flood in 2005, the brunt of the fiscal impact will be on the expenditure side, as revenue is expected to remain stable. The overall fiscal deficit before grants is expected to increase to 26.4% of GDP, compared with a target of 25.1% of GDP for 2006 and the outcome of 22.7% of GDP in 2005. With higher grants and debt relief, the overall deficit after grants will increase by 1 percentage point to 15.7% of GDP. The marginal overshooting of the target will result from higher expenditure on emergency relief, reconstruction and rehabilitation in associated with the flood, including the dredging of affected rivers and repair of embankments. However, as occurred last year, fuel prices and ongoing projects could pose upside risks for a higher fiscal deficit.

Meanwhile, the primary balance will stay within target at over 3% of GDP as current spending will be contained. Transfers representing flood relief have increased, but spending on the big ticket wages and salaries and goods and services will be contained. Moreover, the revenue effort is expected to be maintained as the overall outlook for the economy is a recovery from last year, in spite of the modest dampening impact of the flood.

Although the MDRI debt relief will provide Guyana with a bit more flexibility, the country will have to contract additional debt to undertake the rehabilitation and reconstruction works necessary to mitigate the impact of future floods. Guyana has already approached the IADB in this regard. However, the works programme will be phased over the medium term to smooth the debt burden and also to ensure implementation capacity. With these developments, the external debt of Guyana is expected to increase moderately in 2006.

3.5 Monetary and exchange rate developments

Monetary policy will be geared to maintaining price and exchange rate stability. In spite of the flood, broad money is expected to register moderate growth in line with target, as remittance inflows and recovery from last year lead to deposit inflows. Private sector credit will continue to expand, providing impetus for business expansion and recovery in the aftermath of the flood. With growth in deposits, banks are expected to increase their net foreign assets and the reserve cover should remain with benchmark of three months of exports of goods and non-factor services. The exchange rate is expected to remain stable at around G\$200 to the US\$.

3.6 Balance of payments

The current account deficit is expected to increase to 25% of GDP, surpassing the target of 23.4% of GDP. The merchandise deficit will widen by over two percentage points to 32% of GDP on account of the fall in exports and growth in imports. Exports are expected to decline to 65.5% of GDP, associated with decline in nominal exports of US\$ 4.3 million, reflecting a 10% reduction in rice exports and a marginal decline in sugar exports, as a result of the flood.

On the other hand, imports are projected to grow by 2 % above the projected target to almost 98% of GDP. Imports of capital and intermediate goods will increase to carry out reconstruction and rehabilitation works following the flood, but also for programmed private and public sector investment, including the Skeldon project and bauxite expansion. Also, given the consumption driven nature of the economy, imports of consumption goods are expected to increase both for relief and recovery, but buttressed by the turnaround of the economy following last year's significant contraction.

The services account deficit is expected to increase marginally as higher payments are made for contracted foreign shipping and other services. Transfers are projected to expand to over 17% of GDP, reflecting growth in remittances and aid grants in the wake of the flood.

The capital account surplus is expected to expand to 24.5% of GDP, as net capital inflows increase for rehabilitation and reconstruction in the post-flood period and also disbursements on output expansion in bauxite and ongoing public infrastructure projects.

VI. The vulnerability of regions 2 and 5 and the strategic approaches to address sustainable livelihoods

1. The vulnerability of regions 2 and 5 in the aftermath of the floods

As argued in the second section, one of the purposes of this document is to interpret the results of the assessment within the SLA. To this end this section examines the extent to which the disaster has highlighted and/or exacerbated existing elements of vulnerability in Regions 2 and 5.

In brief the susceptibility to vulnerability has become more apparent following the floods which were not as evident before the disaster. Vulnerability has increased as the impacts of the disaster have severely affected one of the most important sources of livelihood in Guyana, agriculture. It is also a narrow source of livelihood with high indices of poverty, unequal distribution of income and land, and low levels of education.

The consequent loss of income as a result of the natural hazard, include the loss of income for agricultural laborers; the loss of income from backyard operations and the loss of food for household consumption.

It is worth repeating that, not all persons living in Regions 2 and 5, experienced the same degree of vulnerability to the natural disaster. Differences were apparent in a number of ways. Significant among these were the asset base of the farmer; crop type, the size of the household; the sex of the head of the household; and the structure and pattern of the livelihood of households.

There are differences in the resilience between the large cattle farmers, the large rice framers, the small “other crop” and rice farmers and the very small farmers who often engage in backyard operations while working as (agricultural) labourers. As figure 10, 11 and 20 indicate there are a large number of very small to small farmers engaged in rice and other crop production. In fact the majority of “other crop” farmers in Region 2 occupy farms of less than 5 acres and in region 5 of less than 1 acre. Such farms provide food for household consumption and at best a marginal income. Both will be lost until the next crop cycle assuming that the farmer will have sufficient resources (money, seed, and livestock) to resume farming when the floods have subsided. This assumption, however, may not be justified as in many cases all working capital has been lost. Furthermore in Region 5 many farm roads have been deteriorated and as a consequence farmers will face increased transportation costs as well as a fall in produce quality, again adding to a loss of income.

From a gender perspective the aspects of susceptibility for female households included low levels of human capital resulting in a restricted skill base which limited their capacity to diversify their livelihood patterns and thus reduce their risk. Female heads of households had a

high burden of care, particularly in the Amerindian communities, where some had as many as ten children, thus reducing their abilities to save or increase their asset base as virtually all earnings went into household consumption. Also it is likely that many if not most of the very small farms are headed by females.

Undoubtedly as mentioned earlier, poverty is also a central factor of vulnerability. The two regions evince some of the highest levels of poverty in the interior and coastal areas of the country. Without any savings or a broad asset base, the floods of December/January, have virtually wiped out the assets of many poor and subsistence farmers. One farmer described the crisis most aptly “*de young and de ole gon have to start all again*”.

The low levels of educational attainment of the heads of households are also a serious factor in their susceptibility to natural disasters. It was evident in the fact that persons used the same technologies for carrying out their livelihoods as they have done for generations. An example was found in the gathering, husking and drying of copra for sale to the copra mills, and in the treating of cane and palm in preparation for production of craft. These processes were much in evidence as a primary source of income for some and as a secondary income for other households, yet they were disrupted and made more difficult to pursue because of the floods. With modern and appropriate technologies, constant and higher returns may be possible even in times of flooding.

An important aspect of the traits of vulnerability that appeared following the disaster is the shortage of liquidity. Following the 2005 floods IPED instituted a policy whereby for clients who were affected by the floods all the interest payments were forgiven and terms were arranged to pay back the principal. This repayment was connected with a new loan under normal conditions. Under a rule of thumb in operation at IDEP repayments were calculated at 40% of the anticipated net profit. For those who were affected by the above policy the rate went up to 50% of net profit. Following the 2005 flood when about 12% of the portfolio was affected there was only a slight increase in the default rate. Based on these considerations IPED intends continue this policy.

The organization does not anticipate that their loan portfolio will be affected to a degree similar to 2005. For one most of the population is concentrated in the near coastal strip which was less or not affected. Secondly there was more warning this time and vendors had more time to safeguard their possessions. Therefore loans categories exposed to flooding risk were crops, rice and poultry. For example in the Pomeroon area of the 41 loans the 10 crop and the 9 poultry loans are potentially at risk but the 12 vending and 2 logging loans do not appear to be at risk.

2. Strategic approaches to address sustainable livelihoods

2.1. Strategic interventions: An outline

Following the disaster the affected population depended on relief responses and compensatory actions as most do not have the resources to ensure a return to normalcy. Even though the government has made transfers to affected farmers and households, it is necessary to complement these measures to ensure the recovery of the affected population. To this end the

matrix shown in table 33 represents the possible strategic interventions considered to be useful components for programmes and projects developed to mitigate the impact of flooding in Regions 2 and 5, on the livelihoods of the populations. The approaches are presented in regard to short, medium and long terms interventions.

Table 33				
Matrix of Strategic Approaches to address sustainable livelihoods				
Region	Immediate	Short Term to medium Term		
Region 2	<p>Address food shortages of particularly isolated Amerindian Villages;</p> <p>Provide seeds, seedlings and tools for crop farmers;</p> <p>Continue transverse until next crop harvest.</p>	<p>Explore the benefits of biodiversity, particularly the use of coconut oil as bio-diesel fuel and strengthen eco-tourism;</p> <p>Establish a network of Communication Systems;</p> <p>Strengthen baseline information systems;</p> <p>Strengthen Disaster management capacity at the community level;</p>	<p>Provide special incentives to increase the participation of female farmers, particularly those who are heads of households, in the economic development process;</p>	<p>Explore the use of modern and appropriate technology in the production processes;</p> <p>Strengthen Capacity in the management of D& I at the community level,</p> <p>Strengthen/establish water users associations for small farmers to manage the water systems in their environment, and to improve short term mitigation efforts.</p>
Region 5	<p>Provide seeds seedlings and tools for crop and rice farmers;</p> <p>Continue income support actions through transfers until next crop and rice harvest.</p> <p>Establish programme for restocking of small ruminants and cattle.</p>	<p>Repair agricultural roads.</p> <p>Establish a network of Communication Systems;</p> <p>Strengthen baseline information systems;</p> <p>Strengthen Disaster management capacity at the community level;</p>	<p>Encourage the diversification of crop production (as a risk reduction activity);</p>	<p>Establish water users associations for small farmers to manage the water systems in their environment and to improve short term mitigation efforts.</p>
National	<p>Develop a comprehensive disaster risk management strategy.</p>	<p>Establish standing operating procedures for emergency relief.</p> <p>Develop programmes that would safe guard the nutritional status of subsistence farmers and their family, particularly children in the times of disaster.</p>		<p>Strengthen economic diversification efforts (within and outside of agriculture) to generate alternative employment opportunities;</p> <p>Explore the potential of the introduction of a National Agricultural Insurance Scheme</p> <p>Strengthen affordable micro credit facilities (rural development investment funds);</p>
<p>Note: immediate denotes within three months.</p> <p>Source: ECLAC considerations based on official GOG data</p>				

2.2 Risk management and reduction

The Civil Defence Corps (CDC) is the institution responsible for the practical aspects of disaster coordination. The organization was reconstituted during the 2005 floods to function as the national emergency management coordinator under the Office of the President as the national disaster coordinator. However, the CDC is not firmly established as yet and therefore still in a state of development. At the moment the organization is centralized and regional focal points and community focal points have not as yet been appointed, nor have memoranda of understanding been agreed on with technical ministries. Furthermore there are no agreed operating procedures for the conduct of the various stages of damage assessment and needs analysis (DANA) from the initial DANA immediately after the onset of an emergency to, if necessary, a full socio-economic impact analysis. In addition only 1 staff member of CDC and none of the technical ministries have been trained in the conduct of DANA assessment, although staff of the technical ministries has been exposed to the ECLAC disaster assessment methodology. Since Guyana is a member of CDERA it is strongly recommended that the CDC reviews the available training opportunities of CDERA and request that that organization conducts national training courses.

Disaster management is more comprehensive than just emergency or relief response. It also includes mitigation, preparedness – including hazard mapping, and risk reduction. In Guyana, there is no national disaster management plan that includes all aspects of disaster management nor are there Regional or community disaster management plans.

Floods, both coastal and riverain are the most common sort of disaster but drought (as an effect of El Nino) and industrial accidents also affect the country. Extensive floods such as the 2005 and 2006 floods draw international support. However, such floods are only part of the problem as these are accompanied by numerous smaller floods that affect “only” parts of a region. The cumulative impact of such minor events on livelihoods, however, can cause more disruption because support mechanisms that come into play during a large flood would not necessarily be available during a small flood.

It is strongly recommended that a comprehensive disaster risk management strategy be developed for the country as a whole.

Such a strategy for disaster risk management would include:

- (a) Strengthen the national disaster management organization and build institutional capacity throughout central government and private sector organizations;
- (b) Promote the adoption of standard operating procedures in first response agencies (e.g. GWI, Health, shelter management, GDF etc.);
- (c) Establish or strengthen capacity at the Regional Council and National Democratic Council levels;
- (d) Strengthen capacity at the community level and for civil society;

- (e) Update the draft disaster management plan dating from the 1980s;
- (f) Establish national, regional and community level disaster reduction plans; and
- (g) (This section needs to be linked with the specific recommendations from the D&I report).