Distr. LIMITED
LC/CAR/L.31/Rev.1
31 March 2005
ORIGINAL: ENGLISH

GUYANA

SOCIO-ECONOMIC ASSESSMENT OF THE DAMAGES AND LOSSES CAUSED BY THE JANUARY-FEBRUARY 2005 FLOODING[1]

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

[1] This document has been reproduced without formal editing.

PREFACE

This report was prepared at the request of the Government of Guyana following the torrential rains and subsequent flooding that caused physical damage and economic loss to the country. The consequences of the flooding pose 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 the implications on macroeconomic and fiscal performance and the social and environmental consequences.

The assessment was carried out using 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) and the Disaster Assessment Training Manual for Caribbean Small Island Developing States. (ECLAC, 2004, www.eclacpos.org)

This study undertakes a sector-by-sector analysis of damages and losses resulting in its overall assessment. It evaluates the social, economic and environmental effects and proposes guidelines for the country's rehabilitation and reconstruction programme in line with Guyana's poverty reduction and growth strategy. The assessment provides a quantitative estimate to the overall damage and reconstruction costs and its implications on Guyana's macroeconomic performance following the flooding. It also complements other assessments and partial evaluations that have been carried out by national government and non-government institutions and by other international institutions and bilateral and multilateral cooperation agencies.

The methodology makes a distinction between direct damages and indirect damages or losses. The former refers to damage to assets that occur as a direct result of a natural disasters. Assets can be plant and machinery, buildings, other infrastructure such as roads, furniture and other moveable assets, stocks and inventories and losses of livestock and crops ready to be harvested. Indirect losses, or indirect damages under the old terminology, refer to the loss of production of goods and services and to the extra costs that result from the natural disaster. Estimating direct damages is mostly a straightforward process. However, the estimation of indirect losses is often difficult because these become apparent after the disaster, may last for several years and are not always evident when the assessment takes place. The total damage is the sum of the direct damages and the losses.

The methodology also recognized secondary effects. This represents a different view of the assessment since they describe the effects of the disaster on the functioning of the economy and the resulting macroeconomic imbalances arising from the event.

The ECLAC led mission was supported by the United Nations Development Programme (UNDP) and the Inter-American Institute for Cooperation on Agriculture (IICA). The mission comprised:

Erik Blommestein	ECLAC, Coordinator
Radcliffe Dookie	ECLAC, Project Specialist
Michael Hendrickson	ECLAC, Macroeconomist
Asha Kambon	ECLAC, Social Sector
Hossein Kalali	UNDP, Recovery Strategy
Vincent Little	IICA, Agriculture
Esteban Perez	ECLAC, Co-coordinator
David Smith	UNDP, Consultant, Infrastructure

The national counterpart team was coordinated by Dr. Coby Frimpong, Policy Advisor and Co-coordinator of the Policy Coordination and Programme Management Unit of the Office of the President. The mission expresses its gratitude and acknowledges that the assessment would not have been possible without the support from that office, the task force that was established in support of the mission, the Guyana Defense Force (GDF) which kindly provided an over flight and the Civil Defense Commission (CDC), which provided the field trip. Special thanks are due to Ms. Amanda Phillips and Mr. Wayne Forbes for their invaluable assistance with logistics.

Table of Contents

ACRONYMS

ATC	Atlantic Tele-Center
ATN	Atlantic Tele-Network
CDC	Civil Defense Commission
CXC	Caribbean Examinations Council
D&I	Drainage and Irrigation
DSL	Digital Subscriber Line
ECLAC	Economic Commission for Latin America and the Caribbean
EDWC	East Demerara Water Conservancy Dam
EHIPC	Enhanced Heavily Indebted Poor Countries
EPA	Environmental Protection Agency
GD	Guyana Datum
GDF	Guyana Defense Force
GS&WC	Georgetown Sewerage and Water Commissioners
GSA	Guyana School of Agriculture
GT&T	Telephone and Telegraph Company Limited
GTC	Guyana Telecommunication Corporation
GUYWA	Guyana Water Authority
GWI	Guyana Water Incorporated
HIPC	Highly Indebted Poor Country
ICT	Information and Communications Technology
IDB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation on Agriculture
ITCZ	Inter Tropical Convergence Zone
JOC	Joint Operations Command
MDGs	Millennium Development Goals
MSWMD	Municipal Solid Waste Management Department
NARI	National Agricultural Research Institute
NDCs	National Democratic Councils
PRS	Poverty Reduction Strategy
UNDP	United Nations Development Programme
USAID/OFDA	United States Agency for International Development/Office of Foreign Disaster Assistance
WFP	World Food Programme
WTP	Water Treatment Plant

I. Description of the event

I.1. Background

Guyana lies between 2° and 8° N, and 57° to 61° W. It is bordered to the east by Suriname, to the south by Brazil, to the west by Venezuela and to the north by the Atlantic Ocean (see Figure 1 below [2]). Due to its location, it is subject to Atlantic swells on a year-round basis, heavy seasonal rainfall and high humidity. It experiences two distinct rainy seasons each year. The first, and most marked, occurs between May and July, while the second occurs between November and January.

The country is physically divided into four major ecological zones, the coastal clay belt, the sand belt, the highlands and the interior plains and savannahs. The coastal belt is a low lying zone, consisting of clay deposits, and is typically one to four meters below mean sea level. Because it has been formed partially through the alluvial deposits of the main rivers of the country (Berbice, Mahaica, Demerara and Essequibo Rivers), this zone is a fertile agricultural area.

The second zone is the sand belt, which lies to the south of the coastal belt and which includes some of the intermediate savannahs. The third ecological zone comprises over half of the country's land area. In this zone are to be found tropical forests and extensive mineral deposits, in addition to the vast Rupununi Savannahs, which stretch to Brazil. The fourth zone is that of the highlands, which includes the Pakaraima Mountains.

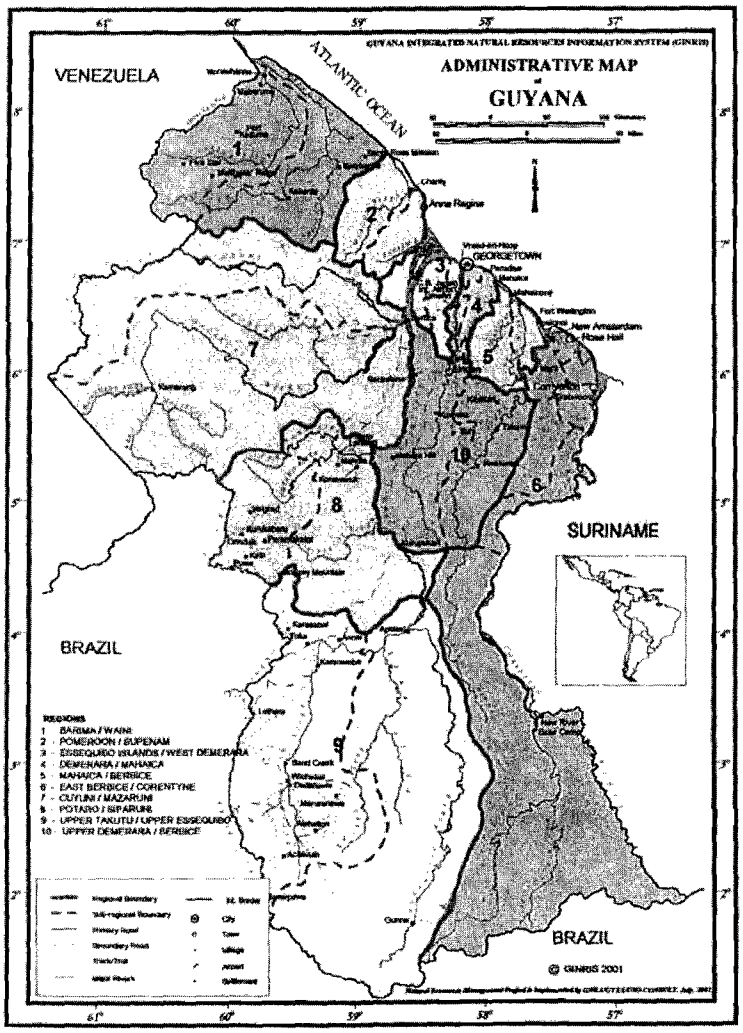
The country is divided into 10 regions, from an administrative perspective, each having varying levels of population and development (Figure 1). The most populous of these is Region 4 (309,059 people), which includes the capital, while the least populated is Region 8 (with 9,211 people). Recent census data estimates the population of Guyana at 742,041. Close to 90% of the country's population live within a relatively narrow strip of land (approximately 25 km wide) which, although it only comprises 5% of the land area, is the administrative, agricultural, commercial and industrial centre of the country.

The combination of agriculture and habitation has been facilitated on this low-lying coastal plain by the presence of a well-designed system of reclaimed lands, drainage and irrigation canals, conservancy dams and seawalls. A cross-section on a north-south plane is shown in Figure 2 below[3]

[2] Source - Guyana Integrated Natural Resources Information System.

[3] Geotechnical and Hydraulic Assessment of Flooding Danger Caused by the East Demerara Water Conservancy Dam. Nisa Nurmahomed and Olaf van Duin, 2005. UNDAC.

Figure 1
Map of Guyana



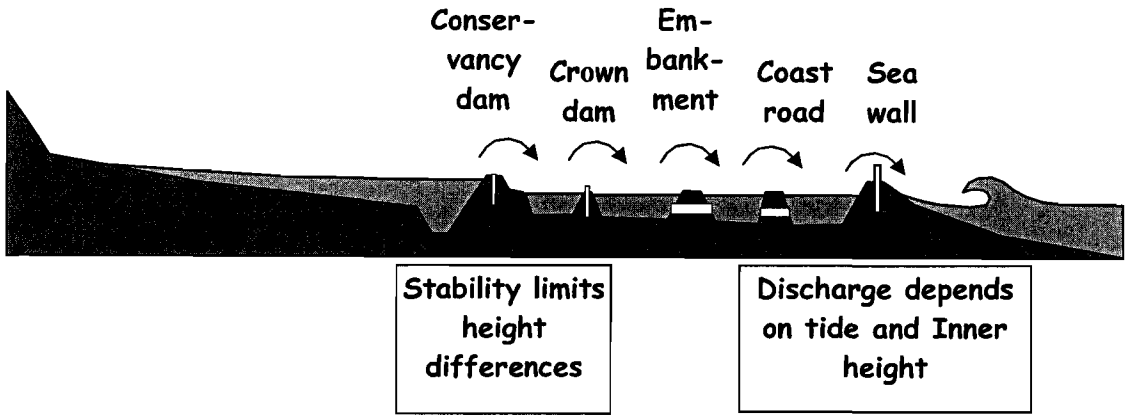


Figure 2 Cross-section through area of main habitation

One of these systems, the East Demerara Water Conservancy Dam, which is located in Region 4, traps surface water flowing to the coast. It was also designed to allow inflow from the Mahaica and Demerara Rivers to the east and west, respectively, during times of high river flow. The capacity of the conservancy is estimated at 100 billion gallons and was originally built in 1818. Outflow from this conservancy was intended to be through a number of canals discharging either to the Mahaica River, the Demerara River, or to the sea. These discharge canals served as the control structures that allowed for management of the water levels behind the conservancy dam. Actual discharge through these canals was controlled by sluice gates. Over time, this system of outflow gates and canals has fallen into disrepair, seriously limiting the ability to appropriately control water levels behind the dam.

In effect, discharge to the Demerara River is now primarily through a structure at the town of Land of Canaan, known as '5 Gates', which is one of four structures that originally facilitated discharge to that river. On the eastern side, there are three operational structures that facilitate discharge to the Mahaica River, although opening of these structures usually results in flooding of towns along this river. In addition to these four functioning discharge structures, there are two canals that discharge directly to the Atlantic Ocean, Shanks and Nebaclis. These canals also require dredging and repairs to culverts and outlet structures, in order to restore them to their former efficiency. Figure 3 below presents a satellite image of the area in question.

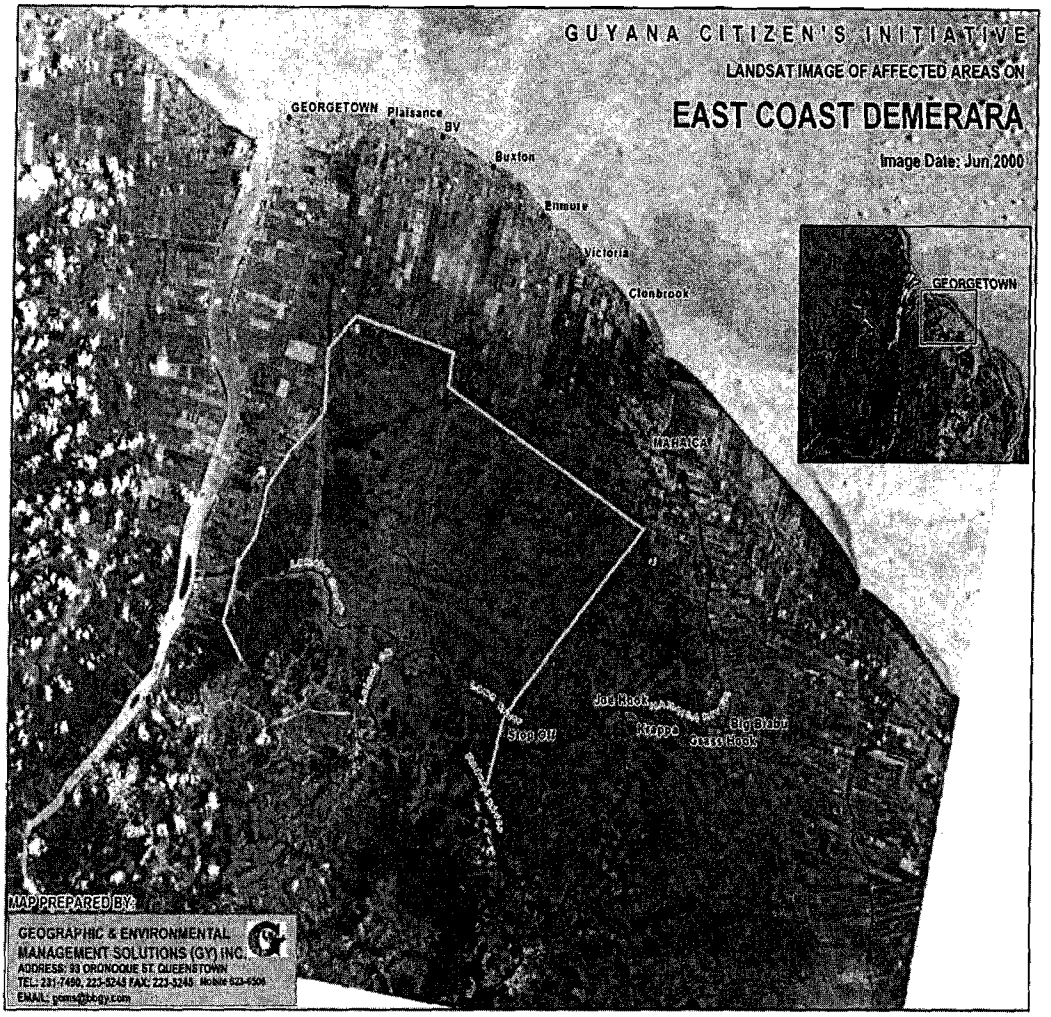
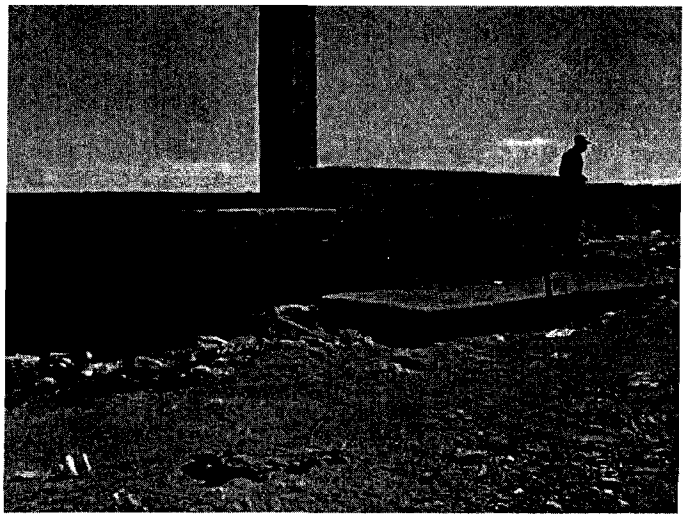


Figure 3 Satellite image of affected area

North of the Conservancy Dam, a Crown Dam was constructed (see Figure 2 above), primarily to ensure proper retention of irrigation water in the agricultural areas. It is not believed that this structure was built with the intention of being a second line of defense for the coastal areas against flood waters. Working as a part of this overall and complex hydraulic system, is a series of sluice gates, or kokers, and pumping stations, which are to be found along the coastal sea wall, and which serve to ensure the proper drainage of the coastal lands immediately adjacent to the sea. Again, over the years a number of these installations have become derelict and unusable, thereby significantly exacerbating the potential for localized flooding within this zone (see Photos 1 and 2 below). In all, it is estimated that at least six such installations will need to be rehabilitated, in order to regain the utility of this aspect of the drainage system.

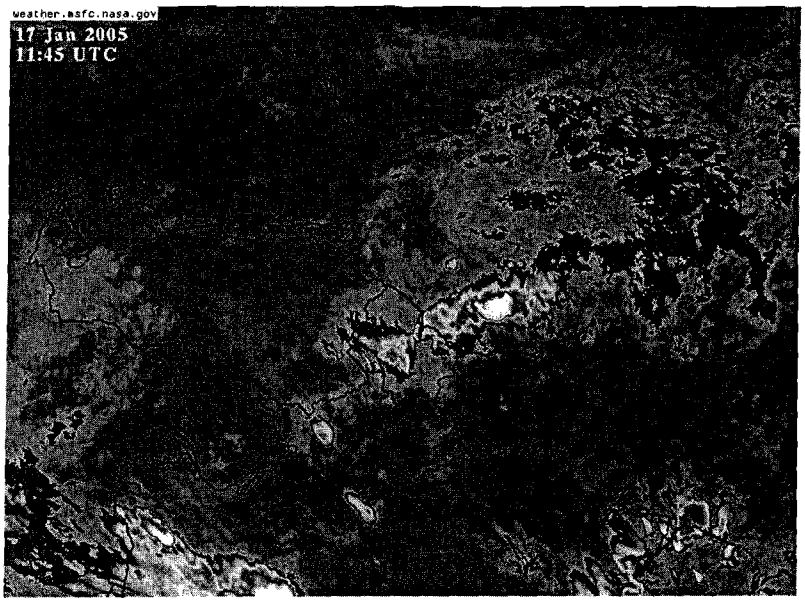


Photos 1 (above) and 2 (below) Derelict Koker and Resultant Ponding in Plaisance

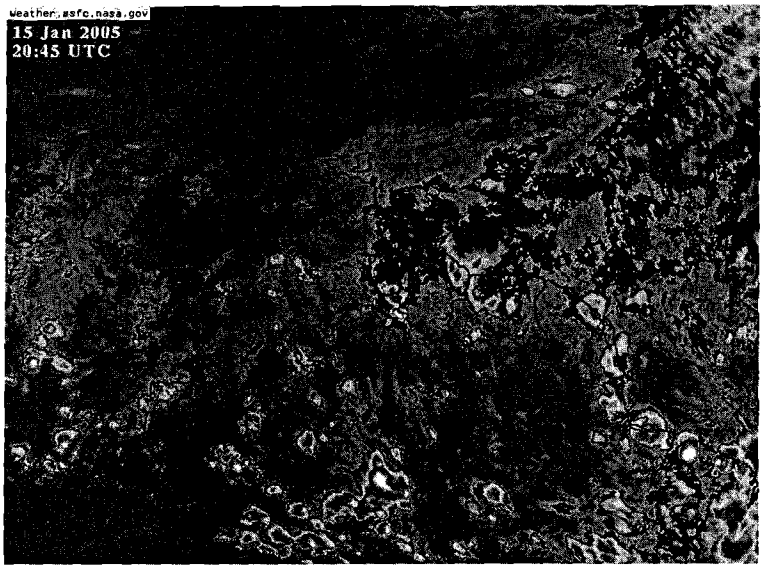
I.2. Description of the event

December 2004 was overall a wet month, with the majority (87%) of the rainfall for that month falling in the last nine days of the month. Most of this rainfall occurred over the coastal areas of Region 1 and along the coast from Georgetown to Albion. These rains were identified as being associated with the Inter-Tropical Convergence Zone (ITCZ) interacting with some low- to mid-level troughs. Moving into January, the period of wetness continued (2-8 January), followed by a dry period from 9–13 January. That initial rainy period in January was observed to be as a result of a low level trough. Both of those wet spells (December and early January) were therefore associated with weather systems that normally affect Guyana.

From 14-22 January, however, the coastal regions of Guyana received some of the heaviest rainfall on record since 1888. These rains were, interestingly, not associated with the usual weather systems affecting Guyana, but rather with influences from the southern hemisphere. This was an anomalous condition, as these southern hemisphere systems usually only exert influence over the southern part of Guyana. This raises the issue of changing weather patterns that must be taken into account when long- term developmental plans are being made. Satellite infra-red images on two of the days of heavy rain are shown in Figures 4 and 5 below.



Figures 4 (above) and 5 (below) Satellite Images of Guyana



Weather conditions over Guyana for this period of heavy rainfall were characterized by an unusual flow of winds from the west to the east. This flow interacted with higher level winds to form a zone of instability above the northern part of Guyana. Moisture laden clouds from the Amazonia region were therefore swept by these winds over the coastal areas of Guyana, resulting in excessive rainfall. This rainfall was so intense that it established new records at the Botanical Gardens, Georgetown, for two, three, four and five-day rainfall, all between 14-18 January. In addition, the monthly rainfall for January 2005 has now become the new maximum monthly rainfall record (1108.2 mm or 43.6 in). It should be noted that these records are in reference to the start of record keeping in 1888. Prior to this event, the highest monthly record at this station was for the month of December 1942, when 1022 mm, or 40.2 in. were recorded.

Figure 6 below shows the rainfall data for the Georgetown Botanical Gardens for the period 20 December 2004 to 14 February 2005, while Figure 7 shows the monthly rainfall for January 2005 compared with the 30-year average. January's rainfall at 1108.2 mm was almost six times the 30-year average of 185.2 mm.

Figure 6
Daily Rainfall, January to February 2005
Georgetown (Botanical Gardens

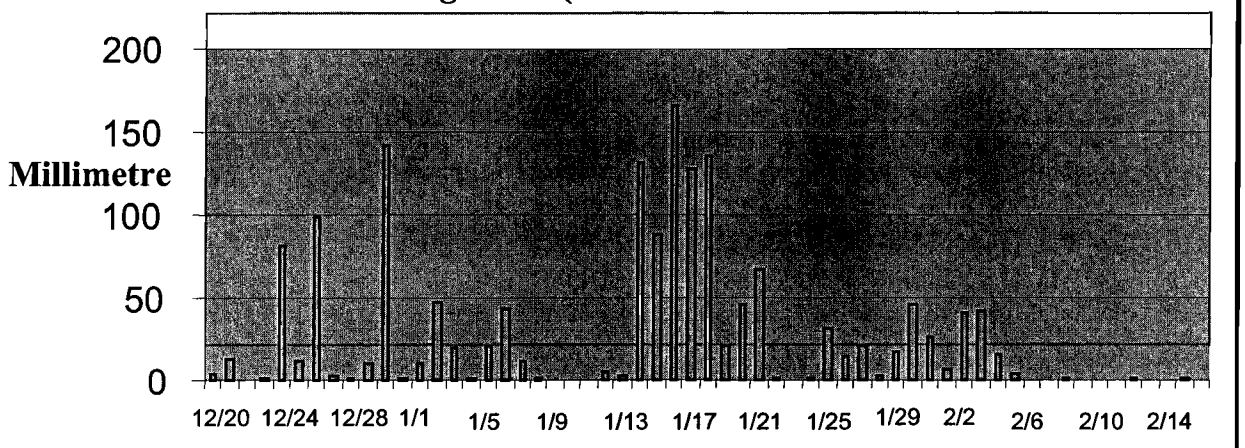
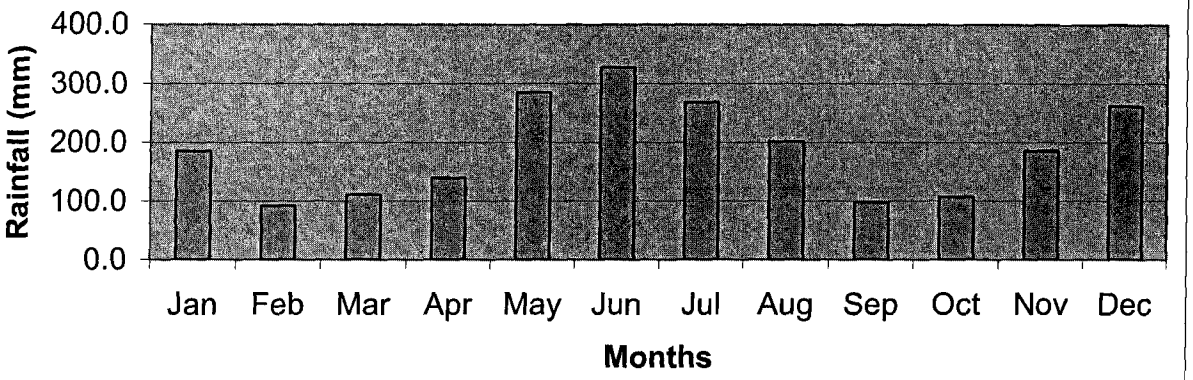


Figure 7
30-Year Rainfall Average
Georgetown



The rains that started in December 2004 would have caused saturated ground conditions. This served to worsen the conditions produced by the unusually heavy rainfall that occurred after mid-January. That scenario then resulted in extensive flooding in Regions 3, 4 and 5 from West Demerara to Mahaica and Berbice, an area where over 62% of the nation's population lives (area of flooding in January 2005 shown in Figure 8 below).

Figure 8 Image of coastal areas showing Flooding zones

In some areas, it was reported that as much as 4-5 ft of standing water was experienced. This produced a severe flood situation for a large number of the affected population, which went on for several days (Table 1).

Table 1
Duration of flooding in affected areas

Affected Area	Period Affected
Georgetown (including suburbs)	1 – 3weeks
East Coast Demerara:	
Industry to Mahaica	3-5 weeks
Mahaica to Mahaicony	>3 weeks
East Bank Demerara	3-5 days
West Coast / Bank Demerara	1-2 weeks
Vergenoegen to Patentia	
Mahaica River	Still flooded

Source: EPA

The heavy rainfall also caused an increase in the water levels of the East Demerara Water Conservancy Dam (EDWC). This structure is not a robust structure and is constructed from sand, clay and some peaty material. In addition, repairs have been carried out in many areas, to address old breaches or recently overtopped sections, using a locally available organic material known as pegas. At the eastern section of the northern dam, about 30% of the dam is considered to be in critical condition. For the rest of the northern sections of the dam and also for the western section of the dam, about 10% is assessed to be in a poor state[4]. The crest of the dam is at approximately 60.0 ft relative to Guyana Datum (GD), which is 1.8 feet above Mean Sea Level. Safe management of the dam requires that the water level in the conservancy should be maintained above 50 feet GD to avoid drawdown failure of the dam inwards, but should not go higher than approximately 57 feet GD to avoid excess pressure on the upper sections of the dam, which could in turn lead to failure, or above 59.0 feet GD, which would lead to breaching of the dam.

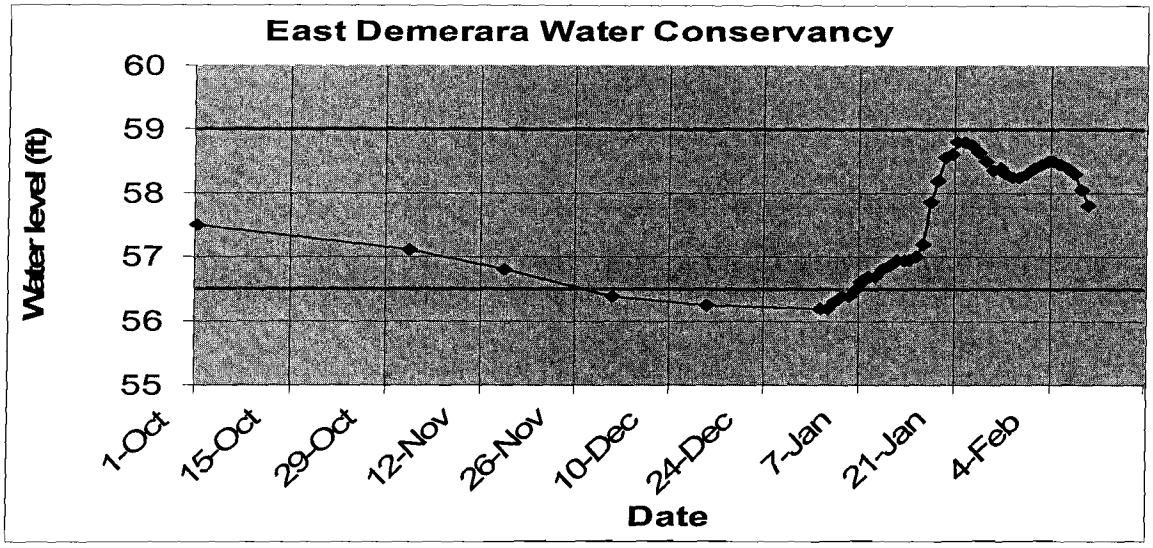


Figure 9 Water Levels in the Conservancy (gauge shown in photo)

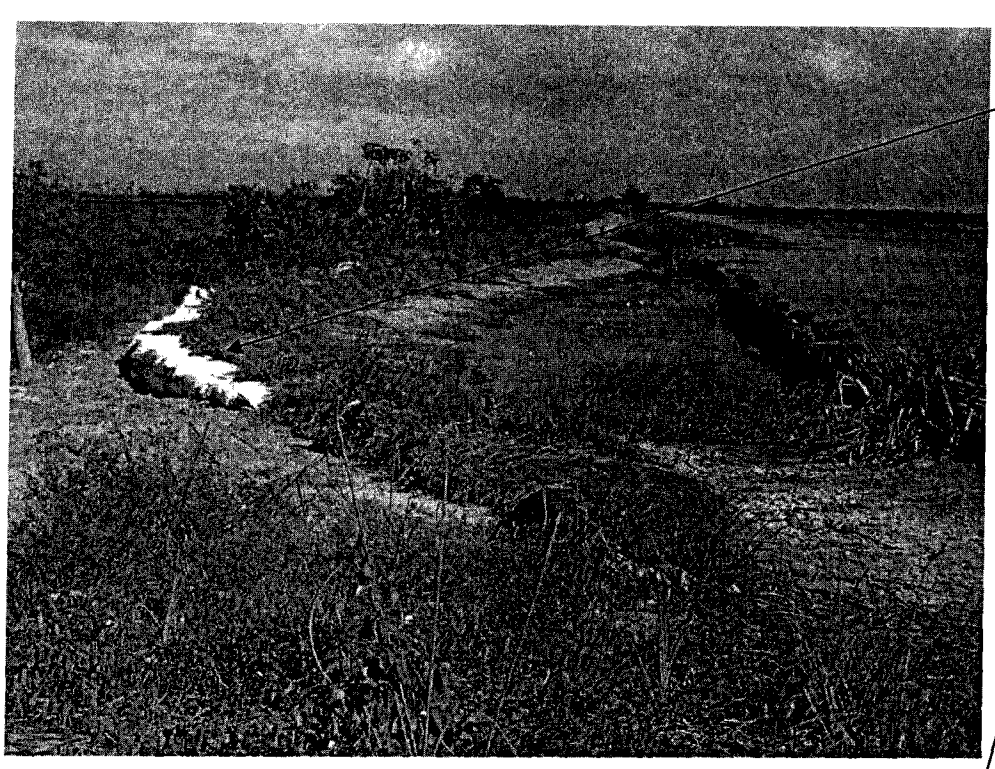
As the rains continued, the levels in the dam came dangerously close to a critical level of 59.0 ft GD (Figure 9). This condition was greatly exacerbated by the fact that many of the water level management canals had became inoperable or had severely reduced conveyance capacities. This situation became even more critical as breaches in the dam began to occur, worsening the downstream conditions for the close to 350,000 coastal populations of Georgetown and the East Coast. As the flood waters continued to rise, power and drinking water systems became temporarily inoperable. Latrines were flooded, crops were inundated and livestock stranded in 40 – 50 in. deep water. In many cases, people were trapped on the upstairs floors of their houses. The occurrence of a period of high tides following the heavy rains also prevented the easy drainage of canal water through the seawall kokers.

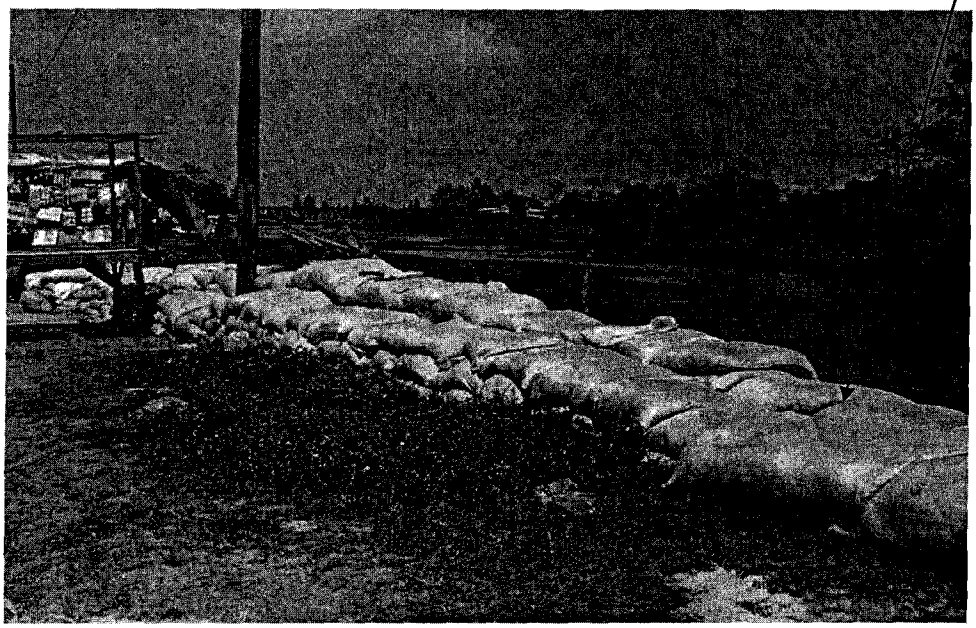
[4] Geotechnical and Hydraulic Assessment of Flooding Danger Caused by the East Demerara Water Conservancy Dam. Nisa Nurmahomed and Olaf van Duin, 2005. UNDAC.

The wholesale flooding of the affected population was prevented by two main interventions. First, excess water was discharged to the canals leading to the Mahaica River, thereby easing the build up of water behind the crest of the dam. This action had the unfortunate, but anticipated, impact of flooding many of the communities along the banks of that river (see Photo 3 below). Had this not been done, it is very likely that the dam would have been breached, releasing close to 100 billion gallons of water into the coastal zone.

Photo 3 Sandbagging on the Banks of the Mahaica River

The second intervention was the 24-hour dam repair operation that was carried out by a team of approximately 150 people, who sandbagged the crest of the dam and/or used pegasse material to raise the height of the dam crest in places where overtopping had already commenced (see Photos 4 and 5 below). It is likely that this action, in combination with the planned discharge of water to the Mahaica River, averted what could have been a very disastrous situation.





Photos 4 and 5 **Sandbags and pegas on the crest of the Conservancy Dam**

2. The affected population

2.1 The affected population

Guyana is divided into 10 administrative regions, with a population of 742,041, of which 75% live along the coast. Some 463,300 persons or 62% of the total population of Guyana, reside in Regions 3, 4 and 5, which were the hardest hit by the flood. The disaster claimed the lives of 34 persons, seven directly attributed to drowning by flood waters and 27 due to illnesses arising out of the flood conditions. Table 2 details the affected population by region.

Table 2
Affected Population by Regions

Region	Total Population	Population severely affected	% of Pop Severely Affected	Pop Moderately affected	% of pop moderately affected
Region 1	23,204				
Region 2	48,411			4,841	10%
Region 3	101,920	41,787	41%	66,248	65%
Region 4	309,059	222,522	72%	262,700	85%
Region 5	52,321	10,464	20%	20,928	40%
Region 6	122,849				
Region 7	15,935				
Region 8	9,211				
Region 9	19,365				
Region 10	39,766				
Totals	742,041	274,774		354,718	
Percentages		37%		48%	

Source: ECLAC estimates based on Official GOG data

The flood was concentrated in what are also the most heavily populated regions of the country, as can be seen in Table 2, resulting in some 274,774 persons, or 37% of the national population, being severely affected by the flood waters. In Region 4, a total of 222,522 persons or 72% of the region's population were severely affected. Some 41,787 persons or 41% of the population in Region 3, and another 10,464 or 20% in Region 5 experienced the cruel conditions of the flooding. In all, 37% of Guyana's population could be said to be severely affected by the flood. The secondarily affected population or those who would be considered to be moderately affected by the disaster accounted for 354,718 or 48% of the total population. They could be found not only in the severely affected regions but also in Region 2. The ECLAC methodology allows for a third category of affected population, those who reside outside the affected areas but who may house or support those found in the direct path of the disaster, such as was the case found among the population of Linden, where many affected persons sought refuge.

From one to seven weeks, persons along the Guyana coast lived in three to five feet of water, in deteriorating environmental conditions including proliferation of solid waste, carcasses of livestock and household pets, sewage from pit latrines and septic tanks, and a contaminated water distribution system, all of which heightened the risk for water and vector borne diseases. People in the villages in the region of the Mahaica and Mahaicony Rivers continue to live in flood waters.

It should be noted, however, that not all are equally vulnerable. The poorest are found to be the most susceptible to natural disasters as they possess the least assets to enable them to buffer against the difficulties caused by the disaster, and have less capacities to improve their positions thereafter. Although there has been some improvement in the living conditions of the Guyanese population between 1992 and the last survey of living conditions, which was conducted in 1999, as Table 3 makes evident, a significant proportion of the Guyanese population, 35%, lives below the poverty line, and Guyana continues to be one of the poorest countries in the Western Hemisphere. Unfortunately, poverty data distributed by regions was unavailable.

Table 3
Poverty estimates for geographic locations in Guyana for 1992 and 1999

Geographical Level	Extremely Poor		Poor	
	1992	1999	1992	1999
Georgetown	15.8	9.0	28.9	16.3
Other Urban	12.3	3.7	23.1	15.4
Rural Coastal	27.9	19.6	45.2	36.7
Rural Interior	70.8	88.0	78.6	92.5
Guyana	28.7	21.3	43.2	35

Source: Guyana poverty Reduction Strategy Paper

Table 3 indicates that there is a substantial difference in the chance of being poor within the rural setting, dependent on whether a person lives on the rural coast or in the interior. In addition to the quantitative difference between rural and urban poverty, there is also a marked difference between the qualitative experience of poverty, as has been suggested by data from a 2000 survey, which found that the prevalence rate for moderate-to-severe malnutrition in children, in the interior rural areas was only 4%, while coastal rural areas suffered 13% and coastal urban areas suffered 9%[5]. It was suggested that the disparities could have been explained by a number of factors. Central among them were the differences between agricultural and non-agricultural areas, conditions in sanitation and water quality and by differences in areas of very high and very low malaria rates. However, the study indicated that 27% of all Guyanese children are at least moderately anemic.

[5] MICS (2001). Table 14. Page 58.

The December/January floods increased the health/nutritional risk of those persons living in the coastal region and, no doubt, exacerbated the health conditions of the most vulnerable in the society, particularly children, as the subsistence or backyard gardens managed by their families, which supported their nutritional intake, were damaged.[6]

2.2. Vulnerability of women and children

Women head approximately 30% of the households, although it has been argued that this figure may be underestimated in light of the heavy out migration of men who go in search of employment in other parts of the Caribbean and North America. When the significant proportion of women who have responsibility for household management is combined with women's low labour force participation rate, some 39% compared to the male rate of 81%, and the high levels of female unemployment - the female unemployment rate is more than twice that of the male rate, 18% and 8% respectively - an appreciation of the extent of the vulnerability of women in Guyana can be had. If consideration is given as well to the fact that many of the poor households, an equal proportion of which are headed by women, have larger households to care for than non poor households, the difficult position of women and their children becomes clear.[7]

Large proportions of these women can be found at work in the informal sector, and are not captured among the employed. Those who work in agriculture are often a forgotten group and are invisible to agricultural planners, agricultural extension providers and their productive efforts may fall outside of the national accounts. They carry the burden for the rearing of children, and care for the elderly; but like their sisters across the region, because they possess few titles to farm lands are unable to access credit, training or benefits from technological advancement.[8] They work supporting family farms, and in the marketing of domestic produce, or selling goods from their backyard gardens. The other group of women in Guyana's informal sector can be found in the commercial/retail sector, selling clothing, engaged in the home-based sewing of garments, running little shops and engaged in light vending on the streets. Both groups of women have suffered from the devastation caused by the flooding. One group, found in the agricultural sector lost their produce and their poultry and other animals and is without the necessary capital to reinvest; and the other group found in the commercial/retail sector has lost goods, which may have been taken on credit and they now need access to new credit for additional goods, in order to turn over a subsistence income and repay their debts.[9]

When the full picture of the damage caused by the flood is told it will be that poor, single female-headed households, of all ethnicities and their children, have suffered immense hardship.

---

6 Corroboration of this information appears in the Agricultural analysis of this assessment.

7 See the Guyana Poverty Reduction Strategy Paper (2002) which discusses the demographic characteristics of the poor.

8 Information on women small farmers can be found in the IICA Study on "Women Small Farmers in the Caribbean" , ed. By Brenda Kleysen 1996.

9 This information was substantiated at a meeting of over 200 women organized by Red Thread, on March 3, 2005. Women came from villages such as Good Hope: Phase 1 and 2, Buxton, Lusignan, Sophia, Better Hope and Strathspey.

2.3. Psycho social trauma

The vast majority of the population of Guyana would not have ever experienced flooding of this magnitude. The last major flooding to affect Georgetown and the East Coast occurred in the mid- 1930s, which suggests that intense flooding may only be a real memory for possibly 2-3% of today's population. This absence of memory seems to have intensified the psycho-social trauma of the population. Another factor which may influence the psycho-social impact of the disaster is the notion held among the average Guyanese, that they 'know' and 'understand' flooding. This false sense of knowledge/safety seemed to have lulled the population into a position of disbelief about the gravity of the situation as the December/January rains turned out to be far more insidious than expected. One senses that as a result of the flooding, a greater sense of anxiety and some fear of the next rainy season, expected in May/June, is widespread.

Disasters have differing impacts on people. It is clear that the heavily burdened health sector, although knowledgeable about the possible psycho-social trauma that may have resulted as a consequence of the phenomenon of the floods, was not in a position to pay the level of attention to the issue as desired. This became evident through the major medical campaign which was waged in order to attend to the physical needs of the population and to ensure that outbreaks of diseases were quickly addressed and kept under control.

It is not surprising that the evidence of psycho-social trauma rehabilitation has not been strong. However, it is clear that the affected population has been traumatised by the event. A team of observers[10] who met with persons resident in shelters noted the sense of despair and hopelessness that existed, evident through questions asked by the shelter residents. Questions asked were: "how will I be able to start over?", "when will it end?", "what can I do, I have lost my job and all my possessions?", and "I feel angry, helpless, hopeless and totally confused... I worry all the time?".

Research on disaster management, indicates that there are varying responses to disasters including abuse of alcohol and abusive behaviours in men and bouts of crying and deep depression in women, as each attempts to cope with the distress which disasters bring. Anecdotal evidence of such behaviours was reported.

2.4. Emergency action

The unprecedented heavy rainfall which inundated the coastal regions of Guyana in mid-January resulted in a limited emergency being declared by the President of Guyana and Commander-in-Chief. The emergency took effect in Regions 3, 4 and later 5 and a number of emergency committees were established to coordinate a response to the disaster. On 3 February, the CDC of the Government of Guyana assumed responsibility for disaster planning and coordination from the JOC (Joint Operations Command).

---

[10] These comments come from a team of observers led by Dr. Desrey Caesar-Fox on behalf of the Guyana Citizens Initiative, a civil society organization involved in supporting relief and recovery efforts. The observations were part of a rapid assessment undertaken on 11 Feb 2005.

At the peak of the disaster, more than 5,000 persons were housed in 45 shelters run by the GDF, the Relief Council and other private organizations. They were supported by agencies such as the World Food Programme (WFP), the Red Cross, and religious and civil society organizations, such as the Rotary Clubs and the Guyana Citizens Initiative. By 2 February, the numbers in shelters had been reduced to just over 2,500 as Table 4 indicates. Nearly 50% of the residents of shelters were children. By 8 March 2005, 21 days after the rains began, only one shelter, housing a family of five, run by the Guyana Relief Council was still operational. All others had been closed.

Table 4
Shelters run by the GDF, occupied as at 2 February 2005

Name	Persons housed	Children
Graham Hall primary, Industry	90	43
St. Paul primary, Plaisance	62	27
LBI Primary	59	36
BVI Community High	86	20
Mon Repos primary	116	80
Buxton Primary	210	58
Paradise primarmy	304	135
Guysuco Coldigen	4	0
Enmorre	65	21
Haslington Nursery	86	46
Golden Grove	143	83
Cove & John	79	43
Victoria primary	39	42
Victoria Nursery	30	15
Ann's Grove	88	49
Annandale	55	26
Lusignan	42	20
Gibson Primary, Unity Mahaica	115	75
Sophia primary	253	135
Colonbrook Primary	61	32
Mocha	167	73
Strathspey	75	41
Vryheid lust	194	104
Golden Grove Secondary	63	24
Albouystown	67	42
Guyana Relief Council	64	0
Total	2617	1270

Source: GDF Report, 8 March 2005

The JOC, also referred to as Joint Services, also provided more than 146,458 cooked meals during the period of the flooding and the Government of Guyana distributed more than 78,327 food hampers. The Central Islamic Organization distributed food hampers to 22 Masjids across the East Coast, totalling some 6,000. Potable water was not available initially in the flood-affected communities, in response the Ministry with responsible for water, Joint Services, private contractors and international agencies such as OXFAM were successful in supplying potable water to most affected communities through a network of tanks, supply of bottled water, water in jerry cans and community stand pipes. In the aftermath of the flooding, the GDF and the Red Cross distributed a total of 32,613 cleaning kits which included soap powder, a hard brush, washing soap and bleach.

Finally, in response to the disaster, in the Budget speech of 21 February 2005, the Government indicated that it would undertake the following: allocate GY$220,000, for the procurement of goods and services; waive the duty and consumption tax on food supplies that were imported for the flood victims; and waive duties and taxes on specified food items that were imported for commercial use.

The response of the international community has been swift and generous. By 18 January the United States Agency for International Development/Office of Foreign Disaster Assistance (USAID/OFDA) had deployed a team to Guyana to assess the emergency needs and coordinate its relief efforts. On 8 February the United Nations issued a consolidated appeal for more than US$2.9 million. Their targeted areas included: access to food, potable water, and adequate sanitation; disease surveillance; waste disposal; community clean-up; health and education services; and livelihoods. Table 5 details the relief assistance received by the Government from regional governments and the international donor community, which amounted to some US$3.7 million.

Table 5
Relief Assistance
By Agency and Amount as at February 25, 2005

Donor	Amount US $
U. S. Government	50,000.00
USAID	653,000.00
DFID	263,200.00
IDB	200,000.00
European Union	910,000.00
CIDA	37,240.00
UNDP	100,000.00
UNICEF	116,269.00
PAHO	100,000.00
CDB	50,000.00
France	62,500.00
People's Rep. China	100,000.00
Alumina & Bauxite Co. Ltd.	100,000.00
Japan	120,000.00
OAS	15,000.00
Guyanese in N.Y.	48,573.00
Atlantic Tele Network	150,000.00
GBTI	15,000.00
South American Mining	10,000.00
Kriskor	3,000.00
Others	14,884.00
South Korea	30,000.00
Trinidad and Tobago	384,000.00
Cuba	not costed
Brazil	not costed
Chile	not costed
Venezuela	not costed
Germany	100,000.00
IICA	40,000.00
Total	$3,742,666.00

Source: ECLAC based on official data from the Office of the President

3. Description of damage and losses by sector

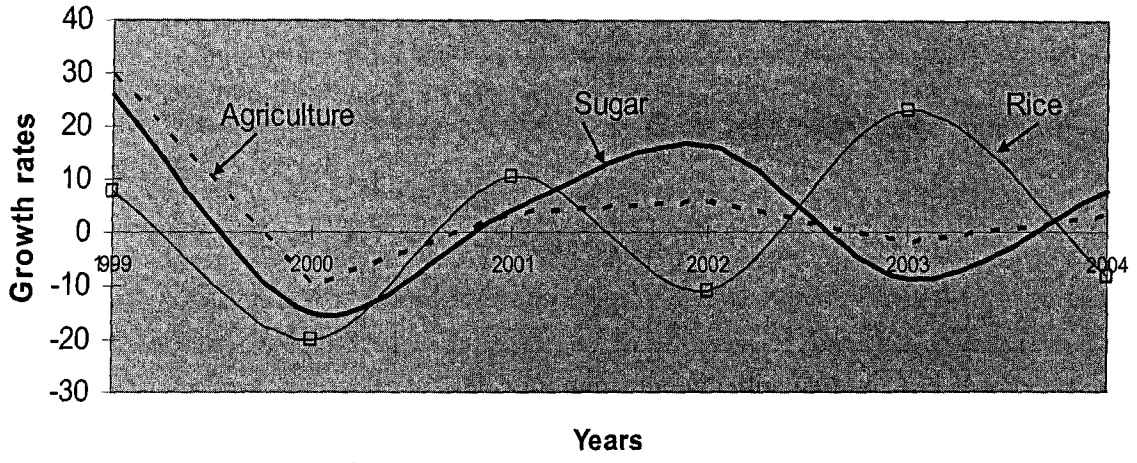
3.1 Productive sectors

3.1.1 Agriculture, livestock, fisheries and forestry

(a) Overview

The agricultural sector plays an important, though fluctuating, role in the economy of Guyana. This is underscored by the sector's contribution to foreign exchange earnings, employment and GDP. In 2004, for instance, the agricultural sector accounted for approximately 35.4% of total GDP, compared with a corresponding 36.4% in 1999.

Figure 10
Growth rates of sugar, rice and agriculture



The performance of the sector for the period 1999 to 2004 may be described as mixed. The high positive growth of 29.7% achieved in 1999 was followed by a negative growth rate of 10.2% in 2000. In the ensuing two years, 2001 and 2002, the sector registered positive growth rates of 3.7% and 6.0%, respectively. The short period of positive growth was, however, followed by a negative growth rate of 1.7% in 2003. In 2004, the sector recovered and registered a positive growth of 3.2%. These changes in the sector's rate of growth are closely related to the fortunes and outputs of the principal crops sugar-cane and rice. The growth rates of these commodities for the period 1999 to 2004 are presented in Figure 10.

Growth in the livestock subsector has been fairly steady since 1998, registering only positive growth, while the fishing industry has registered positive growth rates, with the exception of 2002 and 2004, when the subsector declined by 3.6% and 1.3%, respectively. Growth in the forestry subsector has fluctuated over the period under review with a tendency to decline. A wide range of non-traditional crops are grown in Guyana. These range from fruits

and vegetables, roots and tubers, herbs and spices and legumes. The non-traditional commodities play a significant role in ensuring some element of food security in the country.

Prior to the flood disaster, the sector was expected to register positive growth in, at least, the medium run. In 2005, the sector was expected to expand by 5.2%, fueled by projected growth in sugar (3.9%), rice (13.0%), livestock (5.3%), other agriculture (5.0%), fishing (5.7%) and forestry (2.2%).

(b) Description, analysis and estimation of the flood damage

The impact of the flood damage was concentrated within the coastal administrative regions of West Demerara/Essequibo Islands, Demerara/Mahaica, and Mahaica/West Berbice. These areas comprise approximately 62.4% of the population of Guyana. The damage to the agricultural sector was most severe in Region 4 accounting for 55.0 % of the total damage, followed by Region 2 with 23.2% and Region 5 with 18.8 %. Significant losses were recorded in the sugar, rice, livestock and crop subsectors.

The ECLAC methodological framework for estimating the socio-economic and environmental effects of disasters was utilized in assessing the flood damage to the agricultural sector. Within this context, damage to the sector was categorized under two broad headings: direct and indirect damages. In assessing the direct damage to the sector only losses to capital assets were considered. The direct losses were identified under four broad headings:

- Damage to farmland;
- Damage to physical Infrastructure and to machinery and equipment;
- Losses of crops that are ready to be harvested; and
- Losses of stock (livestock, inputs, harvested products, etc.)

In assessing production losses, only production ready to be harvested at the time of the flood was taken into consideration. However, for affected annual crops that were still growing at the onset of the flood, losses were assessed based on investment in labour and input.

In the case of losses of stock, where total losses occurred, damages were estimated at farm prices and inputs at replacement value. Assessments for partial loss and damage were effected on a prorated basis.

Direct damages caused by the flood disaster that will have a negative impact on production throughout the recovery period were assessed as indirect losses. In the case of the rice industry, the flooding of the rice fields is expected to impact negatively on the future harvesting as well as on the planting of rice. As well, livestock production was to decrease in the future as a result of stress and animal disease.

Table 6
Overall Damage to Agricultural Sector by crop and Region

Region	Sugar	Rice	Other crops	Livestock	Fisheries	Forestry	Farm roads	Nari	GSA	Total
Direct damage										
2	-	44,632,000	159,811,000	-	-	-	3,525,000	-	-	207,968,000
3	475,473,719	185,040,000	1,598,412,000	38,707,300	-	-	9,306,000	-	-	2,306,939,019
4	1,606,191,140	69,859,200	3,337,318,000	445,275,670	194,925	56,000,000	38,540,000	26,992,000	12,691,300	5,593,062,235
5	-	1,087,752,798	584,694,000	92,567,920	-	-	75,576,000	-	-	1,840,590,718
6	-	55,287,200	-	-	-	-	14,946,000	-	-	70,233,200
Total	2,081,664,859	1,442,571,198	5,680,235,000	576,550,890	194,925	56,000,000	141,893,000	26,992,000	12,691,300	10,018,793,172
Indirect damage										
2	-	6,595,160	11,447,785	-	-	-	-	-	-	18,042,945
3	77,463,963	30,385,300	118,644,615	2,119,230	-	-	-	-	-	228,613,108
4	177,207,739	11,591,804	144,245,371	23,659,605	34,200	14,000,000	-	22,140,500	10,218,343	403,097,562
5	-	183,920,746	23,539,365	5,167,685	-	-	-	-	-	212,627,796
6	-	13,074,500	-	-	-	-	-	-	-	13,074,500
Total	254,671,702	245,567,510	297,877,136	30,946,520	34,200	14,000,000	-	22,140,500	10,218,343	875,455,911
Total damage										
2	-	51,227,160	171,258,785	-	-	-	3,525,000	-	-	226,010,945
3	552,937,682	215,425,300	1,717,056,615	40,826,530	-	-	9,306,000	-	-	2,535,552,127
4	1,783,398,879	81,451,004	3,481,563,371	468,935,275	229,125	70,000,000	38,540,000	49,132,500	22,909,643	5,996,142,297
5	-	1,271,673,544	608,233,365	97,735,605	-	-	75,576,000	-	-	2,053,218,514
6	-	68,361,700	-	-	-	-	14,946,000	-	-	82,857,700

Table 6 provides a summary of the direct, indirect and total damage to sugar, rice, livestock, other crops, fisheries and forestry subsectors, as well as to farm roads, the National Agricultural Research Institute (NARI) and the Guyana School of Agriculture (GSA).

The sugar industry

The sugar industry which accounts for approximately 18.0% of Guyana's GDP (2004), 25% of its foreign exchange earnings and affects the lives of over 10% of the country's population, directly and indirectly, was heavily impacted upon. Total damage to the industry is put at G$2,336,336,561.00 which represents approximately 16.3% of that subsector's GDP. The major line item of losses was crop loss, accounting for approximately 84.4% of total loss. While large acreages of crop have not been swept away, it is anticipated that the sugar content of the harvested cane will be lower than usual.

Details on damage assessment of the sugar industry is presented in Table 7

The rice industry

The rice industry was also heavily impacted by the flood disaster, with some 1,000 farmers occupying some 19,680 acres affected.

Total loss to the industry is estimated at G$1,688,138,708.00 or 27.8% of the subsector's GDP. The affected areas were the Mahaica/Abary and West Berbice (Region 5) representing approximately 75.3% of total damage to the industry. The rice industry accounts for approximately 3.6% of the Guyana's GDP and contributes approximately 9% of export revenues. Details on damage assessment for the rice industry is presented in Table 8.

The other crop subsector

The category "other crops" which includes fruits, vegetables, roots and tubers, and herbs and spices suffered severely, with loss estimated at G$5,978,112,136.00. While on the surface the estimate may seem high, it may, however, reflect a high level of previously unreported backyard gardening in the affected areas. Crop production in Region 3 and Region 4 were heavily impacted by the flood disaster, accounting for 28.7 % and 58.2%, respectively, of total damage to the "other" crop subsector.

Details of damage estimate for the subsector are presented in Table 9.

The livestock subsector

The livestock subsector was also severely affected by the flood disaster with total estimated loss to the industry put at G$607,497,410.00. This figure represents approximately 18.8% of livestock GDP. Region 4 was the area mostly affected with loss estimated at G$468,935,275.00 or 77.2% of total loss to the livestock subsector. Details of damage estimate for this vital subsector are presented in Table 10.

The fisheries industry

The impact of the flood disaster on the fisheries subsector has been minimal. The floods have had some impact on the Mon-Repos Aquaculture station, resulting in the loss of Red Tilapia fingerlings and some marketable Hassar. There has been some impact on the Department of Fisheries' building in Brickdam, with damage to the generator. The total flood damage to the subsector is assessed at G$229,125.00 (Table 11).

The forestry industry

The forestry industry also suffered very little effects from the flood disaster. Approximately 20 lumberyards along the East Coast were affected with loss of lumber assessed at one million board ft at an estimated cost of G$70,000,000.00 (Table 12).

The farm roads

Approximately 180.95 miles of earthen farm roads were assessed to be damaged. The value for repairs and reconstruction is assessed at G$141,893,000.00 (Table 13).

The agricultural institutions

NARI and the GSA were also impacted by the flood disaster. Damage estimates for these two institutions are presented in Tables 14 and Table 15, respectively.

Table 7: Damage Assessment - Sugar Industry						
Item	Region					Total Cost
	2	3	4	5	6	
Direct Damage						
1. Crop Loss	-	457,842,000	1,514,370,000	-	-	1,972,212,000
2. Agricultural Land	-	4,808,458	3,589,040	-	-	8,397,498
3. Infrastructure	-	2,250,834	6,621,056	-	-	8,871,890
4. Machinery/Equipment	-	214,231	25,403,920	-	-	25,618,151
5. Chemical Loss	-	9,120,028	690,590	-	-	9,810,618
6. Loss of Stock	-	1,238,168	50,376,787	-	-	51,614,955
7. Buildings	-	-	5,139,747	-	-	5,139,747
Total	-	475,473,719	1,606,191,140	-	-	2,081,664,859
Indirect Damage						
1. Crop Rehabilitation	-	69,877,600	90,888,754	-	-	160,766,354
2. Machines deployed to assist	-	1,651,859	14,985,520	-	-	16,637,379
3. Pumping cost (above normal)	-	985,377	60,547,448	-	-	61,532,825
4. Cleaning/fumigation	-	-	1,911,636	-	-	1,911,636
5. Medical Outreach	-	3,125,798	364,800	-	-	3,490,598
6. Others	-	1,823,329	8,509,581	-	-	10,332,910
Total	-	77,463,963	177,207,739	-	-	254,671,702
Grand Total	-	552,937,682	1,783,398,879	-	-	2,336,336,561

Table 8
Damage Assessment - Rice Industry

Region	No. of Farmers	Acres	Direct Loss Crop Loss		Dams/Meres	Total Direct Loss	Indirect Loss			Total Indirect Loss	Grand Total Loss
			Rice Eq (MT)	G$			Labour	Harvesting	Transportation		
2	70	572	709	39,704,000	4,928,000	44,632,000	2,991,560	2,402,400	1,201,200	6,595,160	51,227,160
3											
Wakenaam	39	283	304	17,024,000	2,464,000	19,488,000	1,485,750	1,839,500	735,800	4,061,050	23,549,050
Leguan	54	643	584	32,704,000	5,632,000	38,336,000	3,375,750	3,536,500	1,414,600	8,326,850	46,662,850
Hog Island	2	37	30	1,680,000	352,000	2,032,000	194,250	185,000	74,000	453,250	2,485,250
West Demerara	263	1,511	1,984	111,104,000	14,080,000	125,184,000	7,932,750	7,208,550	2,402,850	17,544,150	142,728,150
Sub Total Region 3	358	2,474	2,902	162,512,000	22,528,000	185,040,000	12,988,500	12,769,550	4,627,250	30,385,300	215,425,300
4	80	894	1,107	61,992,000	7,867,200	69,859,200	4,082,004	4,827,600	2,682,200	11,591,804	81,451,004
5											
Mahaica/Abary	311	11,631	13,425	751,800,000	102,352,798	854,152,798	53,107,146	58,525,920	32,514,400	144,147,466	998,300,264
West Berbice	101	3,280	3,656	204,736,000	28,864,000	233,600,000	14,976,480	15,940,800	8,856,000	39,773,280	273,373,280
Sub Total Region 5	412	14,911	17,081	956,536,000	131,216,798	1,087,752,798	68,083,626	74,466,720	41,370,400	183,920,746	1,271,673,544
6											
Frontlands	13	212	221	12,376,000	1,865,600	14,241,600	1,696,000	1,060,000	530,000	3,286,000	17,527,600
Black Bush Polder	67	617	636	35,616,000	5,429,600	41,045,600	4,936,000	3,085,000	1,767,500	9,788,500	50,834,100
Sub Total Region 6	80	829	857	47,992,000	7,295,200	55,287,200	6,632,000	4,145,000	2,297,500	13,074,500	68,361,700
Grand total	1,000	19,680	22,656	1,268,736,000	173,835,198	1,442,571,198	94,777,690	98,611,270	52,178,550	245,567,510	1,688,138,708

Table 9
Damage Assessment - Crop Sub Sector

Region	Acreage Affected	Direct Loss	Indirect Loss	Total Loss
2				
Fruits	24.15	51,049,000	3,828,675	54,877,675
Vegetables	85.25	98,940,000	6,925,800	105,865,800
Seasonings	1.01	1,307,000	104,560	1,411,560
Ground Provision	10.5	5,190,000	389,250	5,579,250
Others	3.5	3,325,000	199,500	3,524,500
Sub Total Region 2	124.41	159,811,000	11,447,785	171,258,785
3				
Fruits	403.45	839,716,000	62,978,700	902,694,700
Vegetables	492	572,688,000	45,815,040	618,503,040
Seasonings	40.15	52,280,000	3,136,800	55,416,800
Ground Provision	247.1	128,193,000	6,409,650	134,602,650
Others	6.15	5,535,000	304,425	5,839,425
Sub Total Region 3	1,188.85	1,598,412,000	118,644,615	1,717,056,615
4				
Fruits	446.5	929,314,000	37,172,560	1,301,039,600
Vegetables	1,407.00	1,637,786,000	73,700,386	1,711,486,386
Seasonings	390.75	509,820,000	20,392,800	530,212,800
Ground Provision	486.35	252,343,000	12,617,150	264,960,150
Others	8.95	8,055,000	362,475	8,417,475
Sub Total Region 4	2,739.55	3,337,318,000	144,245,371	3,816,116,411
5				
Fruits	141.25	293,703,000	11,748,000	305,451,000
Vegetables	196	228,144,000	11,407,200	239,551,200
Ground Provision	3.15	1,557,000	62,280	1,619,280
Sub Total Region 5	388.25	584,694,000	23,539,365	608,233,365
Grand total	4,441.06	5,680,235,000	297,877,136	5,978,112,136

Table 10
Damage assessment to the livestock subsector

Region	Number of Animals	Direct Loss	Indirect Loss	Total Loss
Region 3				
Cattle	182	13,986,000	938,080	14,906,080
Sheep	184	3,106,000	124,400	3,230,400
Goats	84	1,670,000	75,350	1,745,350
Pigs	213	1,940,000	112,520	2,052,520
Horses	2	88,000	5,280	93,280
Poultry	20,058	17,082,000	854,960	17,936,960
Products	-	177,800	-	177,800
Supplies	-	604,800	-	604,800
Infrastructure	-	70,700	8,640	79,340
Sub Total Region 3	20,723	38,707,300	2,119,230	40,826,530
Region 4				
Cattle	1,088	99,252,000	5,955,120	105,207,120
Sheep	3,671	78,310,000	4,307,050	82,617,050
Goats	1,362	28,282,000	1,470,664	29,752,664
Pigs	3,045	51,819,300	2,590,965	54,410,265
Horses	155	9,200,000	496,800	9,696,800
Poultry	164,307	146,748,720	8,071,180	154,819,900
Products	-	8,228,450	-	8,228,450
Supplies	-	6,372,400	-	6,372,400
Infrastructure	-	17,062,800	767,826	17,830,626
Sub Total Region 4	173,628	445,275,670	23,659,605	468,935,275
Region 5				
Cattle	708	44,568,000	2,451,240	47,019,240
Sheep	985	15,160,000	909,600	16,069,600
Goats	1,008	13,714,000	745,270	14,459,270
Pigs	177	1,425,000	85,500	1,510,500
Horses	28	696,000	35,496	731,496
Poultry	17,415	15,676,320	940,579	16,616,899
Products	-	1,206,000	-	1,206,000
Supplies	-	122,600	-	122,600
Infrastructure	-	-	-	-
Sub Total Region 5	20,321	92,567,920	5,167,685	97,735,605
Region 6	-	-	-	-
GRAND TOTAL	214,672	576,568,890	30,946,520	607,497,410

Table 11
Damage assessment to the fishery industry

Region	Unit Affected	Direct Loss	Indirect Loss	Total Loss
2	-	-	-	-
3	-	-	-	-
4				
Mon Repos Aquaculture Station	Marketable Fish and Fingerlings	104,925	34,200	139,125
Department of Fisheries and Hydro Met Buildings	Repairs to generator	90,000	-	90,000
Sub-total Region 4		194,925	34,200	229,125
5	-	-	-	-
6	-	-	-	-
Grand Total		194,925	34,200	229,125

Table 12:
Damage Assessment to the forestry industry

Region	Unit Loss (Board Ft)	Direct Loss	Indirect Loss	Total Loss
2		0	0	0
3		0	0	0
4	800,000	56,000,000	-	56,000,000
5	200,000	14,000,000	-	14,000,000
6		0	0	70,000,000

Table 13
Damage Assessment - Farm Roads

Region	Estimated Miles Earthen Farm Roads Affected	Direct Loss	Indirect Loss	Total Loss
2	3.75	3,525,000	-	3,525,000
3	9.90	9,306,000	-	9,306,000
4	41.00	38,540,000	-	38,540,000
5	80.40	75,576,000	-	75,576,000
6	15.90	14,946,000	-	14,946,000
Grand total	180.95	141,893,000	-	141,893,000

Table 14
Damage Assessment - National Agricultural Research Institute

Region	Direct Loss	Indirect Loss	Total Loss
2	-	-	-
3	-	-	-
4 (NARI)			
Land	650,000	-	650,000
Physical Infrastructure	12,049,500	17,365,000	29,414,500
Machinery and Equipment	2,270,000	-	2,270,000
Office Furniture	350,000	-	350,000
Nursery Plants	7,500,000	2,715,000	10,215,000
Ant Bait	17,500	-	-
Stock (animals)	4,035,000	1,560,500	5,595,500
Crops	120,000	-	120,000
Delay in Research Results	-	500,000	500,000
Sub-total Region 4	26,992,000	22,140,500	49,115,000

Table 15
Damage Assessment - Guyana School of Agriculture

Region	Acreage Affected (Acres)	Direct Loss	Indirect Loss	Total Loss
2	-	-	-	-
3	-	-	-	-
4 (GSA)	-	-	-	-
Crop Loss	50	3,831,800	3,731,250	7,563,050
Livestock Loss	-	2,238,000	2,295,000	4,533,000
Building and Infrastructure	-	6,621,500	4,192,093	10,813,593
Sub-total Region 4	-	12,691,300	10,218,343	22,909,643
5	-	-	-	-
6	-	-	-	-
Grand total	50	12,691,300	10,218,343	22,909,643

3.1.2 Commerce, manufacturing and tourism

Commerce includes the wholesale and retail sectors, as well as informal sector activities such as traders, venders and micro businesses. Performance of the sector reflects developments in the economy, and growth has been somewhat indifferent since 2001. At 4%, the apparent contribution of distribution to GDP is low, but this could possibly be explained by a large informal sector component.

Manufacturing contributes around 10 % of GDP. However, sugar and rice account for most of this contribution. The impact on sugar and rice has been accounted for in the section on agriculture. Other manufacturing contributes about 3% of GDP. Like the commerce sector, other manufacturing includes informal sector activities, which may or may not be included in the GDP estimate.

Because of the concentration of economic activities in the coastal zone, the floods affected many commercial and manufacturing establishments. Direct damages included damage to machinery and equipment, loss of inventory (ranging from raw and semi processed materials to stocks ready for sale), damages to buildings, furniture and vehicles. Indirect losses mainly comprised the loss of sales and increased operating costs to businesses.

Following the floods, the Private Sector Commission carried out a survey of 324 establishments to get an impression of the damages and losses incurred by commerce and manufacturing. The survey also provided insight into the actions to be taken from the perspective of the private sector. Not surprisingly, given the low level of flood insurance, over 53 % of the respondents identified financial assistance as a top priority. If combined with other financial instruments, such as access to low cost finance, tax waivers, help with debt repayments or flexibility in the payment of bills, the percentage increases to almost 73%. Improvements in drainage and irrigation, seen by 17 % of the respondents as a top priority, was the second priority.

The survey indicated that planned investment of the 324 businesses declined by 23% as compared with the pre-flood situation. Of the 324 establishments, 270 were engaged in commerce, 43 in manufacturing and 11 in both manufacturing and commerce. Because of the different nature of the damages the commerce and small manufacturing sector was analyzed separately from the manufacturing sector.

Commerce and small manufacturing

The survey of the commerce sector ranged from micro and small enterprises to large business. To facilitate the analysis, the commerce sector was split into two categories. The first group of 227 establishments comprised businesses with an annual pre-flood turnover of less than G$20 million per year. The second group of 28 establishments included those businesses with an annual turnover of over $20 million. Table 16 summarizes the effects of the flooding on the sample.

Table 16
Summary of impact on sampled commercial businesses
G$ million

Turnover	< 20	20 +	all
Number of businesses	227	28	255
Total impact	378.86	374.72	753.58
Direct damages	266.22	276.96	543.18
Repairs/rebuilding/relocation	32.51	12.27	44.78
Repair machinery and equipment	50.37	13.02	63.39
Furniture + vehicles	16.91	4.43	21.34
Inventory	166.43	247.24	413.67
Losses	112.64	97.76	210.40
Loss of revenue	103.05	84.10	187.15
Increased expenditures	9.59	13.66	23.25
Averages			
Total impact	1.67	13.38	3.08
Direct damages	1.17	9.89	2.22
Losses	0.50	3.49	0.86

Source: ECLAC estimates based on Private Sector Commission survey

We note that the total impact for the 28 larger establishments (G$374.7 million) is almost the same as the total impact for the smaller establishments (G$378.9 million). For both categories inventory losses, as expected, dominate. This is followed by loss of revenue as the second largest impact.

Estimates of the total number of businesses in affected areas vary. A lower estimate by the Bureau of Statistics states the number of businesses in Region 4 at 1874. This estimate excludes Georgetown and the other affected regions. On the other hand, estimates by IPED, based on their database of small businesses, number 8000 businesses in Region 4 alone. While not all of these businesses would have been affected, the estimate still excludes Georgetown and the other areas. For the assessment we assume a range between 4000 and 8000 small businesses. This number, however, will also include small manufacturing. While the structure of damages in the small manufacturing sector differs from the small commercial sector the error, given the larger number of small enterprises engaged in commerce, will be small. Furthermore, the average total impact per establishment in small manufacturing (G$1.9 million) is not much higher than that of small commerce (G$1.7 million)

The estimated coverage of the sample of the large commerce sector is assumed to be one third of the total commerce sector. For both the large and small business sector, the total impact will change if further information changes the two crucial assumptions.

Therefore the impact on the commerce sector would be between G$7.8 and G$14.5 billion or between US$39 and $72 million as is shown in Table 17 below.

Table 17
Summary of Impact on Commerce and Small Manufacturing Sector
G$ million

	Turnover $ <20	Turnover $ <20	Turnover $ >20	Total Commerce	Total commerce
number of business	4000	8000	84	4084	8084
total impact	6675.95	13351.89	1124.16	7800.11	14476.05
direct damages	4691.10	9382.20	830.88	5521.98	10213.08
repairs/rebuilding/relocation	572.86	1145.73	36.81	609.67	1182.54
repair machinery and equipment	887.58	1775.15	39.06	926.64	1814.21
furniture and vehicles	297.97	595.95	13.29	311.26	609.24
inventory	2932.69	5865.37	741.72	3674.41	6607.09
				0.00	0.00
losses	1984.85	3969.69	293.28	2278.13	4262.97
loss of revenue	1815.86	3631.72	252.3	2068.16	3884.02
increased operating expenditures	168.99	337.97	40.98	209.97	378.95

Source: ECLAC based on Private Sector Commission data.

Given the disparity between the establishment data as provided by the Bureau of Statistics (1874) and other sources (8000+), an unknown proportion of the losses would have affected the informal sector only and may not necessarily be reflected in the GDP.

Manufacturing

Based on the same survey as for the commercial sector, the total impact of the flood for the sampled manufacturing sector is estimated at G$1.03 billion as shown in Table 18.

We note that in the manufacturing sector the lost or spoiled inventories, while still significant, are proportionally not as large as in the commercial sector. We also note that all small business were included in the commercial sector and invariably will include small manufacturing. To avoid double counting for the manufacturing estimate, therefore, the small manufacturing subsector is excluded.

This poses a problem since the total number of manufacturing enterprises with an annual turnover of G$20 million or more is not known. Indications are that the sample is fairly comprehensive in terms of the number of large manufacturers. However since aggregate sales

data were not available for the manufacturing sector there is more uncertainty with regard to the proportion of the sample to total sales. Therefore, we will use the sample size bearing mind that the value is an underestimate.

Table 18
Summary of impact on sampled manufacturing businesses
G$ million

	Manufacturing	Manufacturing and commerce	Manufacturing	Manufacturing and commerce	Total
	Turnover $ <20	Turnover $ <20	Turnover $ >20	Turnover $ >20	
Number of business	34	6	8	2	50
Total impact	64.72	5.48	883.22	78.26	1031.68
Direct damages	47.02	2.67	656.10	10.00	715.79
Repairs/rebuilding/relocation	8.46	0.47	262.90	0.00	271.83
Repair machinery and equipment	15.75	0.54	248.02	1.00	265.31
Furniture and vehicles	6.51	0.26	7.20	0.00	13.97
Inventory	16.30	1.40	137.98	9.00	164.68
Losses	17.70	2.81	227.12	68.26	315.89
Loss of revenue	14.58	2.36	213.87	60.00	290.81
Increased operating expenditures	3.12	0.45	13.25	8.26	25.08

Source: ECLAC based on Private Sector Commission data.

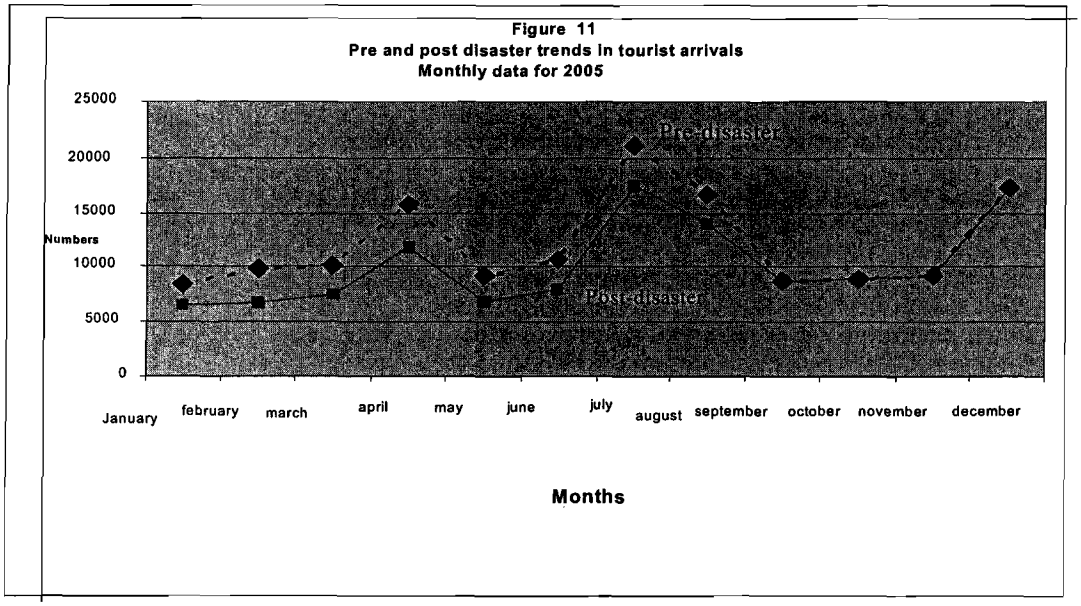
The impact on large manufacturers is then estimated at G$961 million or US$4.5 million as shown in Table 19.

Table 19 Impact of flooding on the large manufacturing sector	
total impact	961.48
direct damages	666.1
repairs/rebuilding/relocation	262.9
repair machinery and equipment	249.02
furniture and vehicles	7.2
inventory	146.98
losses	295.38
loss of revenue	273.87
increased operating expenditures	21.51
Source: ECLAC based on Private Sector Commission data.	

Tourism

At 121,989 arrivals in 2004, the tourism sector experienced an increase of 20.8% over the arrivals of 2003 and a similar growth rate was projected for 2005. The 2004 arrivals generated US$28.3 million in tourist expenditures, equivalent to an average expenditure of US$231 per tourist visit. Using the same expenditure per tourist visit the projected tourist expenditure for 2005 would have reached almost US$34 million. The floods changed this outlook. Following the floods, Canada, the United Kingdom and the United States issued travel advisories and the popular Mashramani Festival (23 February) was postponed until further notice. Tourist arrivals in January 2005 fell by 7.6% as compared with January 2004 (and by 23 % as compared with projected arrivals in January 2005). Arrivals fell by almost 18% in February 2005 as compared with 2004 and by almost 32% as compared with projected arrivals in 2005.Tourism officials in the public and private sector do not expect that the sector will recover before August/September 2005. The Guyana Tourism Authority will undertake additional promotional efforts to counteract the negative impact of the travel advisories.

Tourist arrivals in Guyana show two peak periods. The period July–August, corresponds with the North American summer holiday season, while December corresponds with Christmas. This pattern may indicate arrivals by Guyanese living abroad whose travel plans are presumably less affected by the travel advisories. We will therefore assume that arrivals in July and August will remain at the same level as in 2004 and for the period thereafter that the targeted growth rate of 20% will be achieved. For the period March to June 2005 we estimate that tourist arrivals will gradually increase averaging a drop of 10 % in arrivals. Figure 11 below shows the difference between the projected pre-flood arrivals and the projected post-flood arrivals.



Source: ECLAC

The loss in tourist arrivals amounts to 22,800 visitors for 2005 as compared with the projected arrivals. When the same average tourist expenditure of US$231 per visit is applied, the loss in tourism receipts amounts to US$5.2 million.

Direct damages to the hotel sector were minimal, but also underreported because many hotels did not provide data on cleaning of premises and swimming pools, replacement of carpets or similar expenses. The Lusignan Golf Course suffered damages because of the need to landscape the course after the flooding.

The Ogle airport was closed during the flooding. Estimates for direct damages are not available but are likely to be minor. Aircraft based at the airport had to be relocated.

The impact in the tourism sector, therefore, will largely take the form of losses in tourism receipts and in increased marketing expenditures as shown in Table 20.

Table 20
Summary of Impact on Tourism

	US 000	G$ mln
Total Impact	5634.1	1126.8
Direct damage	235.1	47.0
Accommodation	77.6	15.5
Golf course	157.5	31.5
		0.0
Losses	5399	1079.8
Loss in tourist receipts	5280	1056.0
Additional marketing	116	23.2
Aircraft relocation	3	0.6

Source: ECLAC based on data from the Guyana Tourism Authority

The total impact in the commercial, manufacturing and tourism sectors is estimated at G$16.6 billion or US$83 million as shown in Table 21.

Table 21
Summary of Impact on the commercial, manufacturing and tourisms sectors

	Direct damages	Losses	Total
Commerce and small manufacturing	10213	4263	14476
Large manufacturing	666	295	961
Tourism	47	1080	1127
Total	10926	5638	16564

Source: ECLAC

In terms of recovery the large number of small and micro business that have been affected by the floods is of particular concern, as in many cases the businesses lost their already limited assets, working capital or both. Particularly in the micro sector where 70% of the businesses are headed by women, creative forms of assistance are needed to assist in restoring businesses as quickly as possible.

3.2 Infrastructure

3.1 Drainage and irrigation

Introduction

Drainage and irrigation issues for Guyana are overseen by the Drainage and Irrigation (D&I) Board. All conservancy commissions, even though directly responsible for the day-to-day operation of their respective conservancies, are in principle subject to policy set by the D&I Board. Recently enacted legislation governs the actions and mandate of the D&I Board. Over the past several years, the drainage and irrigation sector has received significant financing from the Inter-American Development Bank (IDB), and recently, this institution has approved a US$30 million loan for the rehabilitation of drainage and irrigation infrastructure along the coastline.

In the general area where the January 2005 floods were concentrated, Regions 3, 4 and 5, there are two water conservancies, which are divided by the Demerara River. The Region 4 Conservancy lies on the eastern side, while the Region 3 Conservancy borders the western side of the river. The combined water storage capacity of the two conservancies is approximately 130 billion gallons.

The East Demerara Conservancy Dam, which is located in Region 4, lies between the Demerara and Mahaica rivers (Figure 12). The total capacity of this conservancy is estimated at roughly 100 billion gallons. This Conservancy Dam traps surface water flowing to the coast, thereby attenuating potential flood conditions that would otherwise affect the coastal areas. It also was designed to allow inflow from the Mahaica and Demerara Rivers to the east and west, respectively, during times of high river flow. Outflow from this conservancy was intended to be through a number of canals (Figure 12) discharging to:

1. The Mahaica River – Through 'Stop-off' to the Lama River, and 'Maduni' to the Maduni River.
2. The Demerara River – Through 'Cunha', '5-Gates', 'Kofi' and 'Diamond' Canals.
3. To the Atlantic Ocean – Through 'Plaisance', 'Nabaclis' and 'Shanks' Canals.

These discharge canals served as the control structures that allowed for management of the water levels behind the conservancy dam. Actual discharge through these canals was controlled by sluice gates. Over time, this system of outflow gates and canals has fallen into disrepair, seriously limiting the ability to appropriately control water levels behind the dam. Presently, only 5-Gates is properly operational to the Demerara River, Shanks to the sea and the two outlets to the Mahaica River.

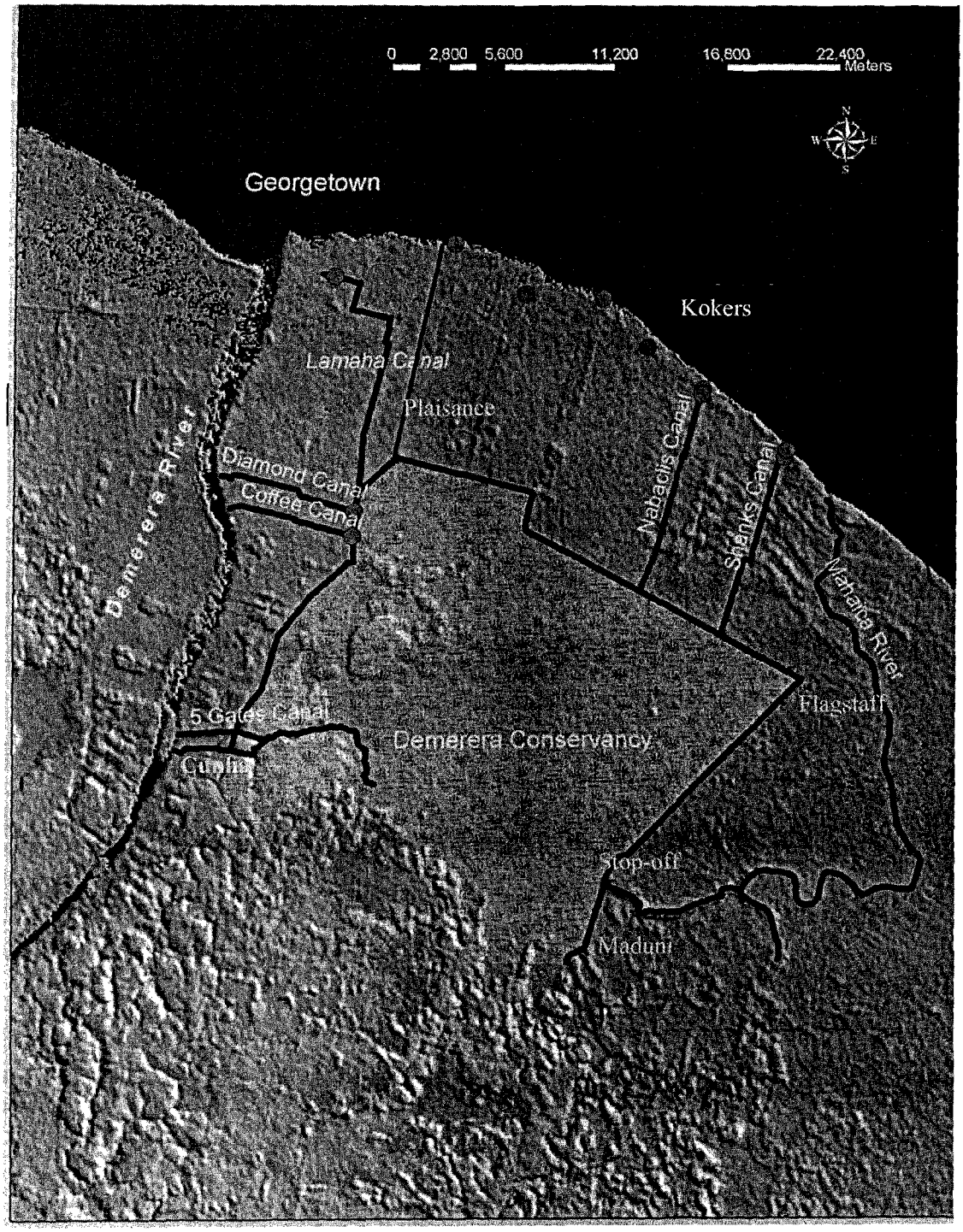


Figure 12 **East Demerara Water Conservancy Dam and Associated Structures**
(Background image source: World Bank Guyana Damage Assessment Report)

Drainage from the conservancy dam flows north into the coastal lowlands, providing irrigation water to agricultural crops during the dry seasons. Through a series of sluices, this flow is restricted during the rainy seasons, thereby protecting the coastal areas from flooding. At the coastline, channeled surface water is drained to the sea through a series of sluices or 'kokers', that facilitate drainage though the canals at low tide conditions.

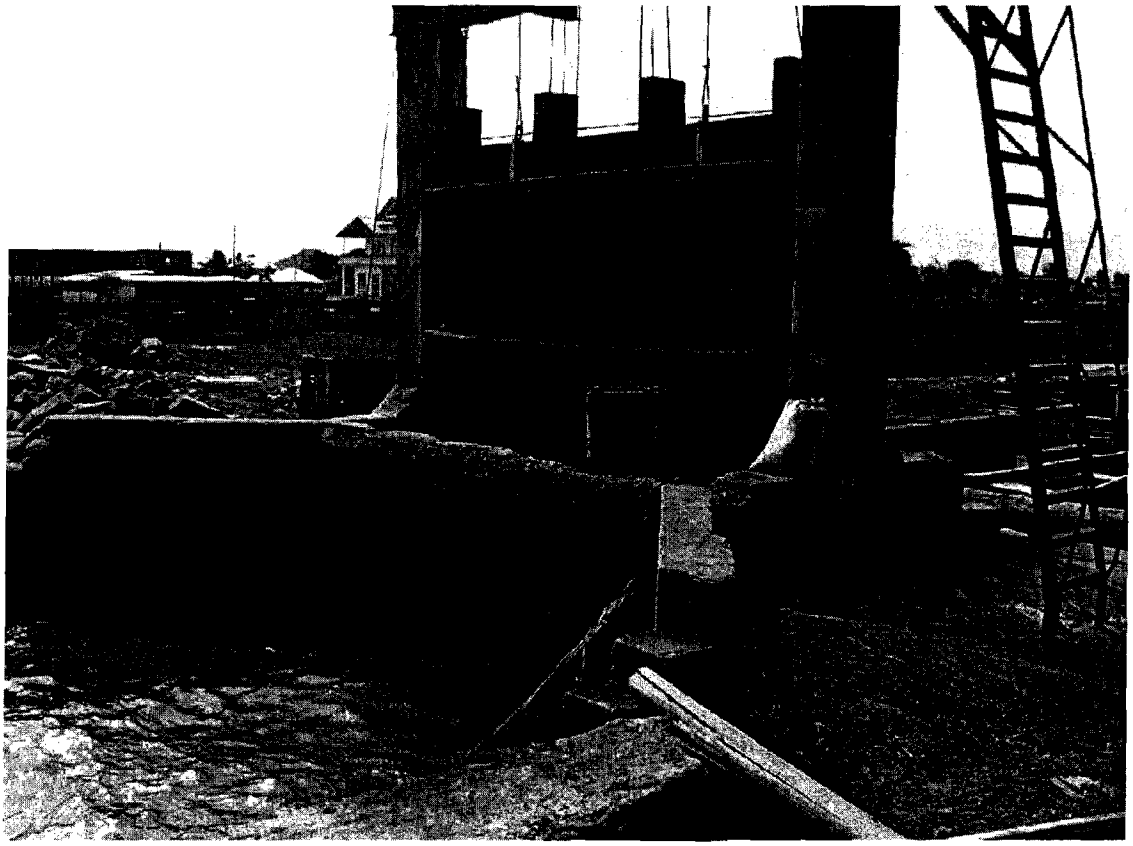


Photo 6 Koker at GUYSUCO Canal

Development has therefore been facilitated on the low-lying coastal plains of Guyana by the presence of this well-designed system of reclaimed lands (polders), drainage and irrigation canals, conservancy dams and seawalls.

The flood event

The actual meteorological mechanism of the floods has been described in Section I of this report. The worst hit area of flooding was between Sparendaam to Enmore, where over 40" of water fell within a five-day period. This situation was exacerbated by the fact that the abatement of the rains coincided with a period of high (spring) tides, which prevented the proper drainage of the ponded water. In order to address this situation, the D&I Board brought in mobile pumps to bring relief to these communities.

At the conservancy dam, a combination of previously saturated ground conditions, high water levels on the south side of the conservancy embankment and malfunctioning sluice gates and/or outlet structures, led to a near catastrophic situation whereby the dam was almost breached. Had breaching occurred, it could have led to the release of a significant volume of water, and could have resulted in an additional 24" of water being added to the 40" that was recorded in the worst hit areas. This situation could have resulted in significant loss of life in the most populous belt of Guyana, making this disaster much worse than it was. Breaching of the dam was averted primarily by two initiatives.

First, excess water was discharged from the conservancy dam to three outlets: the 5-Gates canal, where 750,000 gallons per minute (gpm) were discharged to the Demerara River; the Maduni outlet, where 265,000 gpm were discharged to the Maduni River; and the Stop-Off outlet, where another 265,000 gpm were discharged to the Lama River. As a result of the latter two discharges, however, the communities on the banks of the Mahaica River were flooded out.

The second initiative was taken at the conservancy embankment itself, where a team of approximately 150 rangers worked through the day and night to place sandbags and/or pegasse on the crest of the embankment (Photo 7). This action was taken at locations where the water in the conservancy was seen to be overtopping the embankment and was a constant struggle until some measure of control was achieved.

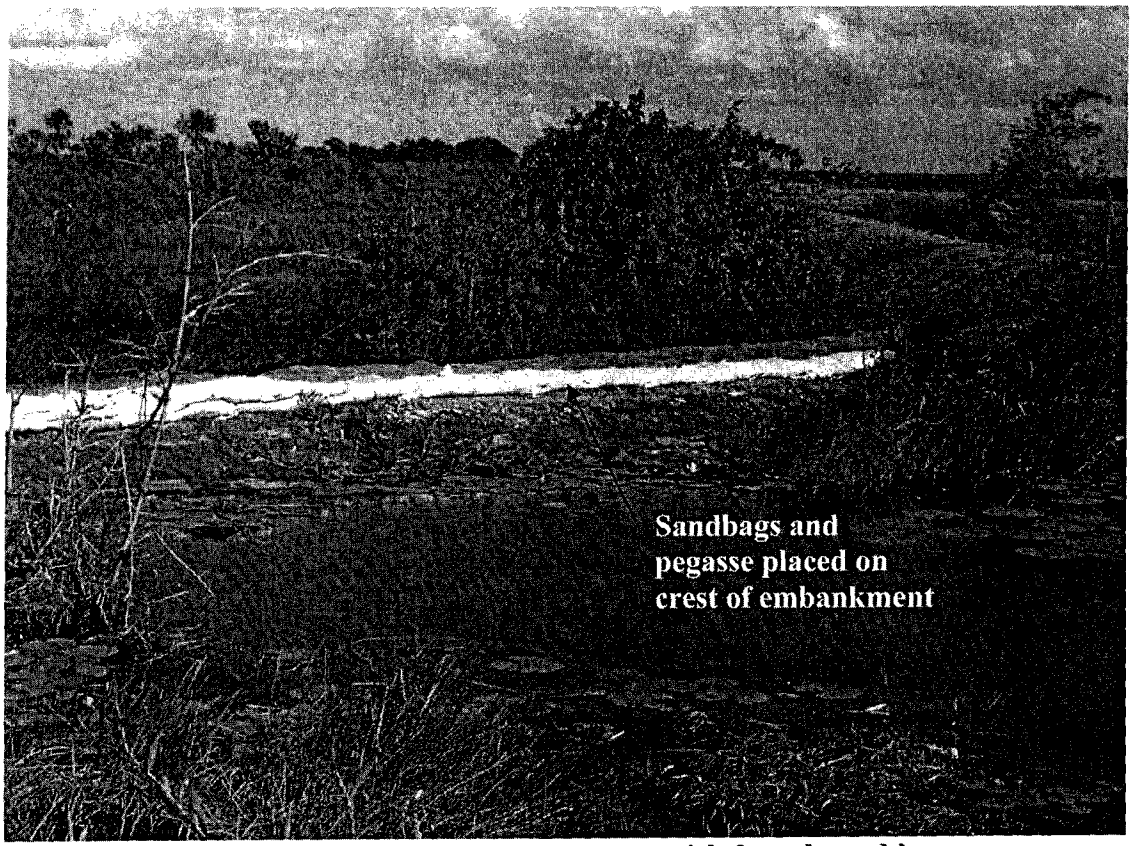


Photo 7 Embankment locations that were at risk from breaching

The following damage to drainage and irrigation was inventoried following the event:

- Damage to sluice gates and associated equipment.
- Damage to intake structures and kokers.
- Damage to culverts and canals.
- Damage to the embankment of the Crown Dam.
- Damage to the embankment of the Conservancy Dam.
- Extensive siltation of canals.

Agency response actions

Coming out of this disaster, the President of Guyana has appointed an Infrastructure Recovery Task Force, chaired by the Director of the D&I Board and staffed by a number of experienced engineers, to oversee the speedy recovery of the drainage and irrigation sector. To date, the task force has obtained funding from a number of donor agencies in the amount of US$3.5 million, to immediately commence rehabilitation works before the onset of the May/June rainy season. Medium-term funding (one to three-year horizon) has also been earmarked, in the amount of approximately US$50 million, and longer-term (10-15 year horizon) funding is being sought in the amount of US$200-300 million.

In order to facilitate this schedule, interviews have already been held with qualified contractors, to carry out the required rehabilitation works, in a design-build manner. The work to be done in the **short term** (i.e. before the May/June rainy season) will be:

1. Rehabilitation of Canals to the Demerara River – Cunha, Kofi and Diamond.
2. Rehabilitation of Canals to the Atlantic Ocean – The Shanks Canal will be excavated and the outlet structures to the sea for this canal rehabilitated.

In the **medium term**, the work to be done will include:

1. Rehabilitation of Canals to the Atlantic Ocean – Plaisance to be cleared; Nebaclis to have a new sluice; reconstructed culverts at the main road and new pumping station.
2. Construction of a proper road at Flafstaff running from the nearest public road to the conservancy dam.
3. Excavation of cross canals within the East Demerara Water Conservancy to increase storage and to channel water to the designated outlet structures.
4. Repairs to the conservancy dam embankment.
5. Hydraulic and hydrologic modeling of the East Demerara Water Conservancy system, sluice gates, water pumps and discharge canals.
6. Repair of critical outlet structures (kokers) in the seawall.

In the **long term**, it is anticipated that related projects will include:

1. Implementation of the Mahaica-Mahaicony-Abary water conservancy system and related embankments, discharge channels and control structures.

Direct damages and indirect losses

The direct damage costs incurred to this sector and the indirect losses are presented in Table 22.

Table 22
Direct and direct losses to the infrastructure sector

Region	General Description	Indirect Losses (G$M)	Direct Damages (G$M)	L/I Ratio[11]	Total Damages (G$M)
3	Repairs to sluices and related equipment.		148.92	62/38	
	De-silting and cleaning of canals.	110.00			
4	Rehabilitation of sluices, intake structures and kokers.		26.00	10/90	
	Installation of culverts.		3.77	60/40	
	Repairs to Conservancy Dam.		800.00	70/30	
	Repairs to Crown Dam.		6.00	70/30	
	De-silting canals and drains.	73.06			
	Pumping excess water.	4.03			
5	Embankment construction and raising.		76.50	70/30	
	Installation of culverts, aqueducts and bridges.		20.45	60/40	
	Rehabilitation of canals.		30.25	70/30	
6	De-silting canals.	7.53			
	Employee overtime payments.	0.16			
	Construction repairs.		4.47	80/20	
Totals		**194.78**	**1,116.36**		**1,311.14**

[11] Ratio of Local/Imported content

Recommendations

The importance of the D&I Board to the proper functioning of the agricultural and drainage sectors cannot be understated. In addition, the importance of this agency to the reduction of vulnerability from flooding is significant. Given the large amounts of funding that are slated to be channeled through the D&I Board over the next one to five years, it is strongly recommended that a programme of institutional strengthening be implemented immediately. This programme should seek to review the organizational structure required to oversee large projects, and should identify suitable engineering personnel who could be sent to undertake post-graduate level training in hydraulics and hydrology at a top-level tertiary institution. These graduates should then be bonded to work with the D&I Board for a suitable period and could be utilized on the projects identified above.

3.2.2 Water supply and waste water disposal

Description of the utility

The Guyana Water Incorporated (GWI) was incorporated in 2002, and was created out of a merger between the Guyana Water Authority (GUYWA) and the Georgetown Sewerage and Water Commissioners (GS&WC). It is headquartered at Fort Street, Kingston, Georgetown. The primary mandate of GWI is to:

- Supply potable water to the citizens of Guyana;
- Provide sewerage disposal services to the residents of central Georgetown;
- Operate and maintain in good condition, the water and underground sewerage system in Guyana; and
- Oversee customer billing and the collection of tariffs for the services provided.

The customers served by this company (water supply) are categorized as being either metered or non-metered. The metered customers are typically institutional, industrial and commercial users who receive bills on the basis of measured consumption. By contrast, the non-metered customers are primarily characterized as domestic households, who are billed based on a fixed annual rate. The distribution and categorization of the company's customer base is presented in Table 23.

Table 23 Distribution and Categorization of GWI Water Supply Customers			
Division	**Metered Customers**	**Un-metered Customers**	**Total Customers**
1	2,425	9,158	11,583
2	7,417	17,648	25,065
3	17,086	69,089	86,175
4	4,955	11,753	16,708
5	7,037	27,031	34,068
Hinterland	0	1,066	1,066
Total	38,920	135,745	174,665

It should be noted that within each of the categories listed in Table 23 above, there is a further categorization of: live customers; those awaiting connection; those temporarily disconnected and those who have been permanently disconnected. Typically, in the metered category, the live customers make up approximately 98% of the total, while in the un-metered category, this group comprises approximately 90% of that group's total.

The GWI sewerage system serves approximately half of Georgetown, primarily the older section, through a central ring main that outfalls to the Demerara estuary with untreated sewage. The remaining inhabitants of the city are on septic fields. The system is characterized by 24 pumping stations, of which eight have been out of service for some time. For those customers living within central Georgetown, who are served by the sewerage system, charges are separate to those incurred for water supply.

Operating revenues received from the supply of all services (for year ended 2003) were:

1. Metered water supply G$ 827,145,425
2. Un-metered water supply G$1,193,444,361
3. Sewerage service G$ 87,944,200

Other sources of income for this entity include Government grant revenues and grant capital, new connection charges and miscellaneous charges. All together, these total G$1,064,073,051.

Recent upgrading works commissioned by the GWI include:

- Rehabilitation of the Anna Catherina/Uitvlugt Water Supply Project.
- The Farm to Barnwell Parika Water Supply Project.
- Rehabilitation of the Lookout and Hydronie, Parika Water Supply Project.
- Rehabilitation of the Parika Extension Water Supply Project.
- The Wisroc-Blueberry Hill Transmission Network.

Water supply from the GWI to its customer base is primarily from deep wells, with some surface water also being used. For Georgetown and environs, approximately 60-70% of the water supply is from wells, and 30-40% is taken from the East Demerara Conservancy Dam.

Impact of the flood event

The flooding experienced in January 2005 impacted GWI infrastructure along a large part of the coastal belt of Guyana, including Georgetown. In Georgetown, a number of water production sites were taken out of service prior to the wells being covered by flood waters. This was done in an attempt to safeguard control and electrical equipment, and to prevent the distribution of contaminated water. In addition, it should be noted that several standpipes in the city had become covered, therefore, residents were not able to access water service.

The wells that were affected in Georgetown included:

1. Sophia, Well No. 2, which was out of service for two days.
2. Turkeyen, Wells No. 1 and 2, which were out of service for six days.
3. Agricola Well, which was out of service for three days.

The sewerage system for the City of Georgetown was severely damaged for a period of 16 days after the event. All but one of the pumping stations (both working and non-working) were affected, with damage to seals, pumps and flooded chambers. With one exception, electrical panels were not damaged. Dewatering began on 24 January, followed by repairs.

On the East Coast of Demerara, approximately 41,000 customers, or an estimated 164,000 people, were directly affected by the flooding. In this area, 17 of the 19 water supply pumping stations were totally submerged. These sites remained out of commission for a period of one to three weeks (e.g. at Friendship). It should also be noted that there are a number of private wells in the flooded area (approximately 70), that are not regulated. In all there is some concern, therefore, for potential contamination of the aquifers, through wellhead contamination. Once wells were re-commissioned, they were pumped for a 24-hour period to prevent back-siphoning to the aquifer. In addition, all GWI wells were disinfected with chlorine before being returned to service.

For the East Coast of Demerara, there is no sewering provided, and disposal of domestic waste is exclusively through septic fields. The flooding of this area therefore resulted in extensive contamination of the flood surface waters.

Agency response

In response to the flooding that was experienced, the GWI mobilized staff working extended hours and using spare parts to effect the repairs. In addition, a major campaign was mounted to supply potable water to the affected communities through the distribution of jerry cans, bottles and a total of 114 static tanks (400 gallon capacity). Of these, 99 were distributed along the East Coast of Demerara (Photo 8) and the remaining 14 in the Sophia area of Georgetown. The tanks were refilled by trucks carrying tanks from which water was dispensed.

During the relief period, approximately 4 million gallons of water were supplied free of charge to residents of the affected areas. Within the Georgetown area, approximately 30 staff members have been utilized, while on the East Coast, approximately 90 people have been involved in the relief efforts.

Following the flooding event, the GWI has sought to bring forward a project funded by the IDB to provide improvements to the Georgetown water and sewerage infrastructure. In addition, a number of modifications will be made to wellhead infrastructure, so as to render these less vulnerable to flooding. These works include the raising of wellheads and critical electrical equipment, and the construction of bunds around the affected well sites.

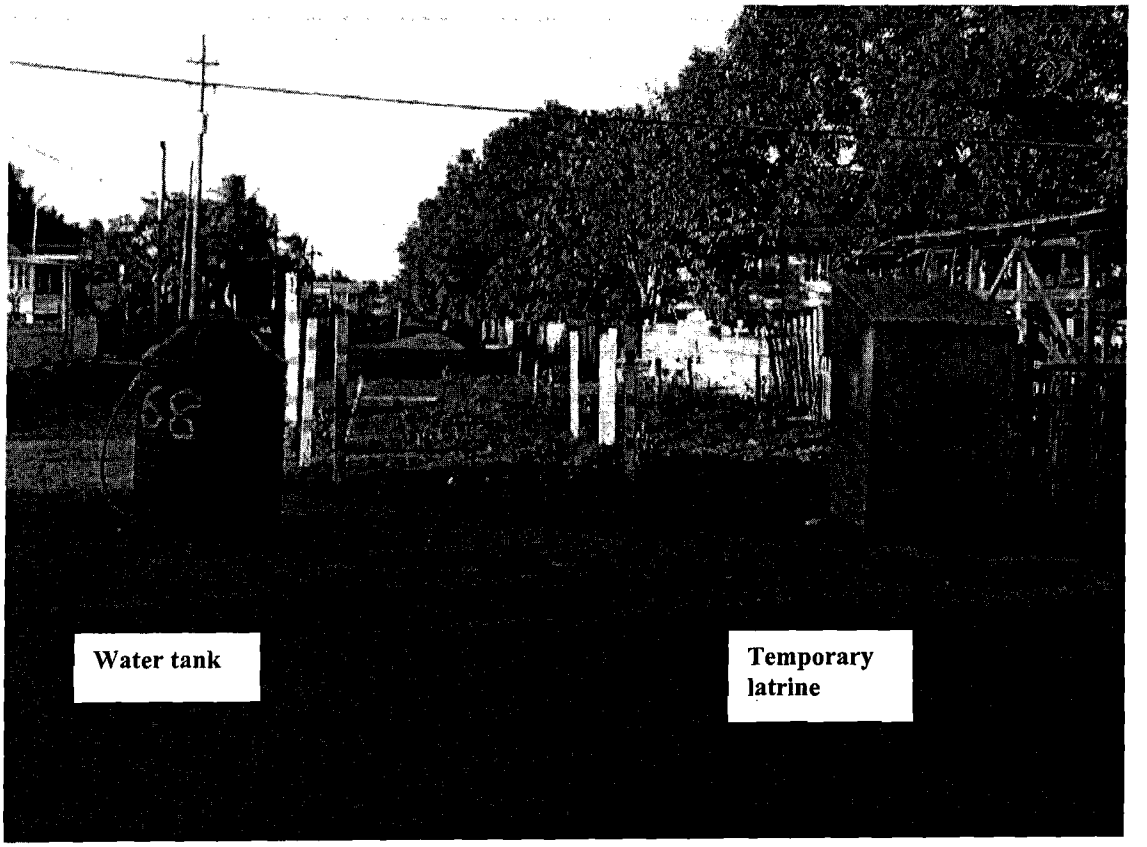


Photo 8 **Water tank and temporary lavatory**

Direct and indirect losses

The direct losses sustained by the utility include:

- The repair of assets at treatment plants (described above);
- The repair of assets at wellheads (described above);
- The repair of service connections. This item includes the provision of cast iron sleeves around pipes leading to service connections, to safeguard against leakage and damage.

The estimated values of these losses[12] are summarized in Tables 24 and 25.

Table 24
Summary of Direct Losses

Item	Comments	Total G$M	L/I Split[13]
Protection of treatment plants and boreholes (wellheads)	Works carried out at: Industry, Sparendaam, Vryheid's Lust, Success, LBI, Lusignan, Coldingen, Enterprise, Bachelor's Adventure, Enmore, Haslington, Victoria, Clonbrook, Unity, Helena # 2, Turkeyen # 1 and # 2, Sophia # 1 and # 2, Better Hope, Mon Repos, Friendship	50	80/20
Protection to service connections	Includes 5750 connections in Georgetown and 28000 on the East Coast of Demerara	675	60/40
Total		725	

In addition to these costs, the components of work that have been requested to be brought forward under the previously mentioned IDB-funded programme totals US$1,935,000. The importance of implementing these works in the near term has been highlighted by the recent floods. They are, therefore, intended to reduce the vulnerability of the affected population through the reduction of health risks and exposure to waterborne disease and include:

1. *Refurbishment of the Shelter Belt Water Treatment Plant (WTP)*: This WTP provides the majority of Georgetown's water supply (a mixture of surface water from the Conservancy and well water), and is presently in poor condition. It is therefore urgently in need of refurbishment.

2. *Installation of a trunk main at Turkeyen: This main is intended to significantly improve the level of service at Sophia, through the delivery of 200 litres/second*

[12] Data provided by GWI
[13] Split of local to imported components assumed.

from the Turkeyen Well. It is estimated that this work will directly benefit up to 20,000 inhabitants of the area.

3. *Installation of a sludge pre-treatment facility at Tucville*: Sewage from the Tucville area is presently routed through a long-inoperable treatment plant. The untreated, raw sewage then flows into an open canal adjacent to Laing Avenue. The flooding that was experienced highlighted this dangerous and unacceptable situation. It is therefore proposed that the collected sewage should now be re-routed and pumped directly (along with septage received at Tucville) to the existing Georgetown Sewage Pumping Ring Main.

4. *Purchase of water bowsers for emergency use*: In order to improve the emergency response capability of GWI, 10 mobile chlorination units will be required as well as the purchase of two water bowsers to facilitate the safe supply of temporary water to communities where the distribution service may be out of order.

Table 25
Loss of revenue

Item	Comments	Total G$M
Loss of revenue	GWI has given a one month rebate to approximately 30,000 customers on the East Coast of Demerara	21
Relief Operations	Staff used in operations in Georgetown and on East Coast	
	• In Georgetown, 20 staff for first 3 weeks	0.3
	• Then another 10 staff for next 4 weeks	0.6
	• On the East Coast, 90 staff for seven weeks	3.15
Water Production for Relief	Cost of producing 4 million gallons of water	
Contractors costs for trucking relief water	Each truck carried approximately 5 tanks per trip and it is estimated that 2000 trips would have been made (10,000 tank loads and 5 tanks per truck per trip) at a contractor cost of G$50,000[14]	100
Total		125.05

[14] Assumed contractor rate through discussion with local contractor

3.2.3 Road transport

Introduction

The majority of damages to the road network was seen to be confined to Regions 3 and 4. In particular, severe damage to road networks was observed on the village roads of the East Coast, the East Bank, the West Coast, the West Bank and the City of Georgetown. Damage to the public roads of the East Coast, East Bank, West Coast and West Bank was minimal, and only a few potholes were evident there. For these latter roads, however, there was significant damage to the verges, particularly on the East Coast Public Road. This is believed to have been as a result of livestock being kept on the edge of the roadway during the floods.

Findings of Services Group Assessment

An assessment of damages to roads and road related infrastructure resulting from the flood rains was carried out by a Works Services Group of the Ministry of Public Works and Communications. The specific objectives assigned to this services group included:

1. Identifying and ensuring that the various relief agency efforts were coordinated with the relevant Neighbourhood Democratic Councils in the inventorying of damages sustained within their communities.
2. Coordination of activities between the relevant agencies, and compilation of the information received.
3. Development of an appropriate financial "model" to determine rehabilitation costs.
4. Subsequently, estimate costs for the repair and/or replacement of damaged infrastructure.

It should be noted that a separate assessment was carried out by the Ministry of Housing that quantified damage to roads within newly developed housing areas.

In all, the Work Services Group investigated a total of 300 miles of road (484 km). These roads were categorized under the headings of: mud; white sand; white sand/sand-clay; burnt earth; crusher run; double bituminous surface treatment; asphaltic concrete; and concrete. It was found that the nature of remedial measures varied from simple pothole patching to road reconstruction. The breakdown was as follows:

- *Rehabilitation works*: Pothole patching; replacement of overlay surfacing (for asphaltic concrete and DBST roads); grading, shaping and re-compacting (for gravel roads): 20% of budget.
- *Reconstruction works*: To be done where structural failure of the road was evident. Typically done only for sections of a roadway: 61% of budget.
- *Cleaning of road drains and verge regrading*: 19% of budget.

To some extent, these findings give rise to concern, as a major part of the repair budget has been earmarked for the reconstruction of sections of roadway (61%). This speaks to problems associated with the road design and/or quality control of the construction works, as it would not normally be expected that complete reconstruction of roads would be required, even given the volume of flooding that was experienced.

Discussions with personnel from the Ministry of Public Works and Communications revealed that construction technique usually used on village roads consists of a sub-base of white sand, a base of white sand/sand-clay and a chip seal double surface bituminous treatment that is typically 0.5" thick. Once water gets into cracks in this surface dressing, the sub-base and base layers become rapidly eroded, leading to the need for complete reconstruction of the road, as was seen to be the case here.

The response of the Ministry will be to improve the design standard for these roads, by introducing a 0.75" thick single layer of crushed stone on the white sand sub-base. One such road, built on the Atlantic coast, was submerged for three weeks after the flooding. Inspection of this road, once the flood waters had receded, showed that damages were slight. This is encouraging, and the Ministry has adopted this modification to the standard road design procedure.

Direct damages and indirect losses

The direct damage costs incurred to this sector were computed by the Work Services Group, and are presented in the following Table 26.

Table 26
Direct losses sustained in water supply and disposal

Area	Total Length of Affected Roadways (miles)	Total Costs of All Road Types (G$M)
East Coast Demerara	132.0	937.2
West Coast Demerara	13.5	124.2
West Bank Demerara	19.2	128.4
East Bank Demerara	3.2	34.0
Georgetown	139	1,770.0
Central Housing and Planning Authority Housing Schemes	107.8	355.2
TOTAL	414.7	3,349.0

Of this total, and including the Central Housing and Planning Authority housing schemes, it is estimated that **approximately G$1,393.2M will be a foreign exchange content**. This estimate relies on the breakdown developed by the Works Service Group.

Indirect losses were captured through taking into account the following items: cleaning of vehicles; cleaning and repairs to upholstery; lubricant and oil changes; repairs to fuel injection systems. Vehicles considered in this assessment were cars and minibuses. The assumption made is that approximately 6,000 vehicles were affected, at an average cost of G$30,000 each. This gives a total indirect loss estimate of G$180M.

3.2.4 Electricity

Guyana Power & Light engaged in preventive and mitigation measures during the flood to reduce the impact of the flooding. Measures included sandbagging, the strengthening of some buildings and securing of transformers. Nevertheless a tense situation arose on Friday 21 January when the control station in Sophia was threatened which could have resulted in a system shut down thereby affecting critical infrastructure such as communications, hospitals, and pumps.

As a consequence of the adopted mitigation measures, direct damages were low at G$53.4 million. Indirect losses, mostly in the form of a loss of revenue, were higher mainly because the flooding caused a fall in the utility's collection rate.

Total damages and losses are summarized in Table 27 below and amount to G$206.7 million or US$1 million.

Table 27
Impact of the flooding on the electricity sector
(G$ million)

Total Impact	206.7
Direct damages	53.4
Distribution network	53.4
Losses	153.3
Emergency work, overtime	9.2
Mitigation measures	8.1
Admin. Expenses	0.7
Miscellaneous	1.8
Loss of Revenue	133.5

Source: Guyana Power & Light

The utility stressed the need for a (flood) hazard assessment map and a disaster management plan with the major evacuation routes so that GPL can plan to locate its major infrastructure along those routes.

3.2.5 Telecommunications

Description of the utility

Prior to 1991, the telecommunications sector in Guyana was handled by the Guyana Telecommunication Corporation (GTC). The infrastructure and technology used by that company became obsolete and antiquated, and as a result, Guyana suffered from a very poor quality of service. The Government of Guyana sought to address this problem by inviting investors (both local and foreign) who had access to capital, skills and technology that would be needed to completely revitalize this critical sector.

Coming out of that invitation, Atlantic Tele-Network (ATN) became a partner with the Government, in the new privatized utility. In 1990, ATN purchased an 80% share in the new company, and the Government retained a 20% share. Following this, the Guyana Telephone and Telegraph Company Limited (GT&T) began operations in January 1991.

Over the past 14 years, GT&T has invested in excess of US$195 million in modernizing and expanding the infrastructure of the nations' telecommunications services. This upgrading has included:

- Digital switching and network gear, and fibre-optic transmission cables.
- An increased number of exchanges.
- Increased services for consumers.
- Introduction of Digital Subscriber Line (DSL) technology to better facilitate the needs of the business community.
- Ensured the connection, through undersea cables, with North and South America and the Caribbean.
- Introduced and expanded the mobile telephony market (see Table 28 below for a summary of the improvements in service of GT&T since its commencement in 1991).

Table 28
Summary of the improvements in service since the commencement of GT&T in 1991[15]

Performance Indicator	1991 (Commencement of Service by GT&T)	2004 (September)
Fixed operating lines	13,000	98,390
Mobile operating lines	0	143,945
Total lines (fixed + mobile)	13,000	242,335
International circuits	99	1,338
IDDD	400	89,900
Persons with access to phones	52,000	600,000
Public call boxes	0	600
Call completion rate (%)	20%	65%

[15] GT&T Corporate Brochure, 2004.

The company has also made a commitment to the provision of communications services in the interior remote regions, through the use of a domestic satellite located at B.V., East Coast Demerara.

In addition to GT&T, the holding company, ATN, operates another company in Guyana under the name of ATC. Business activities for the two companies are, however, quite different. ATC provides call centre, tele-network and help desk services, and operates from a single leased building on the outskirts of Georgetown.

Impact of the flood

During the height of the flooding, the GT&T compound at Telephone House became flooded, and the company came dangerously close to losing electrical and telecommunications equipment. Standby generators at this location were within 2" of being covered with water.

At the Beterverwagting (B.V.) Central Station, water levels reached up to 4ft in height at the rear of the building during the worst of the rain. Equipment affected at the B.V. Central Station included switching and datacom equipment, telephone interfaces, batteries and rectifiers, air-conditioning units and various office equipment.

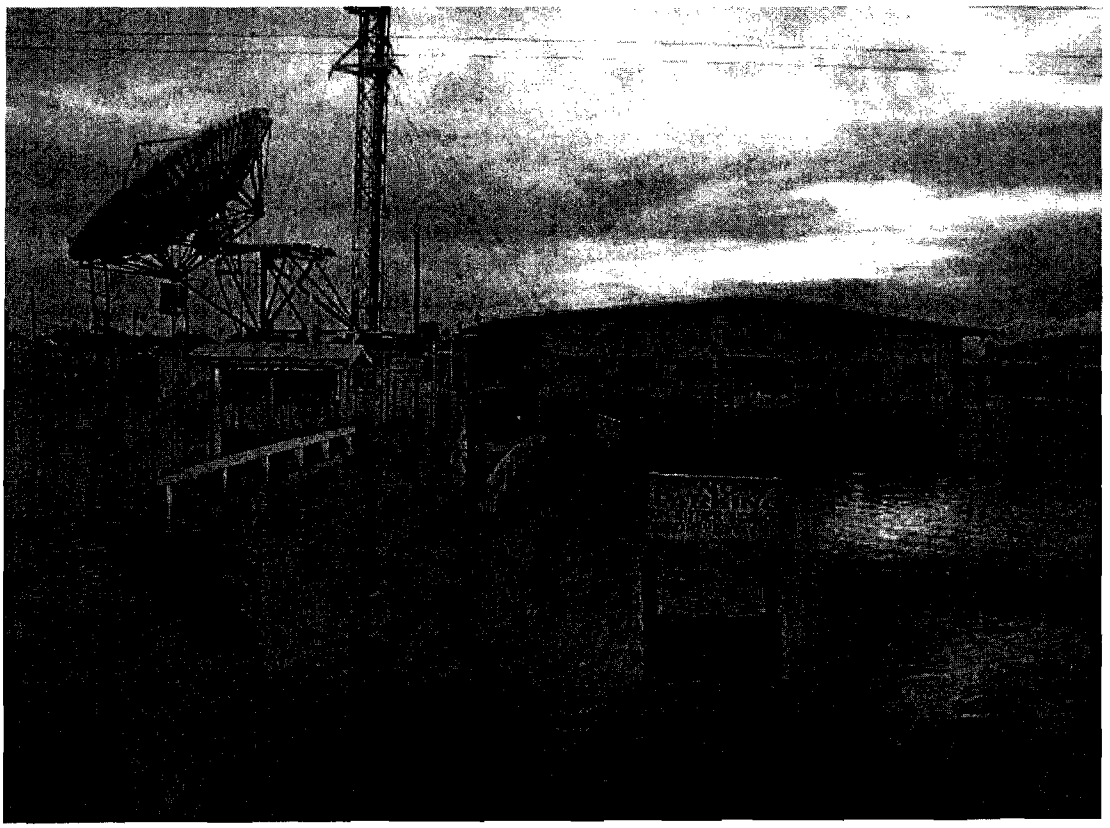
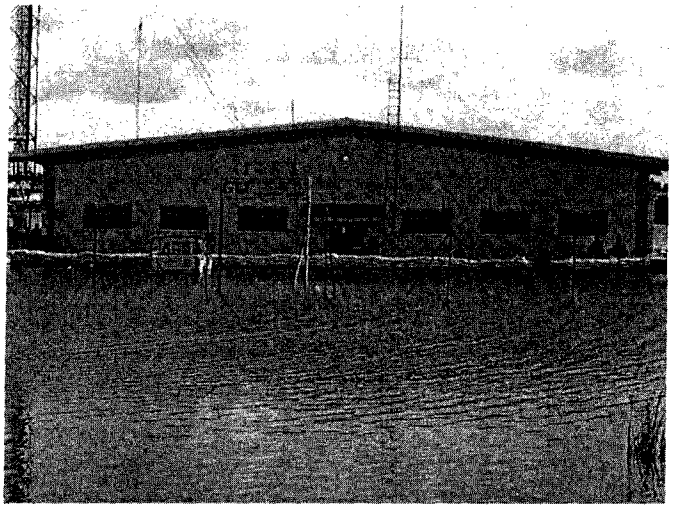


Photo 9 Damage to telecommunications building

Some minor damage was sustained to a number of other small stations: Mahaica, Enterprise, Tropo/Earth, Nonpariel and Beterverwagting West (See photos 9 (above) and 10 (below)).



For Atlantic Tele-Center (ATC), serious damage was sustained to the first floor of the premises and to the equipment contained therein. Water marks of up to 4.5 ft were noted on both interior and exterior walls. Some structural damage to the main building was sustained, including splintering and warping of doors. Damage was occasioned to: air conditioning units, telecommunications and electronic equipment, office furniture and equipment, tools and equipment and a variety of computer hardware.

Photo 10 Damage to telecommunications building

The direct damages and indirect losses for this utility are shown in Table 29.

Table 29
Direct Damages and Indirect Losses Telecommunications

Item	Direct Damages (G$M)	Indirect Losses ((G$M)	Total (G$M)
GT&T			
Replacement of a/c units	3.84		
Replacement of exchange equipment plus building repairs	3.47		
Emergency mitigation measures		21.13	
Cleaning costs		4.13	
Atlantic Tele-Center			
Damage to telecommunications and electronic equipment, office furniture, tools and computer equipment	84.00		
Clean up and repairs to flooded building		36.00	
Total	91.31	61.43	152.74

Source: GTT

Agency response

Response by the management of GT&T was very timely and appropriate. Mitigative works were commenced once it became clear that all equipment in the compound was at serious risk. The compound was sandbagged and dewatering of the cordoned area commenced. In all, eight new pumps were purchased and put into service. A similar strategy was used at the B.V. Central Station, and as a result, loss of service was effectively minimized.

In an attempt to reduce vulnerability to future similar events, GT&T has embarked on a programme whereby:

- A containment wall will be built around Telephone House and some of the other critical exchanges, thereby allowing for faster and easier flood-proofing of these installations.
- Sump pumps will be used for dewatering, where possible, in this pre-emptive programme.
- Sandbagging will also be used to close off entrance gate areas of the larger installations, and to ring the smaller, outlying installations. Effectively, GT&T are developing a more formalized emergency response strategy, by drawing on their recent experience.
- Transformers will be raised above ground level, to give an extra degree of protection against flooding in the future.

It should be noted that the commissioning of these remedial works has already commenced.

3.3 Social sectors

3.3.1 Housing

Damage to the housing sector has been significant. It amounts to GY$55,120 million. It represents estimates of damages to approximately 70,000 dwellings, or 44% of the national housing stock, with their furnishings and equipment and the indirect losses incurred through the cleaning of these homes, and losses from rental properties. Damage to the housing sector accounts for 99% of the damage to the social sector, caused by the floods.

Meeting the housing needs of the population continues to be a challenge for the Government. The damage caused by the floods may set back the development possibilities of the country as a significant proportion of a country's wealth exists in its built environment. When that environment is damaged it impacts negatively on the country's development trajectory.

Table 30
Population and Households by administrative region

Region	Total Population	Households
Region 1	23,204	4,223
Region 2	48,411	11,253
Region 3	101,920	26,057
Region 4	309,059	80,445
Region 5	52,321	12,835
Region 6	122,849	31,681
Region 7	15,935	3,748
Region 8	9,211	1,781
Region 9	19,365	3,553
Region 10	39,766	10,224
Totals	742,041	185,800

Source: ECLAC based on official data of the Bureau of Statistics

The number of households in Guyana amount to 185,800 as indicated in Tables 30 and 31. Administrative Regions 3, 4 and 5, which were the most severely affected by the floods, account for 119,337 or 64% of the nations households. Within those affected regions were numerous squatter communities living in precarious situations.

The Ministry of Housing and Water undertook an assessment of affected households. Based on their survey it was possible to infer that 72%, or 53,312 of the households in Region 4; 10,683 or 41% of households in Region 3; and 2,567 or 20 % of households in Region 5 were severely damaged. The Survey of Living Conditions conducted in 1999 had indicated that 35% of the population was living below the poverty line. Based on the average household income, by region, made available by the Bureau of Statistics, it was possible to arrive at an income scale which could be applied across each of the affected regions.

Table 31
Population and affected Households distributed within regions

Region	Population	HHs	Number Affected	% of HHs Affected within each region
Region 3	101,920	26,057	10,683	41%
Region 4	309,059	80,445	56312	72%
Region 5	52,321	12,835	2567	20%
Totals	463,300	119,337	69,562	

Source: ECLAC estimated on the basis of Ministry of Housing and Bureau of Statistics Data

The scale assumed that 10% of all households could be distributed among the high income category, 55% among the middle income range and 35% among the low income. This scale was applied across each of the three regions which allowed the assessor to apply estimates for damages to dwellings and furnishings according to the scale in each region. The assessed damage to housing by Region appears in Table 32.

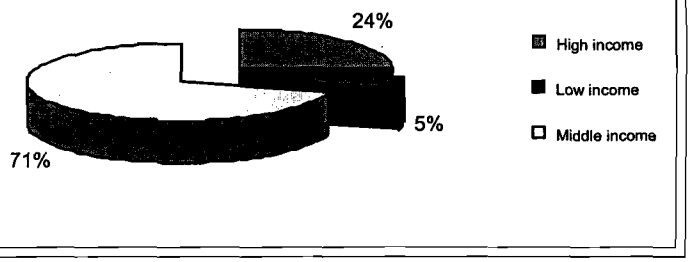
Table 32
Value of Direct Damage to Regions by Type of Damage

Type of Damage	Region3	Region 4	Region 5	Totals
Housing	5,208,142,875.00	27,451,856,250.00	1,251,412,500.00	33,911,411,625.00
Furnishing/equip	3,138,239,937.50	16,541,503,125.00	754,056,250.00	20,433,799,312.50
Totals	8,346,382,812.50	43,993,359,375.00	2,005,468,750.00	54,345,210,937.50

Source: ECLAC estimates based on official GOG data

It is clear that Region 4 mainly contributed to the value of direct damage. However, when the data is examined by income groups, as illustrated by Figure 13, the middle income group is the most significant contributor to the direct damage of the sector with 71%, followed by the high income group with 24% , and the lowest income group with 5%.

Figure 13
Distribution of value of damage by income group



As can be seen in Table 33, the total damages to the housing sector is GY$55,120 million. Direct damages comprise 99% of this sum. Of the direct damages, damage to housing accounts for 62% of the value and damage to furnishings and equipment, the balance of 38%. Indirect losses account for a mere 1% of the housing sector, comprising losses due to rents and losses incurred for the cleaning of homes.

Table 33.
The Summary of Damage to the Housing sector
(Millions of Guyana $)

Total Damages	**55,120,988,887.50**
Direct effects	54,842,567,187.50
i. Damage to housing	33,911,411,625.00
ii. Damage to furniture/equip	20,931,155,562.50
Imported Component	5,484,256,718.75
Total Indirect Losses	278,421,700.00
i. Cleaning of Homes	278,240,000.00
ii. Losses due to rental properties	181,700.00

Source: ECLAC estimates based on official GOG data

3.3.2 Education

Damage to the education sector accounted for GY$371.6 million, and reflected damage to almost half of the schools in the country. The disaster affected 59% of the student population and 55% of the teacher population, excluding the University of Guyana. Table 34 indicates that in the three main regions which were most affected by the flooding, some 124,413, students were affected by the disaster, some students were more severely affected than others. As of Friday 4 March, 40 schools were still unopened. The Government was working feverishly to ensure that all students were back in school by 7 March.

Table 34
Affected student and teacher population by administrative region

Region	Students	Teachers
Region 3	26233	975
Region 4	36964	1565
Region 5	16081	622
Region GT	45135	2271
Totals	124413	5433
Total All Guyana	211721	9957
Student /teacher affected pop as proportion of total pop	59%	55%

Source: ECLAC on the basis of data from the Ministry of Education

The damage suffered by the education system, due both to the closure of schools for a little over 30 days, either caused directly by the flooding and/or secondarily from schools used as shelters, is a significant setback to a country like Guyana, seeking to strengthen its human resource capacity. The Poverty Reduction Strategy Report for 2004 had indicated that the Government intended to construct over 25 new schools and rehabilitate an additional 50, during this period. This disaster may act as an impediment to the Government's ability to meet its goals as the cost of rehabilitating the existing stock of schools is significant.

It is unfortunate that the flooding interrupted what was the first week of school for the new term for most students. This setback is inopportune, as recent Ministry of Education statistics [16] indicated that Guyana had been recording relatively high percentages of average attendance rates at the primary school level (ages 6-12) and that enrolment rates were relatively high with a national completion rate for Grade 6 at 85%.

It is also a setback because education statistics estimated that 33% of children were graduating from primary school without acquiring basic literacy skills. This loss of time, even if it does not have a high economic cost, could have a significant social cost to the country, unless arrangements are put in place to support students who have missed school work this term, which is usually the final preparation for critical examinations such as the Common Entrance and Caribbean Examinations Council (CXC) Ordinary Level exams.

[16] Digest of Educational Statistics of Guyana 2000-2001. The Planning Unit of the Ministry of Education. March 2004.

Table 35
Summary of damages to the Education Sector
(Millions of Guyana $)

Total damages	395,661,248.00
Total	
Direct damage	352,091,913.00
i. Damage to schools	303,654,543.00
ii. Damage to school furniture and equipment	39,006,370.00
iii. Damage to libraries	9,431,000.00
Imported Component	35209191.3
Total Indirect losses	43,569,335.00
i. Cleaning of Schools	19,465,035.00
ii. Losses from use as shelters	24,000,000.00
iii. Losses from service	104,300.00

Source: ECLAC on the basis of data received from the Ministry of Education

As can be seen in Table 35, the direct and indirect costs of damage to the education sector stands at GY$395.6 million. The value of the direct damage comprises 95% of the total value and the value of the indirect losses makes up the remaining 5%. A significant portion of the cost of damage to the education sector is the damage to tertiary level institutions which amounts to GY$280.9 million or 76% of the total cost of damages, as can be seen in Table 36.

Table 36
Damage to Tertiary level institutions and educational facilities
(Million of Guyana $)

Name of institution	Type of facility	Description of Damage to Facilities	Description of Indirect Losses	Value of Direct Damage	Value of Losses
Cyril Potter College of Education	Teacher Training College	Floors , doors windows, sanitary facilities, filing cabinets, books and teaching aids	Alternative accommodation for students, meals and transportation	470,500	
National Library	Library	Chairs, tables, books, sanitary facilities, steps	Purchase of cleaning materials, and staff time for additional clean up time	9431000	45000
Guyana School of [17]Agriculture	Tertiary level	Floors/walls of student dormitories, dinning areas, kitchen, and library books, book racks; chairs, mattresses, doors, student lockers	Cleaning materials and loss of income for cash crops	...	...
University of Guyana	Tertiary level	Damage to interior and exterior walls , floors, doors and windows, electrical works, sanitary facilities, books, computer equipment, furniture, sporting equipment	Cleaning and sanitizing roads and walk ways, fences and bridges; Purchase of cleaning materials, fuel and lubricants, transportation, additional labour; disinfecting and fogging, removal of debris	252,108,187.00	5,328,196.00
Total: 280,953,896.00				262,009,687.00	5,373,196.00

[17] Guyana School of Agriculture is treated in the Agricultural assessment of the document and appears in Table 15

3.3.3 Health

The main damage to the health infrastructure, was found in Regions 3 and 4 and could be attributed to the infrastructure of the health centres which accounted for 52% of the damage, followed by damage to furnishings and equipment, which accounted for 38% of the total direct damage. Table 37 details the centres damaged and the values for floors, furniture and equipment.

Table 37
Value of Affected health facilities in region 3 and 4
(Millions of Guyana $)

Region	Name of health Facility	Size (Sq.Ft.)	Value of Damage to floor	Furniture & Equipment
Region 3				
	Meten Meer Zorg	1500	3,750	1,000.00
	La Grange	1500	3,750.00	1,000
	Canal #1	1500	3,750	1,000
Region 4				
	Sophia			
	Campbellville	4500	11,250	2,800
	Kitty			
	Lodge			
	Queenstown			
	Bell Air			
	Albouystown	1800	4,500	1,100
	Festival City	500	1,250	500
	N/E La Penitance	4500	11,250	2,800
	David Rose	5000	12,500	3,200
	Industry	1500	3,750	1,000
	Plaisance	4000	1,000	2,500
	Beterverwagting	6000	15,000	3,750
	Lusignan	5000	12,500	3,100
	Buxton	3000	7,500	1,900
	Enterprise	5,000	12,500	3,100
	Enmore	8,000	20,000	5,000
	Nabaclis/Golden			
	Grove	4,000	10,000	2,500
	Victoria	800	2,000	500
	Anns			
	Grove/Clonbrook	400	1,000	250
Total			137,250	37,000.00

Source: ECLAC on the basis of data provided by the Ministry of Health

The damage to health centres listed in Table 37 represents damage to 51% of the health centres in Region 4 and 7% of health centres in Region 3. Damage to the health centres was not

the only damage as both public and private hospitals suffered damage. Data in Table 38 details the damage incurred by those institutions.

In response to the disaster and continuing well into the recovery period, the Ministry of Health was engaged in a medical campaign with as many as 30 teams which were sent into the field to address the medical needs of the population. By early February the teams had visited over 42 communities in the affected areas and had made 114,264 contacts. The Ministry of Health volunteers were supplemented by a team of 26 Cuban GPs and four nurses resulting in 751 team visits utilizing over 6,532 volunteers. While colds, diarrhea and skin rashes were the prime conditions in the early days of the flood, these were later overtaken by an outbreak of *leptospirosis* which may have been responsible for about 21 deaths. This resulted in the largest public health intervention in recent times, where 160,000 persons were reached with *doxycycline* and other related antibiotics. The value of the increased spending on drugs and medication in order to support the Ministry of Health's medical campaign, accounted for 61% of the value of the indirect losses to the health sector, as can be seen in Table 39. This is the best proxy for the overall indirect losses to this sector as losses due to increased cost of the provision of health services were not yet available at the time of the report.

Table 38
Damage to Hospitals, Public and Private
(Millions of Guyana $)

Institution	Infrastructure	Furnishings
Davis Memorial	470,000	
Prashad's Hospital		400,000
Medical Arts		1,660,000
St. Joseph's Mercy	65,000	1,584,000
Georgetown Public Hosp'	3,500,000	
Training Institutions		
Guysuco	906,360.00	9,094,641
Totals	4,941,360.00	12,738,641.00

Source: ECLAC based on official Government of Guyana data

Total damage to the health sector amounted to GY$173.4 million, of which direct damage accounted for GY$52.5 million or 30% of the total cost. The indirect losses amounted to GY$120.8 million which amounted to 70% of the total value of damages, of which losses due to increased spending on drugs and medication comprised a substantial part. Damage to the hospitals comprises 9% of the direct damage to the sector. The details of the damages can be found in Table 39.

Table 39 Summary Damage to the Health Sector	
Total damages	173,417,862.00
Direct effects	52,530,001.00
i. Damage to Health Centres	27,450,000.00
ii. Damage to furniture and equipment	20,138,641.00
iii. Damage to Hospitals	4,941,360.00
Imported Component	21,012,000.40
Total Indirect effects	
i. Cleaning supplies for Health Facilities	120,887,861.00
ii. Establishment of temporary sites	23,000,000.00
iii. Losses due to increased spending on drugs and medication	2,100,000.00 73,146,870.00
iv. Losses due to provision of increased public health services e.g. Fogging, education, etc	19,971,579.00
v. Losses incurred due to increased transportation	2,669,412.00

Source: ECLAC on the basis of official Government of Guyana data

3.4 Cross-cutting issues

3.4.1 Governance

Disaster preparedness and mitigation

Unlike other Caribbean countries that are regularly exposed to disasters, mostly hurricanes, Guyana has experienced extensive natural disasters with much less frequency even though flooding is quite a regular occurrence throughout much of the coastal areas. Perhaps as a consequence of this more limited exposure, Guyana, unlike other Caribbean countries, did not have a national emergency management organization.

When the flooding began and it was realized that this flooding was much more extensive than experienced in most people's lifetime and Government declared an emergency in Regions 3, 4 and 5, there was no automatic national response mechanism, nor was there an earlier prepared disaster management plan.

Despite the existence of the CDC, and the separate JOC, of the GDF, the Guyana Government found itself without an integrated and proficient disaster management organization. Initially the JOC, under the command of Colonel J. Lewis, GDF, consolidated and managed activities for the GDF, police, coast guard, fire and related agencies, while working as the initial disaster management organization for the flood emergency. The Government then reconstituted

the CDC which was placed under the leadership of Colonel J. Ramsaroop. As the CDC was activated, the JOC began the transfer of emergency management responsibilities to the CDC. In seeking to manage the impact of the disaster and to bring the requisite relief to the population, the Office of the President brought together the CDC and the JOC in the CDC/JOC under the direct control of the President as Commander-in-Chief. The JOC/CDC held daily coordination and briefing meetings, covering issues of weather, infrastructure, shelter status, food supplies, potable water distribution, as well as health and security issues. All donor agencies and a representative of the Guyana Citizen's Initiative were invited to attend.

In many Caribbean countries the disaster management agencies are tasked with coordinating preparedness, mitigation and response to small or larger emergencies, including natural disasters and the preparation of disaster management plans. This would include cooperation with all relevant government, private sector and civil society institutions.

Warning systems

Many sources indicated that warning systems advising the country of the flooding and the level of the threat were less than adequate which may have contributed to a lack of preparation and increased damages. Clearly, this is linked with a weak or non-functional disaster preparedness and mitigation office as was described above.

Other

Many of the other issues raised during the assessment are consistent with observations made during the preparation of the Guyana Poverty Reduction Strategy Paper and the 2004 Progress Report on the Guyana Poverty Reduction Strategy and need careful consideration particularly for establishing the recovery strategy.

3.4.2 Financial institutions and insurance

Debt issues

Most banks and hire purchase companies have been dealing with customers on a case-by-case basis. While banks have been granting relief such as increasing the moratoria on loans, relieving interest payments, and/or waiving penalty fees on late payments, the Financial Institutions Act does not allow for more than 90 days exemption. Longer period loans would have to be classified as non-performing. For many banks, around 15% of their loan portfolio may be affected.

This causes a problem, particularly for micro enterprises since in many cases payments were stopped after the flooding began and on the East Coast a time span of 30 days or more passed before floodwaters receded. This implies that the effective period of debt relief is two months or less. The Bank of Guyana is aware of the problem and, if necessary, banks can make a proposal for consideration of qualifying accounts to be exempt of the 90-days provision.

Small producers in agriculture or vendors and small commercial enterprises may be particularly affected by the disaster, because, often, those people have few, if any, financial reserves and will have to repay existing loans – without a corresponding income – and need to enter in new loans, mostly for working capital, to restart their business. It therefore comes as no surprise that particularly for the micro and small loans there is a high risk of default. Already, at least one micro finance organization has reported an increase in the default rate from 2-3% to 25 to 30%. Such estimates were corroborated in discussions with women who indicated that they did not have the monies to pay back loans. Other micro financing institutions have rescheduled existing loans without interest while at the same time entering into a new loan agreement to replace lost assets or working capital.

Insurance

Preliminary estimates indicate that flood insurance claims are around G$750 million (US$3.75 million) from about 600 claims. Claims are still coming in but it is not expected that total claims will reach over Gy$1 billion (US$5 million). Of the claims, 80% arise from households and the remainder from industry and commerce. Of the household claims 60% are for building repairs and 40% for content.

The low level of claims is related to the low level of flood insurance which ranges from 15% to 20% of the number of policy holders. While the insurance rate in Guyana is relatively high at 60% the insurance rate combined with the low level of flood insurance among the insured result in an estimated 9% to 12 % of the population that have any form of flood insurance. The low level of flood insurance is compounded by under-insurance although insurers expect to pay out small claims (as most claims are) in full.

Reinsurance rates are expected to range between 60% to 70% of the claims.

Another issue, which has not been quantified as yet, is claims related to flood-related illnesses such as respiratory diseases, skin rashes, dengue, typhoid and filaria. Insurance companies have seen an increase in the number of claims since the last week of February 2005 and anticipate a continuation of such claims for the next six months.

3.4.3 Environment

Contamination of flood waters occurred in the flooded areas. Factors that contributed to the pollution included the overflow of sewers in the Georgetown area and overflowing septic tanks and pit latrines particularly in the highly populated villages in the East Coast Demerara as well as garbage accumulation and the improper disposal of garbage.

In effect, the flood highlighted weaknesses in the management of liquid and solid waste not only in East Coast Demerara but also in Georgetown and West Bank Demerara.

Contamination

The contamination of the coastal areas was widespread and emergency action was undertaken by Government and civil society to stem the impacts on the population, which is described in more detail in the sections on affected population, health and water in this report. The impact of the contamination can be illustrated by two examples. For households, the contamination resulted in increased illness and death and in increased expenditures for health, clean up, extra food, transportation and the purchase of bottled water, as shown in Table 40.

Table 40
Average Costs deduced from EPA household survey
Average Cost (G$) Per Household

	Georgetown	East Coast Demerara	West Demerara	Mahaica
Illness	3,934	5,914	3,906	3,325
Clean Up	2,762	4,819	2,645	3,200
Extra Food	7,410	19,364	5,870	13,150
Transportation	4,246	6,457	1,544	15,025
Bottled Water	1,549	2,739	757	5,220
	19,901	39,293	14,721	39,920

Source: Environmental Protection Agency

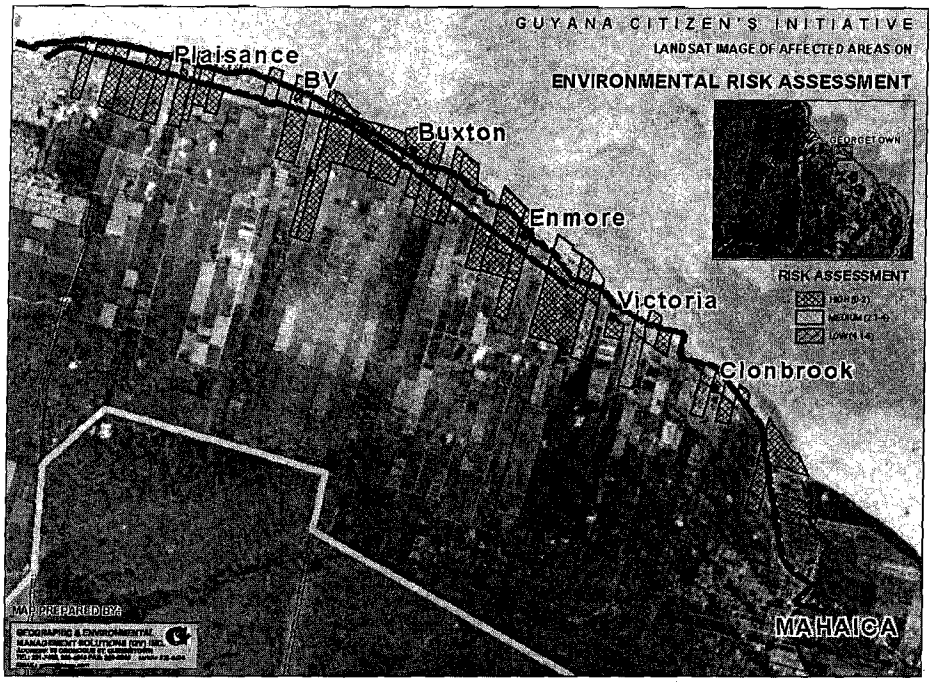
Another example of the threat of the contamination is shown in Figure 14, which shows different levels of threat for the coastal villages based on criteria such as presence of flooding, availability of water, availability of health services, condition of livestock and the management of human waste.

Solid Waste

Solid waste collection and disposal for Georgetown is handled by the Municipal Solid Waste Management Department (MSWMD). This agency does not have its own fleet of collectors, but rather contracts the collection services out to two contractors, each assigned to a particular 'Ward". Through this arrangement, the agency services hospitals, medical centres, and a number of other institutions.

The areas east of Vlissengen Road have collection service one day per week, the commercial areas are serviced six days per week and the hospitals are serviced every day. In addition, night cleansing activities have been instituted by the MSWMD in the downtown Georgetown areas. Disposal of collected waste is at the Mandela Avenue dumpsite, which is presently being transformed into a sanitary landfill under an IDB-funded loan. Typical waste collection averages 200-220 tonnes per day for the Georgetown area.

Figure 14
Environmental Risk Assessment



Source: Guyana Citizen's Initiative

The floods highlighted weaknesses in the collection and disposal system, as the volumes of material increased significantly. After the main flooding event, private residences were filled with garbage, as were canals, drains and open spaces. This was so marked, that the normal contingent of collection contractors could not cope with the collection and removal of the waste deposited by the floods, and additional contractors had to be hired. Tonnages for Georgetown increased to 250 tonnes per day, and most surprisingly, those for the East Coast of Demerara also increased to 250 tonnes per day. Combined, this effectively doubled the normal pre-flood volumes of solid waste that were being handled. To deal with this increase, the Director of the MSWMD increased staff, and instructed the collection contractors to increase capacity. Waste typically included furniture, tins, plastic bottles, styrofoam boxes, and miscellaneous material of all kind. In addition, over 250 animal carcasses have been brought to the Mandela Avenue dumpsite, where a special pit, lined with lime, had to be constructed for their disposal.

In order to strengthen its capacity, the MSWMD has mounted a programme whereby its officers will visit residences and encourage owners to dispose of litter and garbage, rather than leave it lying around where it could be moved by the next flooding event. In addition, there is presently an IDB project that calls for the setting up of holding areas for garbage collected from the National Democratic Councils (NDCs). It is then the intention that the waste would be picked up from these holding stations and taken to a new facility at Haags Bosch. A note of caution must be sounded here, as the existing channel conveying potable water from the East Demerara Conservancy to the Shelter Belt WTP facility runs adjacent to Haags Bosch. The

threat of leachate contamination of this water must therefore be carefully examined before this project is implemented.

Essentially all losses incurred for this agency as a result of the flooding can be considered to be indirect. These include contractor costs in excess of those that would normally have to be paid, cleaning/cleansing operations that had to be specially mounted and additional collection and disposal requirements. These indirect losses total G$40 million.

Biodiversity

A preliminary assessment by the Environmental Protection Agency (EPA) observed a "browning effect" of vegetation and dislocations of the fauna. These, however, are likely to be temporary phenomena and longer- to medium-term effects are not anticipated. However the EPA intends to carry out a more detailed analysis of the environmental impacts.

Increase influx of fresh water

The Ministry of Agriculture reported that the influx of fresh water has been pushing marine fish further out to sea. While the effects are temporary and are not expected to cause damage to the near shore marine biodiversity, the effect impacts negatively on fishermen as they experience increases in operating costs and, possibly, reduction in catches. This impact has not been assessed because of lack of data.

4. Summary of the impact of the disaster on the affected economy

The magnitude of the damage caused by the floods that affected Guyana in the months of January and February is estimated to be equivalent to G$93 billion or 59.49% of current GDP for the year 2004. The brunt of the damage is direct damage accounting for 87% of the total (51% of GDP). For its part indirect damage represents 15% of the total (8% of GDP). (See Tables 41 and 42 below). Direct damage refers to damage to physical assets and indirect losses to changes in economic flows that will occur during the remainder of 2005.

In relation to some of the main macroeoconomic variables, the total impact represents:

- 64% of the exports of goods and services
- 184% of gross domestic investment
- 75% of total consumption
- 42% of the public external debt stock.

Table 41				
Summary of damage and losses				
Sector and subsector	**Damage and losses**			
	Total	**Total**	**Direct**	**Indirect**
	Millions of US dollars	**Millions of Guyana dollars**		
Total	465.1	93,022.9	83,659.5	9,363.4
Social sectors	278.3	55,665.9	55,247.2	418.7
Housing	275.6	55,120.8	54,842.6	278.2
Education and culture	1.9	371.7	352.1	19.6
Health	0.9	173.4	52.5	120.9
Productive sectors	137.3	27,458.6	20,945.0	6,513.7
Agriculture	54.5	10,894.3	10,018.8	875.5
Commerce	72.4	14,476.1	10,213.1	4,263.0
Tourism	5.6	1,126.8	47.0	1,079.8
Manufacturing	4.8	961.5	666.1	295.4
Infrastructure	45.7	9,143.3	7,452.2	1,691.1
Drainage and irrigation	6.6	1,311.1	194.8	1,116.4
Water supply and water disposal	19.7	3,943.7	3,763.7	180.0
Road transport	17.6	3,529.0	3,349.0	180.0
Telecommunications	0.8	152.7	91.3	61.4
Electricity	1.0	206.7	53.4	153.3
Environment	0.1	15.1	15.1	
Emergency expenditures	3.7	740.0		740

At a sectoral level, the effects of the disaster were most visible in housing and agriculture. The housing sector accounts for 60% of the total damage estimate. Its losses are estimated at G$55.1 billion (or 35% of GDP). By far the greater proportion of the damage (G$54.8 billion) is classified as direct, far surpassing the indirect losses (G$0.3 billion).

The commercial sector suffered a loss of G$14.5 billion. Direct and indirect damages represent 70% and 30% of the total, respectively. In the case of agriculture the total losses amount to G$10.9 billion. The direct and indirect damages are estimated to be G$10.0 and $0.9 billion (92% and 8% of the total).

Table 42 Summary of damage and losses As a percentage of GDP			
Sector and subsector	**Damage and losses**		
	Total	**Direct**	**Indirect**
Total	59.49	53.51	5.99
Social sectors	35.60	35.33	0.27
Housing	35.25	35.08	0.18
Education and culture	0.24	0.23	0.01
Health	0.11	0.03	0.08
Productive sectors	17.56	13.40	4.17
Agriculture	6.97	6.41	0.56
Commerce	9.26	6.53	2.73
Tourism	0.72	0.03	0.69
Manufacturing	0.61	0.43	0.19
Infrastructure	5.85	4.77	1.08
Drainage and irrigation	0.84	0.12	0.71
Water supply and water disposal	2.52	2.41	0.12
Road transport	2.26	2.14	0.12
Telecommunications	0.10	0.06	0.04
Electricity	0.13	0.03	0.10
Environment	0.01	0.01	0.00
Emergency expenditures	0.47	0.00	0.47

The damage in the other sectors is minor by comparison. Within the social sector, education and health have a combined loss, which is less than 0.5% of GDP (G$372 and $173 million, respectively). Tourism and manufacturing sustained damage equivalent to 1.3% of GDP (G$1127 and $962 million, respectively).

Finally, the combined losses in infrastructure are estimated at G$9.1 billion (6% of GDP). These are roughly equally divided between direct and indirect damage (47% and 53% of the total, respectively). The damage is concentrated in the subsectors water supply and water disposal and road transport (2.5% and 2.3% of GDP, respectively).

Table 43
Selected natural disasters in the Caribbean and their impact

Natural disaster	Year	Country	Impact
Hurricane Gilbert	1988	Jamaica	65% of GDP
Hurricane Hugo	1989	Montserrat	200% of GDP
Tropical Storm Debbie	1994	St. Lucia	18% of GDP
Hurricane Luis and Marilyn	1995	Antigua	65% of GDP
Hurricane Luis and Marilyn	1995	St. Kitts and Nevis	85% of GDP
Hurricane Georges	1998	St. Kitts and Nevis	50% of sugar harvest
Hurricane Lenny	1999	Barbuda	95% of primary sector GDP
Hurricane Michelle	2001	Jamaica	1% of GDP
Hurricane Ivan	2004	Grenada	200% of GDP
Hurricane Ivan	2004	Jamaica	8% of GDP
Hurricane Ivan	2004	Dominican Republic	1.9% of GDP
Hurricane Frances and Jeanne	2004	The Bahamas	7% of GDP
Hurricane Ivan	2004	Cayman Islands	138% of GDP
Earthquake	2004	Dominica	12% of GDP
Floods	2005	Guyana	59% of GDP

Source: On the basis of official information

Based on the above information it is possible to assert that the effects of the floods that affected Guyana in the months of January and February 2005 had a high degree of geographical and sectoral concentration. As analysed in an earlier section most of the damage affected Region 4. The severely affected population represents 37% of the total national population.

In the same vein, the housing sector suffered most of the damage. The agricultural and commercial sectors also sustained important losses. The disaster brought about decreased government revenues and increased operational costs for utilities in the electricity, water supply, telecommunications and transport sectors as well as higher capital expenditures. The floods will also impact negatively on export performance, while at the same time requiring an increase in external purchases. The secondary or macroeconomic effects will be dealt with in the following section.

The magnitude of the disaster, its geographical and sectoral concentration and the severity of its impact on macroeconomic variables indicate that the floods can be considered a significant event that can undermine the future performance of the economy. Even if compared to the effects of more potent phenomena such as hurricanes and earthquakes that have ravaged the Caribbean region in the past year, the impact of the floods is sizeable (see Table 43). As a result, it is necessary to undertake actions that will offset its effects and guarantee that the country can recover quickly enough to avoid any permanent damage to its economic and social sectors.

5. Macroeconomic effects

5.1 Macroeconomic performance in 2004 prior to flood

Output

Reflecting the confluence of improved value added in some key sectors and continued prudent macroeconomic policies, the economy grew by 1.6% in 2004, reversing the negative growth of 0.7% in 2003 (see Table 44).

Sectoral growth dynamics in Guyana have long been subject to the vicissitudes of investment in capacity expansion, contributing to factor accumulation and measures to enhance productivity. In addition, natural disasters also impact negatively on growth by destroying productive assets. This pattern continued in 2004. Although affected by adverse weather conditions, sugar output was up by 8.1%, as a result of enhanced productivity stemming from improved agricultural practices and management of field and factory operations. However, the unfavourable weather meant that Guysuco was unable to meet its targeted output of 328,383 tonnes of sugar. The other major primary agricultural produce, rice, also suffered from unseasonal rainfall, which disrupted land preparations and shortened the harvesting period of the first crop and this, compounded by logistical problems, led to a 8.5% reduction in output to 324,746 tonnes, relative to 2003.

In other lower, growth-inducing agricultural subsectors, both crop production and livestock production increased by 2% each. Forestry value added was up marginally by 0.5 %, due to higher harvests of logs, sawn wood and round wood. In the fisheries subsector, high fuel prices led to the temporary decommissioning of some vessels leading to a 1% fall in real value added in the sector.

Value added in mining and quarrying declined by 6.9% in 2004. With the winding down of production by Omai Gold Mines Limited, gold declaration contracted by 7.7% to 361,233 ounces. Similarly, bauxite production fell by 15% to 1,458,931 tonnes, in spite of a 43% increase in output of refractory grade bauxite (RASC).

Activity in the nascent manufacturing sector continued to be stable. Higher production in the beverage subsector (beer, stout, aerated drinks and distilled water) was offset by reduced value added in other subsectors.

Improved performance of key goods subsectors was complemented by more robust service sector performance. Bolstered by vibrant activity in the Information and Communications Technology (ICT) subsector, transport and communications value added shifted up by 4 %. Value added was up in the engineering and construction subsectors by 4% buttressed by increased public investment in infrastructure including roads, bridges and sea defense.

Table 44
GUYANA
MAIN ECONOMIC INDICATORS

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2005
						Annual growth rates b/							
Growth in Gross Domestic Product	8.4	5.1	7.1	7.1	-1.7	3.0	-1.4	2.3	1.1	-0.7	1.6	0.4	-2.7
Gross Domestic Product per Capita													
						In US$ dollars							
Gross domestic product per Capita							773	777.5	829.2	840.2	868.6		
Gross National Disposable Income							718.6	705.9	705.2	754.5	795.2		
						Annual growth rates b/							
Gross domestic product by sector of economic activity													
Agriculture, forestry and fishing	12.2	8.4	5.1	24.0	-6.4	14.6	-10.2	3.7	6.0	0.1	3.2	-3.7	-1.9
Agriculture										-1.3	3.1	-.1	-3.3
Sugarcane	4.0	-0.5	10.3	30.2	-7.5	25.8	-14.9	4.0	16.4	-8.7	8.1	3.0	-5.2
Rice Paddy	10.8	35.9	-16.4	79.5	-0.5	7.7	-20.0	10.6	-11.1	23.2	-8.5	2.2	-2.8
Other crops	5.9	8.4	3.9	5.4	6.7	1.1	1.1	1.1	1.4	2.1	2.0	-6.3	-7.3
Livestock	15.0	21.7	25.0	5.7	-1.8	1.8	4.5	2.6	5.0	4.0	2.0	-2.9	-4.3
Fishing	7.1	10.0	2.3	8.1	-2.7	0.7	14.7	0.6	-3.6	0.0	-1.0	-4.1	-1.9
Forestry	68.4	15.7	0.4	15.3	-24.2	13.0	-16.4	3.2	-7.7	1.8	0.5	-3.8	-0.6
Mining and quarrying	6.6	-11.4	15.2	15.0	2.7	-8.4	5.9	4.2	-6.9	-8.7	-6.9	-24.9	-25.6
Manufacturing	5.3	9.4	3.9	-39.4	-10.6	6.7	-11.7	0.0	2.3	-3.0	2.5	-0.7	-1.8
Construction	20.0	9.7	14.0	13.1	4.7	-10.0	6.6	2.0	-3.9	5.7	4.0	6.0	4.4
Basic services													
Transportation, storage and communication	7.9	9.6	10.9	8.9	-3.1	2.1	7.1	5.4	4.5	5.0	4.0	1.5	-3.6

Other services													
Distribution	5.9	5.0	5.1	5.6	5.3	-8.0	5.2	0.5	-0.9	-2.5	0.5	-9.2	-16.1
Transport and communications	7.9	9.6	10.9	8.9	-3.1	2.1	7.1	5.4	4.5	5.0	4.0	1.5	-3.6
Rental of dwellings	9.1	6.9	6.5	7.3	5.7	-6.5	5.7	2.2	0.0	3.0	2.0	-2.0	-2.6
Financial services	7.9	7.8	9.6	4.4	3.2	2.0	3.0	-5.2	-1.0	1.1	1.0	1.0	-3.1
Government	2.0	2.0	1.9	2.8	-0.2	1.1	4.9	0.0	-1.0	0.6	1.5	0.4	-0.8
Other	7.9	6.7	7.5	5.2	3.9	1.6	3.7	3.0	0.0	2.6	2.6	3.0	-11.8
					As percentage of GDP b/								
Gross domestic product by expenditure													
Consumption	63.6	72.9	81.6	92.4	101.1	111.5	133.4	138.6	136.9	145.3	162.9	97.6	
Private	47.9	54.2	58.6	63.6	70.4	71.8	85.9	98.1	93.2	95.0	112.8	66.9	
Public	15.7	18.7	23.0	28.8	30.7	39.7	47.5	40.5	43.7	50.3	50.0	30.7	
Gross domestic investment	45.5	53.1	57.6	62.5	59.4	63.1	66.4	68.1	69.8	66.9	66.4	40.7	
Private	33.0	37.0	36.4	37.1	37.5	41.7	40.3	44.0	42.9	41.2	40.4	23.1	
Public	12.6	16.1	21.2	25.3	21.9	21.4	26.1	24.1	26.9	25.7	26.0	17.7	
							Millions of dollars						
Balance of payments													
Balance on current account	-101	-95	-48	-81	-86	-75	-113	-129	-106	-84.1	-99.0	-149	-202.5
Exports of goods and services	463	496	575	593	547	525	505	490	496	517.0	554.0	533	519
Imports of goods and services	-504	- 537	- 595	- 642	- 601	- 550	-585	- 584	- 563	-572.0	-643.0	-686	-713
Income account balance	- 83	- 86	- 54	- 74	- 56	-57.9	-44.3	-58.6	-23.5	-49.7	-34.3	-2.0	-33.1
Current transfers balance	32	39	58	64	57	39	45	44	40	40.3	44.0	64.2	45
Capital and financial account balance f/	23	28	54	102	70	68	127	115	86	107.1	39.7	165.1	195
Foreign direct investment											47.7	50	65
Other capital													
Global balance	-64	-69	-1	4	-23	-4	17	-8	-25	-3.0	-55.5	11.5	-12
Variation in reserve assets g/	-28	2	-14	3	23	4	-53	-17	4	-8	28	-30	30
Other financing	92	67	15	-7	0	0	35	25	29	11.0	27.5	18.5	28

Other indicators of the external sector					
Gross external debt (millions of US$)	1,999.5	2,058.3	1,537.0	1,513.0	1,507.5
Gross external debt (% of GDP)	366.5	330.9	217.9	19.4	210.0
Employment and wages					
Participation rate k/					
Open unemployment rate l/					
Employment (000')					
Public sector minimum monthly wage (Rate of growth))					30.0
Prices					
Consumer price index (December to December)	.....	8.1	4.5	4.1	4.8
Nominal exchange rate (average)	138.2	141.9	140.4	13.65	150.42
Non-public financial sector					
Current revenue	31.4	33.4	35.5	31.9	30.7
Current expenditure	31.2	26.9	24.2	26.3	28.0
Capital account balance	-6.9	-9.8	-12.9	-12.8	-9.5
Primary balance	-6.8	-3.3	-1.6	-7.2	-6.8
Financial balance	-6.8	-3.3	-1.6	-7.2	-6.8
Interest Payments on the Public debt	...	...	...	...	...
Internal	...	...	...	...	...
External	...	...	...	...	...
Money and credit					
Internal credit	3.4	11.4	17.2	25.9	34.9
Public sector	-15.0	-12.5	-19.4	-16.2	-13.1
Private sector	18.4	23.9	36.7	42.1	48.0
Currency	10.8	10.2	10.1	10.5	10.5
Demand deposits	5.4	5.7	6.1	5.8	6.0
Narrow money (M1)	16.3	15.9	16.2	16.3	16.5

1,210.9	1,193.2	1,196.7	1,246.7	1,092.0	1,080	1,184.7	
174.0	169.6	170.0	172.7	148.2	137.8	145.4	
31.1	26.7	5.5	5.0	5.0	5.0		
8.7	6.2	2.6	6.2	6	4.8	5.6	6.5
177.66	184.75	189.5	191.75	195.5	198.5	202	204.4
Percentages of GDP							
29.8	31.8	29.9	33.4	45.4	33.2	32.4	33.4
25.7	31.3	31.2	33.5	49.7	32.9	33.8	36.7
-6.0	-7.9	-6.4	-3.1	-6.4	-23.4	-19.8	-23.6
-2.0	-7.4	0.3	2.1	4.6	4.9	3.2	1.5
-2.0	-7.4	-9.2	-7.5	-4.3	0.3	-1.4	3.3
…	…	8.8	7.7	8.9	4.7	4.6	4.8
…	…	5.1	4.6	3.0	2.0	1.8	1.9
…	…	3.6	3.1	5.9	2.6	2.8	2.9
%of GDP (end-of-period)							
23.5	25.0	25.2	26.5	24.5	31.2	33.7	
-21.6	-19.9	-18.1	-15.9	-9.2	0.3	1.4	
45.1	44.9	43.3	42.4	33.7	30.9	32.3	
10.9	11.1	11.3	11.1	12.4	12.5	13.6	
6.6	7.9	7.2	7.9	9.0	9.6	8.6	
17.4	19.1	18.6	19.0	21.4	22.1	22.2	

Savings and time deposits	35.6	40.0	41.9	44.0	47.1	44.8	46.6	51.1	51.8	52.4	51.1	53.7
Broad Money (M2)	51.9	55.9	58.1	60.3	63.6	62.3	65.7	69.7	70.9	73.8	73.2	75.9
	Annual percentages											
Real interest rates												
Small savings rate		2.2	3.1	3.2	2.1	-0.7	1.4	4.7	-1.7	-1.4	-2.0	
Weighted lending rate		20.4	18.5	18.3	18.3	17.9	17.7	17.6	16.8	11.2	9.9	

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 personnel services.

e/ In nominal terms.

f/ Does not include errors and omissions.

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

h/ Includes use of credit and International Monetary Funds Loansd and Financing.

i/ Annual average weighted by international trade.

j/ Refers to net investment income divided by the ratio of exports of goods and services of the balance of payments .

k/ Percentages of working age population.

l/ Percentage of economically active population.

Prices, wages and employment

Inflation overshot its target of 4.5% reaching instead a rate of 4.8% in 2004. Higher inflation stemmed largely from the knock-on effects of higher oil prices on domestic prices given the importance of oil as a source of energy for output in agriculture, mining and other sectors. However, offsetting policy interventions such as the lowering of the consumption tax on fuel dampened the rise in the inflation rate.

The exchange rate depreciated in 2004. Even though exchange rate flexibility gives Guyana greater degrees of freedom in macroeconomic management, wage levels remain critical both from the supply and demand sides of the economy. From the supply side, wage costs as a major component of firms' recurrent costs, affect competitiveness, firm survival and economic growth and from the demand side, wages as incomes for household impinge on consumption, savings and the pool of funds available for investment.

Fiscal operations

Central government finances improved in 2004, following the deterioration in 2003. The overall deficit after grants expanded sharply to $26.4 billion, the equivalent of 17.2% of GDP. Current revenue expanded by almost 12% to $50.8 billion, roughly 33% of GDP. Revenue was buoyed by growth in receipts from consumption and trade taxes, reflecting increased taxable imports and also improved tax administration and collections.

Current expenditure grew only marginally by 1.4% to $50.4 billion, the equivalent of 33% of GDP. Growth in expenditure was dampened by reduced transfers to Linmine, which acquired transfers to the tune of $3 billion in 2003. Non-interest current expenditure (net of reimbursable rice levy 'A') increased by 5.9% to $43.2 billion, rising to 29% of GDP. Debt service costs declined by almost 20% to $7.1 billion, on account of Enhanced Heavily Indebted Poor Countries (EHIPC) relief and a reduction in the average treasury bill rate.

Capital expenditure more than doubled to $36.8 billion, equal to 24% of GDP, reflecting heavy outlays on infrastructure including roads and bridges and the sea defense system.

Monetary and exchange rate developments

Given the relatively rapid transmission of accelerated growth in money supply into higher prices and the weakening of the exchange rate, monetary policy in 2004 continued to be aimed at liquidity management in order to maintain price stability, orderly growth in private sector credit and exchange rate stability. The authorities used open market operations and reserve requirements to achieve monetary goals.

Broad money grew by 9% to $115.8 billion, bolstered by an 11.4% growth in private sector deposit liabilities, which accounted for 84.7% of total deposits. Relatively dynamic growth in private sector deposits was offset partly by a decline in public sector deposits in the banking system. Public sector deposits contracted sharply by over 38% to $6.7 billion, reflecting the setting aside of funds in an escrow account for Guysuco.

Net domestic credit expanded substantially (48.5%) to $37.4 billion. Even so, credit to the private sector declined significantly by $456 million, on account of weak demand in some sectors and a risk-averse approach of commercial banks to lending in some activities where demand was higher, but where risk expectations were also higher. The reality is that having lost money on insolvent loans in the latter 1990s, commercial banks have become even more cautious in lending and with their overwhelming dominance of the credit market, this could have an adverse impact on Greenfield investment - the very kind of investment that could stimulate employment and recovery in the aftermath of a natural disaster.

Commercial banks remained relatively liquid, with total liquid assets increasing by 19% to $47.6 billion in 2004. Interestingly, excess liquid assets were 85.2% above the stipulated minimum amount. This reflected the banks' preference for short-term assets including treasury bills, but is also a manifestation of their risk aversion and a probable lack of sufficient bankable projects. Economic restructuring, especially new entrepreneurial activity demands that commercial banks opt for a better balance between short and longer-term assets, the latter being more suited to lending for productive activities.

Balance of Payments

The balance of payments resource gap continues to act as an important constraint on the growth process in Guyana. In 2004 the gap expanded with the overall balance of payments deficit swinging to a deficit of US$55.5 million. The current account deficit shifted upwards by over 17% to US$99 million. The merchandise deficit expanded sharply (over 60%), as relatively dynamic growth in exports (over 7%) to US$554 million was offset by an even larger (12.4%) growth in imports. Sugar export receipts increased by 7.7% to US$139 million, benefiting from a 14% rise in average export prices to US$472.3 per tonne and higher exports. Rice export receipts expanded 19.2% to US$54 million, reflecting the impact of greater export volume, in spite of lower production and higher average prices. Export receipts for gold were up by almost 4% due to the depreciation of the US dollar that led to a 12.1% increase in price. Bauxite exports receipts rose marginally by roughly 1% to US$45 million.

On the debit side, the relatively more robust expansion in merchandise imports was driven by higher imports of all three major categories: intermediate, capital and consumption goods. The value of imports of intermediate goods posted strong growth in 2004 driven largely by a 28% (US$41.6 million) increase in the value of imports of fuel and lubricants due to the steep rise in oil prices. Outlays on imports of capital goods expanded by 13.8% to US$132 million, reflecting growth in imports of industrial machinery for capacity expansion in bauxite production and other activities, building machinery and other capital goods. Similarly, imports of consumption goods shifted upwards by 5% to US$156.7 million, bolstered largely by higher imports of food for final consumption and motor cars.

Debt dynamics

Guyana's debt burden eased in 2004, as under the EHIPC Initiative, eight out of 10 creditors agreed to forgive 100% of outstanding debt stock. Consequently, as at the end of December 2004, the stock of external debt had declined by 1.1% to US$1080 million.

Associated with this development, debt service payments fell by 12.2% to US$43.7 million, equivalent to about 10% of exports of goods and non-factor services.

5.2 Projected macroeconomic performance without the floods

Growth in real output was expected to decline in 2005, with dynamism in some sectors being offset by contraction in others and some pass through benefit of expected lower fuel prices. Real GDP was forecasted to grow by 0.4% in 2005, compared with growth of 1.6% in 2004.

At the sectoral level, real sugar output was projected to grow by 3% to roughly 336,810 tonnes. Rice production was forecasted to grow by 2.2% to 332,000 tonnes due to increased acreage under cultivation, higher prices and improved productivity. Other agriculture comprising small crop production largely for domestic consumption was expected to decline by 6%, while livestock output was projected to contract by about 3%.

Unfortunately, the real value added in mining and quarrying was projected to decline by almost 25% in 2005, precipitated by the expected closure of the country's largest gold mine in August 2005. As a result, gold declaration is forecasted to fall by almost 38% to 224,294 ounces, reflecting a 58% reduction in the production of Omai Gold Mines Limited. Bauxite output in tonnes was expected to increase by over 20%.

Engineering and construction activity was expected to be strong with growth of 6%, bolstered by robust public investment in infrastructure projects such as roads, bridges and housing, and private sector investment in residential and commercial properties. Meanwhile, manufacturing activity was projected to decline by less than 1%.

Activity in services was expected to weaken partly due to lower profit expectations. Distribution was projected to contract by over 9% offset partly by growth in transport and communications and financial services.

Prices, wages and employment

Inflation for 2005 was targeted at 5.6%, which was deemed in keeping with policy goals of maintaining price and exchange rate stability.

Fiscal operations

The fiscal position of central government was expected to improve in 2005, with the overall deficit after grants declining from 17% of GDP in 2004 to 14% in 2005. The favourable result was expected to hinge on a 1.8% increase in total revenue and a similar decline in total expenditure. Tax revenue was projected to increase by about 3% to about 31% of GDP, on account of growth in yields from all categories, especially trade and other taxes. However, non-tax revenue was expected to decline by about 13%. Given the potential developmental impact of capital works such as improved transport and communications networks, housing and health

system, concern should relate to the quality and development multiplier of these investments and not simply to the size of the deficit.

Current expenditure was forecasted to grow by 7% to about $54 billion. Spending on goods and services was projected to increase by over 13%, while outlays on personal emoluments were projected to rise by about 7% to $18.9 billion. Transfers to the private sector were programmed to increase by over 4%, while those to the public sector were to be eliminated. Interest payments were projected to increase by about 4% to roughly 5% of GDP and 7% of exports of goods and non-factor services.

Monetary and exchange rate developments

In the monetary sector, the banking system was projected to accumulate substantial net foreign assets in 2005. The net foreign assets of the Bank of Guyana were projected to decline by about 18% to about $1.6 billion, while the holdings of commercial banks were expected to increase by 28% to roughly $1.9 billion. The accumulation of substantial net foreign assets abroad by commercial banks is an area of concern since it reflects a preference for foreign investment, even in an environment where international returns are still relatively low, to the detriment of credit allocation to the domestic sector. On the domestic assets side, credit to the public sector was expected to increase significantly in line with strong investment in infrastructure projects. Credit to the private sector was projected to grow much more slowly at over 8%.

With respect to liabilities, broad money was projected to grow by 8% in 2005. Quasi-money (savings and time deposits) was projected to expand by 9.5% to $8.6 billion, associated with growth in savings as activity in the traditional sectors resurged. However, money (currency and demand deposits) was forecasted to register slower growth of 4.6%, reflecting a sharp contraction in demand deposits.

Balance of Payments

With the resurgence of capital inflows to expand production capacity in bauxite and public sector projects, the overall balance of payments position was expected to strengthen in 2005. The overall balance of payments position was forecasted to turn around from a deficit of US$55.5 million, equivalent to about 7% of GDP to a small surplus, equal to less than 1.4% of GDP.

The current account deficit was projected to increase to US$149 million, equivalent to 18.6% of GDP. The merchandise account was projected to deteriorate with the deficit rising to US$153 million. Exports of goods and services were forecasted to decline by about 4% to US$533 million, down from 72% in 2004 to 67% of GDP in 2005. Export earnings are expected to contract due to lower earnings from gold on account of a sharp fall in production and also as a result of the likely strengthening of the United States dollar. Earnings from sugar, rice and fish exports were expected to increase, but not enough to offset the contraction in earnings from gold. Sugar receipts are expected to increase by 2.9% to US$143 million, while receipts for rice are projected to expand by 7.4% to US$58 million. Importantly, earnings from bauxite are

forecasted to register strong growth of 27% to US$57 million, underscoring the capacity expansion and improved productivity in the sector. Other exports, including fish and shrimps, diamonds and forestry products are budgeted to post marginal growth to US$135 million.

Imports of goods and services were projected to increase by 6.7% to US$686 million, equivalent to just over 100% of GDP. Growth in imports is expected to stem from higher imports of capital and intermediate goods geared towards infrastructure projects and capacity expansion in the productive sectors.

On the other hand, the services account is expected to improve with the deficit declining by about 16.4% to US$46 million, equivalent to almost 6.7% of GDP. In the capital account, private capital inflows were expected to reverse the decline in 2004 and to increase to US$50 million in 2005. With the contraction in debt service payments and growth in disbursements, the capital and financial account surplus was projected to increase sharply helping to offset the merchandise deficit.

Debt dynamics

The stock of external debt was projected to increase by 10% to US$1185 million. Debt to bilateral creditors was expected to increase by 33%, while debt to multilateral creditors was projected to increase by 8%. Even with these developments, debt service payments were budgeted to decline, reflecting debt forgiveness under the EHIPC initiative. Debt service to exports after the EHIPC initiative was expected to drop by 1% to 7.7% of GDP in 2005.

5.3 The macroeconomic performance with the disaster

The floods have disrupted economic activity and are expected to have lingering effects that will worsen internal and external balance. Most major macroeconomic indicators would be affected adversely, necessitating adjustments to limit the fallout in economic activity and social welfare.

Impact on GDP

The impact of the floods on real GDP growth depends not only on the scale of the disaster, but also on the speed, quality and intensity of the recovery operations that are implemented to counter the fall-out in real output. The authorities have allocated substantial resources to recovery and reconstruction, which should cushion the impact of the floods on economic activity. Nevertheless, the scale and lingering nature of the disaster means that relatively large fallout in activity is expected in 2005.

Reversing the projected growth of 0.4% for 2005, the floods are expected to lead to a decline in real growth of between 2.7% and 3.4%. The negative multiplier effect is expected to be felt in all the major sectors. The agricultural sector, an important pillar of the economy, is projected to decline by 3.3%. Sugar-cane production will decline by 5.2% as a result of crop losses and the inability to harvest some fields due to the flooding. Rice output is projected to

contract by 2.8% as a large number of fields were flooded and some might not be in a harvestable condition. As a result, the yield per hectare is expected to decline in 2005. In the livestock subsector the loss of income from animals lost and increased costs of feeding and maintaining livestock will lead to a 4.3% decline in value added.

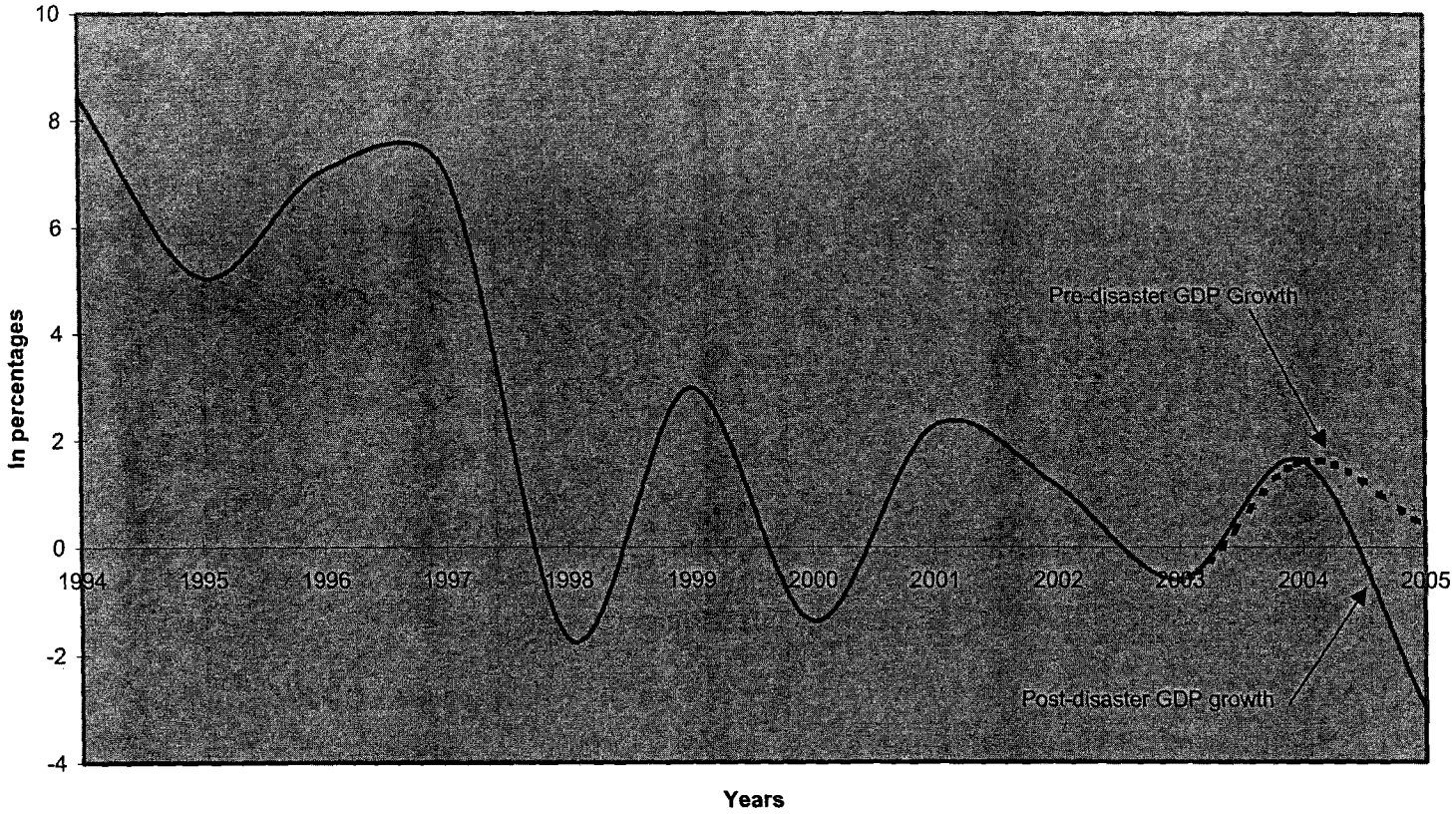
The small crops subsector that provides much of the nutrition for the poorer segments of the population also suffered loss of output due to flood damage and a loss of sales for those crops that were not lost due to a threatened outbreak of *Leptospirosis*. These developments are expected to lead to a 1% reduction in value added in the small crop subsector. The floods only marginally affected fishing and forestry, with declines in their GDP of less than 1.9% and 0.6%, respectively.

Manufacturing activity will decline slightly by 1.8% as value added losses were low, even if damage to capital stock was much higher. Manufacturing suffered from the disruption of production and damage to plant and equipment.

Projections indicate that the distribution sector will suffer the single largest contraction (16.1%) in GDP as a result of the floods. Loss of stocks and disruption of sales have affected a number of wholesale and retail outlets in the aftermath of the floods. However, the sector is expected to recover in the medium term as households purchase building materials to repair damage to their homes and durable consumer goods that were lost.

Transport and communications were disrupted in a number of areas around the flood zones, as a result the sector is expected to contract by 3.6% in 2005. However, the loss in value added due to the blockage of road networks was partly offset by the use of alternative transport such as boats. By contrast, engineering and construction is expected to grow by 4.4%, as reconstruction and rehabilitation work leads to a recovery in construction activity. Financial services were projected to decline by 3.1%, while government services are expected to post about a 1% decline. Meanwhile, other services, including tourism, are projected to register a sharp fall with value added decreasing by over 11%, as businesses and operators suffered cancellation of bookings and reduced sales. Mining and quarrying were little affected by the floods with value added declining by 25.6%, 0.7% more than the projected decline for 2005.

Figure 15
Guyana
Pre and post-disaster GDP growth
1994- 2005



Prices, wages and employment

The rate of inflation is expected to rise to about 6.5% in 2005, largely reflecting increases in food prices as a result of supply side shortages. However, prices should stabilize in some months following the disaster.

Fiscal operations

Disasters tend to buffet government finances both from the revenue and expenditure sides. As a result of the floods, government finances are projected to weaken significantly. The overall fiscal deficit before grants is projected to expand to $30 billion, roughly 19% of GDP, reflecting relatively sharp increases in expenditure, as revenue is projected to remain stable. Total expenditure was projected to grow by about 9% (compared with budgeted contraction of less than 1%) to $93.3 billion, equivalent to 60% of GDP. Capital spending, a critical catalyst of the growth process, is projected to expand sharply to almost 30% of Product, up from 20% in 2004. Government priorities on the capital budget are expected to be focused on the rehabilitation of infrastructure, including drainage and irrigation canals, reinforcing the conservancy, roads and bridges and public buildings.

With substantial outlays on transfers to enable the affected population to cushion the impact of the disaster and maintain reasonable levels of welfare, these payments were forecasted to grow by 11%.

Given the domestic financing constraint, foreign financing to undertake rehabilitation and reconstruction is expected to shift upwards by over 25% to $24 billion, equal to 15.5% of GDP. At the same time, interest payments are expected to remain stable in 2005, as Guyana benefits from some relief from interest payments from some creditors and also debt rescheduling to facilitate recovery in the post-disaster period.

Monetary and exchange rate developments

Growth in broad money is projected to register slower growth in line with the contraction in GDP. Also, net domestic credit is also expected to register dampened growth as financial institutions become more risk averse in anticipation of the inability of some borrowers to repay.

Balance of Payments

In spite of the substantial weakening of the internal position, the external position of the economy is set to remain stable in 2005. A significant erosion of the merchandise account, as a result of the plummet in value added and exports of major commodities, is expected to be offset by capital inflows and higher disbursements of programmed funds.

In the critical goods sector, the merchandise deficit was expected to widen to US$194 million, instead of the budgeted US$153 million. Export of rice is projected to decline by over 6% to US$54 million, while sugar exports are expected to decline marginally to US$141 million. The relatively favourable out-turn in these subsectors stems from the stage of the crops at the

time of the disaster that mitigated the impacts for 2005. Meanwhile exports of gold and timber, which were only marginally affected by the floods are expected to remain stable at aroundUS$88 million and US$43 million.

On the other hand, imports are forecasted to grow by about 4% to US$713 million, equal to roughly 92% of GDP. Fuelling the recovery, imports of capital goods are expected to shoot up to US$205 million. On the other hand, with reduced household disposable income, imports of consumer goods are projected to decline to US$155 million. Meanwhile, the deficit on services is set to increase by 17% to US$54 million.

Fortunately, the surplus on the capital and financial account is expected to grow by almost 18% to US$195 million, compensating to a large extent for the growth in the current deficit. This should stem largely from increased financing to the non-financial public sector for undertaking reconstruction and rehabilitation and for ongoing projects.

The overall out-turn in the balance of payments is expected to lead to international reserves covering 3.1 months of imports of goods and non-factor services, down from 3.3 months in 2004.

Debt dynamics

With the disaster, it is hopeful that Guyana will benefit from some debt rescheduling or moratorium on repayments. Indeed, it is clear that a concerted package including a moratorium, increasing grant resources and greater flexibility in the benchmark targets under the EHIPC Initiative are necessary to put the country back on a stable growth path. Such initiatives are required for the country to achieve the goals set out in the Poverty Reduction Strategy (PRS) and the Millennium Development Goals (MDGs). Even though debt service payments were programmed to decline to 54.5% of GDP after the EHIPC initiative, they still constitute a significant drain on scarce resources with high opportunity costs in other development activities.

Guyana's debt level is high by international standards. Sustainability computations indicate that it is also unsustainable, especially after the effects of the floods, and that the stabilization of the debt levels would require significant tax and/or expenditure efforts. However, the reduction of the current debt levels may simply not be a feasible policy option as it may result in output and employment losses and jeopardize the country's process of rehabilitation and economic recovery. This, therefore, strengthens the case for the further introduction of external debt relief measures to bolster the recovery and reconstruction agenda over the medium to longer term.

Table 45
Public debt in the Caribbean

Country	Total public debt as % of GDP		Internal Debt as a percentage of GDP 2003	External debt as a percentage of GDP 2003
	1997	2003		
Anguilla	10.7	17.2	3.8	13.2
Antigua and Barbuda	107.0	151.7	68.9	83.1
Aruba	39.4	41.5	21.2	20.3
The Bahamas	46.0	45.0	31.5	5.6
Barbados	62.0	71.1	54.9	25.9
Belize	41.0	88.9	13.0	75.8
Dominica	61.0	127.0	39.4	87.6
Grenada	42.0	110.1	30.1	79.9
Guyana	**211.0**	**172.0**	**....**	**172.0**
Jamaica	103.0	142.0	85.4	56.5
Montserrat	26.0	16.4	2.8	13.2
Netherlands Antilles	64.6	90.2	.....	....
St. Kitts and Nevis	86.0	162.0	75.4	86.6
St. Lucia	36.0	66.1	19.1	46.9
St. Vincent and the Grenadines	48.0	76.7	25.6	51.4
Suriname	24.0	37.0	9.8	27.2
Trinidad and Tobago	52.0	28.0	....	13.8
Average	62.3	84.9	34.4	53.7

Source:ECLAC (2004).

A long-term solution must obviously involve some type of fiscal consolidation but it should also take into account the constraints facing smaller economies. The fundamental constraint facing these economies is the foreign exchange constraint. In this sense, smaller economies are balance-of-payments-constrained economies. This means that their actual rate of growth is below that which is warranted by the prevailing internal conditions.

One consequence of this constraint is that a smaller economy, such as Guyana, cannot pursue a fiscal policy that is independent of current external conditions. Indeed, the former must be attuned to the latter. An expansionary fiscal stance will translate sooner or later into a higher import demand and a current account deficit unless export performance improves. As a result, starting from a position where government expenditure equals revenue and imports are equal to exports, an increase in government expenditure means that government is spending more than it earns (fiscal deficit) and imports surpass exports (external deficit). In other words a fiscal stance

in excess of the export performance ratio will result in a twin deficit situation (fiscal and external deficits) and in the accumulation of debt.

Debt does not increase or accumulate over time because governments spend 'too much' per se, but rather because they spend 'too much' relative to what the external conditions could tolerate, that is relative to their main constraint which is the balance of payments constraint. As a result, within the logic of this explanation, macroeconomic equilibrium means that the fiscal stance should seek to be aligned to the value of the export performance ratio. In other words, export performance is the variable that ultimately sets the limit and scope to fiscal policy. Fiscal policy can work only if the external conditions allow it to work. Thus any attempt at fiscal adjustment, reform or consolidation must also go hand in hand with efforts to develop export promotion strategies and to raise the productivity of imports. Debt reduction strategies must incorporate options to soften the external constraint.

These ideas can be formalized using simple national accounts identities. Indeed, it is possible to demonstrate that in a 'quasi steady state' the value of the flow of national income is a weighted average of the export performance ratio and the fiscal stance (Godley and Cripps, 1983; Anyadike-Danes, 1996). The export performance ratio is the ratio of the value of exports to the average propensity to import. The fiscal stance is equal to the ratio of the value of government expenditure to the tax to GDP ratio. Formally,

(1) $Y = \omega_1 (X/\mu) + \omega_2(G/\theta)$

Where,

Y = national income
ω_1 and ω_2 = weights
X = value of exports
μ = average propensity to import
G= value of government spending
θ = the government's share or tax collections to national income (tax to GDP ratio)

Accordingly, as stated by Anyadike-Danes (1996, p.716) since the flow of national income is a weighted average of the export performance ratio and the fiscal stance, when the fiscal stance is greater than the export performance ratio, national income is smaller than the former and greater than the latter. That is,

(2) $G/\theta > X/\mu <=> G/\theta > Y > X/\mu$

In turn this implies that a budget deficit will, by definition, be accompanied by a deficit in the balance of payments. In other words,

(3) $G/\theta > Y <=> G > \theta Y$ and $X < \mu Y$

Since $\theta = T/Y$ and $\mu = M/Y$, where T are taxes and M imports,

(4) $G > \theta Y <=> G > (T/Y)Y <=> G > T <=> G-T > 0$ (Fiscal deficit)
$X < \mu Y <=> X < (M/Y)Y <=> X < M <=> X-M < 0$ (Current account deficit) [18]

The main message of the relationships set out above is that a fiscal stance that exceeds the export performance ratio will result in an increasing stock of debt in relation to GDP.

[18] The relationship here stated between the fiscal stance and the export performance ratio holds under the hypothesis of no net asset accumulation.

In a smaller economy, such as that of Guyana, the binding constraint par excellence is the foreign exchange constraint. As a result, within the logic of this framework macroeconomic equilibrium means that the fiscal stance should be aligned to the value of the export performance ratio. In other words, export performance sets the limit and scope to fiscal policy. Fiscal policy can work only if the external conditions allow it to work.

As a result, a deteriorating export performance can frustrate any effort or attempt at fiscal adjustment or reform. In this sense economic policy must focus on softening the external constraint. Otherwise any country may find itself in a process of continuous fiscal adjustment whose main consequences would be the further impoverishment of the population.

After a natural disaster such as the one that affected Guyana, the export performance will most likely decline, as agriculture was one of the main affected sectors. At the same time the fiscal stance will increase as the government responds to the disaster by increasing capital expenditures. The likely result will be an increasing debt stock over time unless the authorities can align the fiscal stance to the export performance ratio. It means furthermore that the country may be unable to comply with the performance benchmarks set out in the HIPC initiative. However, the HIPC provisions do not contemplate the case of a country that cannot comply with the agreed benchmarks because it was badly damaged by an external shock, such as in the present case.

The alternatives that Guyana faces are improving export performance, which is unlikely to happen given the extent of the damage, or fiscal contraction, which in a HIPC country is close to a prohibitive policy alternative. The solution to this policy dilemma is to seek further debt forgiveness or debt restructuring.

6. Guidelines for recovery, rehabilitation and reconstruction

In the last two decades more than one and a half million people around the world have fallen victim to natural disasters such as earthquakes, cyclones, floods and drought. In the last quarter century the number of reported incidents of natural disasters and their global impact has been increasing each year. The extraordinary rainfall in Guyana beginning in mid-January 2005 has added another critical example of new environmental vulnerabilities for national governments to address in preparing for and recovering from such a catastrophe.

While hazards are inevitable and the elimination of all risks is impossible, there are many technical measures, traditional practices and public experience that can reduce the extent or severity of economic and social disasters. The fundamentals for human development are founded on the development of building human capacities. The stress and shock felt by those vulnerable and exposed to natural hazards will impact in myriad ways on the capacity of people to achieve and enjoy human development gains. [19]Another important lesson is that human beings, not nature, determine whether a hazard poses a threat to the well-being of society. How people view both hazards and mitigation factors, and how other stakeholders respond to these

[19] Reducing disaster risk - A challenge for development. UNDP Bureau for Crisis Prevention and Recovery. 2004

issues, will determine which preventative measures are taken and which are overlooked. As such, human beings will decide their vulnerability and capacity quotient to accept disaster losses.

The vulnerability of Guyana to natural disasters is a function of the geographical endowment of the State as well as the development and management choices, which have been exercised throughout the nation's colonial history. The reliability of sea and river embankments to balance between tidal levels and drainage from the interior along a floodplain has been stressed. Thus, the network of dams (conservancies), canals and locks must be re-examined to ensure they are able to control runoff and flooding while also make available water for life and livelihoods.

Guyana faces three challenges in its effort to achieve the eight MDGs: its poverty; its economic underdevelopment; and its vulnerability to economic, environmental and social hazards.[20] The economic losses from the January 2005 deluge and the number of citizens affected by disasters during the period of 1991-2000 now underscores the need for a more proactive approach to build the capacities of the people and the economy to better withstand and rapidly recover from future natural disasters.

In devising a strategy to guide the rehabilitation and reconstruction process, decision makers will need to consider incorporating the following key components: (a) a comprehensive damage and needs assessment; (b) rapid mobilization of reconstruction funds and activities; (c) a focus on the needs of the local population; (d) establishment of the highest fiduciary standards and efficient systems for the management of rehabilitation and recovery funding; and (e) updating and monitoring of national vulnerabilities and capacities associated with disaster risk management.

The development of a vision and guiding principles by the Government is critical to the development of a National Recovery Strategy. For example, the Government of Indonesia has developed the following strategy to underpin its National Reconstruction and Recovery Plan following the December 2004 tsunami:

- A people-centered and participative process, where the administration listens to and understands the feelings and aspiration of the people;
- A holistic approach – rebuilding based on a comprehensive strategy;
- Effective coordination for consistency and effectiveness among sectoral and regional programmes at the national and local levels;
- Drawing a distinction between rehabilitation – achieving minimum standards – and reconstruction, with a clear strategy for each;
- Focus on services and institutions, rather than on project;
- Incorporating fiscal transparency and effective monitoring into the rehabilitation programmes.

[20] Report on the Progress Towards the Achievement of the Millennium Development Goals. Government of Guyana, United Nations Development Programme Country Team. 2003.

A successful reconstruction strategy should result in five primary outcomes. First, it should restore people's livelihoods – clean water, health clinics and access to same, shelter and a livelihood to support families. Second, it should restore the economy – jobs for people, markets to buy and sell daily necessities and lending institutions to support small-scale enterprises. Third, it should strengthen local governance – education, health, water and sanitation. Fourth, it should use the poverty reduction strategy as a framework for recovery and reconstruction and develop appropriate strategies for the rehabilitation of the productive sectors.

The initial phase of recovery is focused on normalizing the lives of citizens while reactivating the economy. The following actions are provided as illustrations of the transitional recovery processes:

- Provision of household support until livelihoods are re-established.
- Restoration of household and livelihood security;
- Restoration of public services and public safety functions;
- Technical assistance to address post-disaster complications in health, agriculture and livestock sectors;
- Development of improved building standards to withstand future flood episodes;
- Development of more effective waste management, sanitation and environment standards;
- Development of diversified economic livelihood strategies for poverty-level households;
- Encourage entrepreneurship and micro-financing opportunities;
- Restoration of the environment;
- Capacity-building of institutions and communities in disaster risk management.
- Urgent upgrading and repair of the drainage and hydraulic infrastructure systems protecting coastal residents.
- Community preparedness and contingency planning capacity-building including a proactive early warning system, for public and private sector disaster risk management, stakeholders and communities at risk.

The proportion of the damage arising from the social sector is 35% of GDP, of which damage to housing accounted for near 99% of that value. Such a significant share of the damage requires a corresponding strategy to address the loss to the affected communities.

The dwellings most severely affected belonged, to a large extent, to the most vulnerable populations. Their vulnerability arising from their already low incomes was impacted by the location of their settlements, housing design and quality of materials used in the construction of their housing. There vulnerability also arose from their low or non-existent levels of insurance coverage or other means to buffer their losses. The recovery, rehabilitation and reconstruction efforts therefore, should ensure that measures are taken which are geared to prevent or mitigate the impact of a future occurrence of a similar nature. Without mitigation measures, many households would be susceptible to new damage from the impending 2005, May/June rains.

Government therefore may wish to introduce mitigation measures which address the following. In the short to medium term:

- Repair measures which involve treatment of the wood already in use in the construction of steps and flooring boards to provide for longer life;
- Support new low cost designs for the rebuilding of housing to ensure safer levels off the ground;
- Provide technical assistance to the informal construction sector aimed at improving construction skills and capacity to introduce low cost mitigation techniques;
- Strengthen measures which facilitate institutional coordination in the provision of mitigation and recovery services to the most disadvantaged; and
- Strengthen organizational and institutional mechanisms which support community participation and training in disaster prevention and mitigation in housing settlements.

In the long term:

- Review land use policy, so as to ensure safe locations for new or relocated housing settlements;
- Ensure compliance with building standards, which speak specifically to the design, construction and materials used in the construction of dwellings making them more resilient to their natural environment; and
- Explore micro-financing or indigenous financing schemes that would provide a community insurance or buffer from the effects of a natural disaster.

Among the most important lessons from international experiences in managing recovery and reconstruction in disaster-affected areas is the need for effective coordination. Coordinating all public sector initiatives, in addition to providing guidance and standards for humanitarian and civil society agencies, while promoting the interests of the local communities, is a major task.

Setting a common framework for the implementation and administration of assistance operations is critical to preventing inconsistencies of programme effectiveness, on one hand, while also not creating an overwhelming bureaucratic process at a time when rapid assistance is a paramount priority.

The Government of Guyana is responsible for strategy and planning. A central agency should be appointed to play the role of coordinator for the recovery and reconstruction activities following a smooth transition from the humanitarian relief efforts.

7. Project profiles

Project Formulation Process

This section provides a list of project profiles of the various sectors, which have been developed to assist in the process of economic and social development as part of the reconstruction process. The profiles contain basic information on specific aims, scope, expected

results, activities and financing required. They supplement the information on project proposals that the Government of Guyana will present as part of its development and reconstruction process. The profiles are listed below.

A review of the profiles will assist Government in the development of its rehabilitation and recovery strategy by prioritizing an execution strategy, thus bringing resources in line with defined needs. It is an advisable strategy to first focus on a rehabilitation programme to redress the issues of affected populations and then proceed into a reconstruction phase to overcome economic and social adversities, restore and improve infrastructure and production facilities and prevent or reduce the effects of similar events.

The profiles are intended to assist the Government of Guyana in the development of a post-disaster recovery strategy after discussions with civil society, parliamentarians, economic stakeholders and others. Illustrative guidelines (An outline for a comprehensive and sustainable recovery process in Guyana) are provided as Attachment 1

GUYANA – DISASTER RECOVERY AND RECONSTRUCTION 2005-2008
(US$million)

	Total	2005	2006	2007
TOTAL	**75.86**	**23.8**	**33.7**	**18.4**
Agriculture	16.10	3.5	8.1	4.5
Development of integrated agri-business	1.50	0.33	0.75	0.42
Restoring capacity of small scale farmers	4.00	0.88	2.00	1.12
Restoring productive capacity for food security	10.60	2.33	5.30	2.97
Education	4.50	0.99	2.25	1.26
Rehabilitation educational and recreational facilities	3.50	0.77	1.75	0.98
Diversification of educational system	1.00	0.22	0.50	0.28
Environment	1.00	0.22	0.50	0.28
National emergency management organization	0.22	0.05	0.11	0.06
Sustainable sanitation system	0.43	0.09	0.21	0.12
Infrastructure Reconstruction	0.10	0.02	0.05	0.03
Sustainable solid waste management	0.25	0.06	0.13	0.07
Disaster Risk Management	3.00	0.66	1.50	0.84
Institutional capacity building (national)	0.20	0.04	0.10	0.06
Institutional capacity building (regional)	0.20	0.04	0.10	0.06
Support for Disaster Risk Management Council	0.20	0.04	0.10	0.06
Capacity building at civil society	0.40	0.09	0.20	0.11
Disaster Risks Management Plans	1.20	0.26	0.60	0.34
Development of early warning systems	0.80	0.18	0.40	0.22
Health	3.05	0.67	1.53	0.85
Training of health workers	0.10	0.02	0.05	0.03
Rehabilitation of health infrastructure	2.90	0.64	1.45	0.81
Social rehabilitation of children	0.05	0.01	0.03	0.01
Water	4.60	1.01	2.30	1.29
Improved water quality, food safety, and sanitation	4.60	1.01	2.30	1.29
Housing	5.70	1.25	2.85	1.60
Repair and construction of houses	3.20	0.70	1.60	0.90
Shelters Programme	2.50	0.55	1.25	0.70
Drainage and Irrigation	33.85	14.52	12.73	6.60
Institutional strengthening D&I Board	0.30	0.07	0.15	0.08
Rehabilitation of drainage canals	6.50	2.60	2.60	1.30
Rehabilitation of sluices and kokers	3.50	1.75	1.40	0.35
Rehabilitation of conservancies	6.80	3.40	2.72	0.68
Road rehabilitation	16.75	6.70	5.86	4.19
Economic Growth and Income Regeneration	4.06	0.89	2.03	1.14
Employment regeneration and business reactivation	4.00	0.88	2.00	1.12
Supporting women's capacity for income regeneration	0.06	0.01	0.03	0.02

GUYANA

AGRICULTURE 1

Project Title: DEVELOPMENT OF AN INTEGRATED APPROACH TO AGRI-BUSINESS

Sector: AGRICULTURE

Subsector: Agribusiness

Background: In the immediate and short term, there is an urgent need to restore livelihood, which were destroyed during the floods. The floods caused widespread destruction to the agricultural sector in East Coast Demerara and surrounding areas.

Project objectives:

1 To provide a mechanism to increase the productivity of labour and capital,
2 Improve the use of technology and attract young people to the sector
3 Diversification of the crop mix
4 Improve the nursery capacity in the forestry sub sector

Duration of services: Three years
Date of initiation: June 2005

National executing agency: Ministries of Agriculture and Fisheries Crops and Livestock, with the collaboration of Donor Agency

Description of activities and tasks:

1 Detailed assessment of the status of land and water resource
2 Introduction of training and retraining programmes for all farmers
3 Development of a strategy which would focus on agricultural diversification based on commercialization of the sector, and on interventions compatible with the National Agricultural Sector Plans
4 Distribution of adequate planting materials, use of bio-technology and restoration of nurseries
5 Improvement in the accessibility to lands
6 Strengthening marketing and support services such as credit facilities, agrarian services and crop insurance
7 Strengthening institutional capacity through adaptive research, multiplication of planting materials etc
8 Identify priority crops
9 Develop export market in intelligence mechanism – agricultural price index, product realignment.

Expected results and products: Development of an efficient and competitive agricultural business, including the fishery sector. The implementation of a longer-term programme in the sector geared towards growth in agricultural productivities through improvement in the community development approach in the rehabilitation process.

Total required investments: US$1.5m

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor

Special remarks

GUYANA

AGRICULTURE 2

Project Title: RESTRORING THE PRODUCTIVE CAPACITY OF SMALL-SCALE RICE FARMERS IN THE AREAS AFFECTED BY THE FLOODING

Sector: Agriculture

Subsector: Rice

Background: The preliminary assessment revealed that approximately 1,000 small-scale rice framers suffered excessive loss to their crops. The holding of these farmers were just over 19,680 acres with expectancy of a harvested crop of 22,656 tonnes valued at G$1,268,736,000. The sustained high levels of water in the fields have destroyed the rice harvest. The situation is worst for 350 smaller rice farmers who have no resources to salvage any of their stocks. The soil is too saturated to attempt any cutting of the ripened rice.

Project objectives:

1 To provide a mechanism of support to the small rice farmers so that they can quickly reestablish their income generating capacity by regaining their productive capacity to at least pre flooding levels.
2 To assist small-scale rice farmers in securing affordable and accessible credit to enable them to regain their productive capacity
3 To improve the farmers' productive capacity, competitiveness and profitability
4 To strengthen those institutions associated with the rice industry to allow for better irrigation, support and impact
5 To establish capacity and infrastructure which will mitigate the adverse effects of flooding and other disasters

Duration of services: Three Years
Date of initiation: June 2005

National Executing Agency: Ministries of Agriculture and Fisheries Crops and Livestock and the Guyana Rice Board

Description of activities and tasks:

1 Detailed assessment of the status of land and water resource of these small scale farmers
2 Coordinate and mobilize resources to support farmers to re-establish their production system and rebuild their productive capacity, such as credit facilities, agrarian services and crop insurance
3 Rapid drainage of affected fields
4 Provide of short-term labour support during the restoration programme
5 Provide technical assistance, training and inputs (i.e. seeds, agrochemicals, farm machinery services) to enable farmers to restart their farming activities
6 Assess and establish the necessary infrastructure needed to mitigate the effects of floods and other natural disasters

Expected results and products:
1. Regained productivity, profitability and stability of small-scale rice farmers
2. Improved institutional and farmers' capacities to mitigate the adverse socio-economic impact brought on by the flooding
3. Improved management and efficiency
4. Established infrastructure to deal with potential flooding

Total required investments: US$4.0M

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External

Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

GUYANA

AGRICULTURE - 3

Project Title: RESTORATION OF PRODUCTIVE CAPACITY FOR FOOD SECURITY COMMODITIES

Sector: AGRICULTURE

Subsector: Small crops

Background: Guyana is self sufficient in the production of domestic food crops, which includes rice, sugar fruits, vegetables, ground provisions, a variety of other small cash crops and livestock. It is estimated that more than 4,440 acres were completely destroyed by the floods, totaling over 6.3 billion Guyana dollars. The hardest hit areas were Region 3 and 4. The losses in the livestock subsector were also significant. These commodities are traditionally cultivated by small and medium sized farmers whose practices play a significant role in poverty reduction through contribution to food security, employment and income generation to inhabitants in rural Guyana, more so in the affected areas. The flooding has significantly affected these rural communities, resulting in loss of earnings, employment and a complete disruption of social stability in severely affected areas. It is anticipated that the recovery process will be slow and costly. The primary target in this project is the small farmer who has limited resources, low cash income and produces with labour-intensive technology

Project objectives:

1 To restore the productive capacity of small farm families who suffered damages as a result of the flooding
2 Restoration of food security by rehabilitating destroyed farms
3 Improve farmers' capability and infrastructure for storage, value added and marketability of food products
4 Enable small farm families to reduce devastation from future natural disasters such as flooding

Duration of services: Three years
Date of initiation: June 2005

National executing agency: Ministries of Agriculture and Fisheries Crops and Livestock

Description of activities and tasks:

1 Securing affordable financing, identifying production inputs (i.e. seeds, agrochemicals, farm machinery services), providing technical assistance and training in production and management techniques
2 Identification of selected commodities, introduction and dissemination of appropriate technology
3 Introduction of land utilization strategies, and implementation of comprehensive land use options for sustainable development
4 Rapid drainage of affected fields
5 Provide of short-term labour support during the restoration programme
6 Assess and establish the necessary infrastructure needed to mitigate the effects of floods and other natural disasters

Expected results and products:
1. Regained productivity, profitability and stability of small-scale farmers
2. Establishment of the relevant infrastructure to deal with potential flooding
3. Improved management and efficiency

Total required investments: US$10.6M

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

EDUCATION 1

Project Title: **REHABILITATION OF THE EDUCATIONAL AND RECREATIONAL FACILITIES**

Sector: EDUCATION

Sub sector: Facilities

Background: The education sector suffered considerable damage. Schools in the rural areas affected by the floods, particularly in Regions 3, 4 and 5, suffered the most damage to the building and loss of supplies. Schools were reconfigured to serve as shelters in an ad hoc manner, which also caused some damages.

Project objectives:

Reconstruction and repair of existing structures, including reinforcement, in order to reduce vulnerability to natural disaster, mainly flooding

Duration of services: Three years
Date of initiation: Immediate

National executing agency: Ministry of Education, Civil society organizations

Description of activities and tasks:

1 Reparation of schools
2 Replacement of school materials, equipment and furnishings
3 Reparation of libraries and sports facilities
4 In the longer term include the schools into the disaster management plans as "shelters"
5 Rationalisation and re-mapping of the location of schools
6 Rebuild and reconstruct according to an established National Building Code
7 Reconstruction of bridges and culverts leading to schools
8 Construction of additional semi-permanent classrooms

Expected results and products: Preventive: Fewer damages to be foreseen from the nest possible flooding, given the location of the Water Conservatory Dam. Rehabilitation: school building will be better equipped to withstand the disaster

Total required investments: US$3,500,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

EDUCATION 2

Project Title: **PROGRAMME OF DIVERSIFICATION OF THE EDUCATIONAL SYSTEM**

Sector: SOCIAL

Sub sector: Education

Background: The lessons learnt from the recent disaster highlighted how unprepared the society was for such a disaster. The challenge is to remodel the education system through the diversification of school curriculum, which would enhance the learning programme with the involvement of the community.

Project objectives:

1 To develop a strategy for improvement to the learning and teaching environment, through the a process of curriculum reform, based on a comprehensive needs assessment
2 To create an opportunity for individuals to receive early training in disaster preparedness through the education system

Duration of services: Three years
Date of initiation: immediate

National Executing Agency: Ministry of Education, Civil society organizations

Description of activities and tasks:

1 Reviewing school and teacher training curricula, teacher materials to include knowledge, safety and precautionary measures, and coping strategies relating to natural calamities: first aid, health education and sanitation and hygiene: and life skills, including communication skills
2 Improving the overall quality of education at all stages and moving towards a self managed system of school assessment
3 Inclusion of educators in the programme of review
4 Support needy students with grants for travel, books, uniforms and other support needs

Expected results and products: Increased awareness among the school and general population on issues related t

Total required investments: US$1.0M

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

ENVIRONMENT 1

Project Title: ESTABLISHMENT OF A NATIONAL EMERGENCY MANAGEMENT ORGANIZATION

Sector: environment

Sub sector: NEMA

Background: The recent flooding demonstrated the need for increased capacity at national, regional and local levels in disaster preparedness and response. The extended designation of Regions 3, 4 and 5 as disaster areas is cause for concern.

Project objectives: To establish a mechanism that would increase the disaster management response capacity at all levels

Duration of services: Three years
Date of initiation: Immediate

National Executing Agency: Ministry of National Security Task Force on Infrastructure Recovery

Description of activities and tasks:

1 Conduct national consultations to evaluate the current response capacity and make recommendations on how to strengthen capacity at all levels
2 Develop a national disaster preparedness plan

Participants: Civil society, CDC

Expected results and products:

1 Establishment of a National Emergency Management Organization
2 Establishment of local emergency management committees
3 Increased participation of civil society
4 Avoidance of the severe problems associated with the January/February 2005 floods

Total required investments: US$220,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

ENVIRONMENT 2

Project Title: ESTABLISHMENT OF SUSTAINABLE SANITATION SYSTEM

Sector: Environment

Sub sector: Solid Waste

Background: The aftermath of the horrifying floods has highlighted the need for improved levels of sanitation, particularly solid waste disposal. The political will generated by the Guyana Citizens Initiative in getting citizens to take responsibility for cleaning their own community provides the catalyst for the clean-up exercise to be replicated in other communities. The experience of the Plaisance/Industry District Clean-up Programme offers a number of lessons, which can be shared with others. The District was one of the first areas to be cleared of floodwaters, due to the responsiveness of the residents and other supporting citizens. The tasks were carried out in two phases.

Project objectives:

1 To promote a system of sustainable sanitation in all communities
3 To phase out existing arrangements for solid waste disposal
4 To reduce health risks due to unhealthy and dangerous environment in residential areas
5 To embrace a new system of waste disposal, better geared to maintain new levels of cleanliness
6 Establishment of community radios to assist in the disaster preparedness

Duration of services: Three years
Date of initiation: immediate

National executing agency: Guyana Citizens Initiative, Civil society organizations, IDB, GEF

Description of activities and tasks:

1 Workshop to introduce the lessons learnt from the Guyana Citizens Initiative
   a. How to replicate the clean-up experience in other affected communities
   b. How to introduce sustainable systems of sanitation quickly after post-flood clean-up
2 Establishment of a sustainable system of solid waste collection on the ECD
3 Create an information exchange mechanism in sanitation and clean-up
4 Development of a database to assist in the implementation of the new system
5 Generation of a networking strategy, including an education campaign
6 Development of alternative programmes for the disposable of solid waste
7 Establishment of community radio stations to enhance the networking process to advance the need for a clean environment
8 Ensure that the new programme of collection and destruction of garbage is properly carried out

Expected results and products: Increased awareness among the various communities on the need for an improved system for the disposal of waste. Elimination of garbage and waste material from contaminating the residential areas.

Total required investments: US$430,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks

GUYANA

ENVIRONMENT 3

Project Title: ESTABLISHMENT OF A DISASTER INFRASTRUCTURE RECOVERY PROGRAMME

Sector: Environment

Sub sector: Disaster recovery

Background: The January/February floods inflicted sever difficulties in Regions 3, 4 and 5, area designated as disaster areas at the height of the flooding. From all accounts, these areas were under prepared for the level of flooding and as a result the process of recovery is taking longer than expected. There is an urgent need for the livelihoods of persons in East Coast Demerara, Georgetown and West Coast Demerara to be put back into motion as soon as possible.

Project objectives: To restore the livelihoods of persons affected by the January/February flooding, especially in Georgetown, East Coast Demerara and West Bank Demerara.

Duration of services: Three years
Date of initiation: immediate

National Executing Agency: Office of the President, National Task Force on Infrastructure Recovery

Description of activities and tasks:

1 Develop a disaster preparedness plan to avoid a repeat of the flooding
2 Review all reports with the use of the appropriated designs plans
3 Access the relevant funding for the recovery programme
4 Monitoring of the reconstruction work, especially the execution of approved works in Regions 3, 4 and 5.
5 Selection of competent design/build contractors, requesting modifications of the works as necessary

Expected results and products:

1 Restoration of the conservatory drainage system with the rehabilitation of culverts, outlets and dredging of the canals.
2 Restoration of the livelihoods of persons in the affected areas
3 Availability of a well structured disaster prepared plan

Total required investments: US$100,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor: O

Special remarks:

GUYANA

ENVIRONMENT 4

Project Title: ESTABLISHMENT OF SUSTAINABLE SOLID WASTE MANAGEMENT PROGRAM FOR THE AREAS AFFECTED BY FLOODING

Sector: Environment

Sub sector: Solid Waste

Background: The unprecedented raining and subsequent floods have inundated most areas in Georgetown and the Neighborhood Democratic Councils (NDCs) along the East Coast of Georgetown. The floods have unearthed all the waste that lay buried in drains, canals and everywhere else. This waste included furniture, "floatable" woods, tins, plastic bottles, Styrofoam boxes, animal carcasses and waste material of all kinds. It was an environmental disaster. The resulting floods also placed enormous pressure on the waste disposal services. There was a 50% increase (220-300 tons daily) in the volume of waste, which led to increased demand for disposal services. The floods have exposed the weakness of the SWM program of those NDCs and the city.

Project objectives:

1 To develop a sustained waste management programme which can effect environmental sustainability of the affected geographical area
2 Establish a mechanism for the transfer of this programme to other affected areas

Duration of services: Three years
Date of initiation: immediate

National Executing Agency: Guyana Citizens Initiative, Civil society organization

Description of activities and tasks:

1 Cleanse the environment of litter
2 Remove accumulation and mounds of solid waste
3 Increase the percentage of waste generated to the Mandela Landfill
4 Training of persons involved in the operations of SWM, in the areas of solid waste management, safety and health including equipment, and enforcement
5 Public awareness campaign
6 Establishment of three holding areas for waste

Expected results and products: Development of an effected programme to dispose of solid waste, which can be used in other parts of the country. Development of a cleaner environment.

Total required investments: US$250,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor: PAHO

Special remarks:

GUYANA

DRM 1

Project Title: INSTITUTIONAL CAPACITY BUILDING AT THE NATIONAL LEVEL

Sector: DISASTER RISK MANAGEMENT

Subsector: Capacity Building

Background: Creating a culture of prevention is essential to address everyday hazards and to meet the consequences of a disaster episode. The Disaster Risk Management profiles have been proposed as a means to illustrate ways to enhance and incorporate more efficient and effective mechanisms at the National, Regional and community levels by management of both the risk and consequence of a disaster episode.

Project objectives:

1 Raise level of understanding of disaster risk management at the senior government stakeholder levels.

2 Determine priority needs of the Government to effect any changes in the legislation, policy or institutional mechanisms for preparing for and responding to natural or human induced emergencies.

3 Determine priority areas for strengthening of institutional capacities through skills-based training, seminars, retreats and study tours.

Duration of services: Three years
Date of initiation: Immediate

National Executing Agency: Office of the President, the Civil Defense Commission, and Task Force on Infrastructure Recovery

Description of activities and tasks:

1 Training
2 Study Tours
3 Public Education
4 Social Mobilization
5 Disaster Risk Management print/media materials

Expected results and products

1 Proactive interest in adopting disaster risk management as part of the national development planning strategy.
2 New legislation/policies that empower disaster risk management within the national governmental infrastructure.
3 Creation of an institutional mechanism for dissemination of disaster risk management skills within the public sector.

Total required investments: US$200,000

- Labour requirements – (work/months =6 months)
- National inputs – Nomination of a national focal point institution/Staff
- Imported inputs – Consultant/Technical support from UNDP/BCPR

Financial requirements (dollars)

- Local – n/a
- External – US$200,000
- Donation/Loan/Funding – n/a

Potential source of funding

- External credit: n/a
- Donor: To be determined

Special remarks: The UNDP Bureau of Crisis Prevention and Recovery has expressed interest in providing support for the Disaster Risk Management sector project profiles.

GUYANA

DRM 2

Project Title: INSTITUTIONAL CAPACITY BUILDING AT THE REGIONAL LEVEL

Sector: **DISASTER RISK MANAGEMENT**

Subsector: Capacity Building

Background: Creating a culture of prevention is essential to address everyday hazards and to meet the consequences of a disaster episode. The Disaster Risk Management profiles have been proposed as a means to illustrate ways to enhance and incorporate more efficient and effective mechanisms at the National, Regional and community levels by management of both the risk and consequence of a disaster episode.

Project objectives:

1 Raise level of understanding of disaster risk management at the senior government stakeholder levels.
2 Determine priority needs of the Government to effect any changes in the legislation, policy or institutional mechanisms for preparing for and responding to natural or human induced emergencies.
3 Determine priority areas for strengthening of institutional capacities through skills-based training, seminars, and retreats.

Duration of services: Three years
Date of initiation: Immediate

National executing agency: Regional and District Level Government officials and Civil Defense Commission staff

Description of activities and tasks:

1 Training
2 Public Education
3 Social Mobilization
4 Disaster Risk Management print/media materials

Expected results and products

1 Proactive interest in adopting disaster risk management as part of the national development planning strategy.
2 New legislation/policies that empower disaster risk management within the national governmental infrastructure.
3 Creation of an institutional mechanism for dissemination of disaster risk management skills within the public sector.

Total required investments: US$200,000

- Labour requirements – (work/months =6 months)
- National inputs – Nomination of a national focal point institution/Staff
- Imported inputs – Consultant/Technical support from UNDP/BCPR

Financial requirements (dollars)

- Local – n/a
- External – US$200,000
- Donation/Loan/Funding – n/a

Potential source of funding

- External credit: n/a
- Donor: To be determined

Special remarks: The UNDP Bureau of Crisis Prevention and Recovery has expressed interest in providing support for the Disaster Risk Management sector project profiles.

GUYANA

DRM 3

Project Title: INFRASTRUCTURE SUPPORT FOR A NATIONAL DISASTER RISK MANAGEMENT COUNCIL

Sector: **DISASTER RISK MANAGEMENT**

Subsector: Infrastructure support

Background: Creating a culture of prevention is essential to address everyday hazards and to meet the consequences of a disaster episode. The Disaster Risk Management profiles have been proposed as a means to illustrate ways to enhance and incorporate more efficient and effective mechanisms at the National, Regional and community levels by management of both the risk and consequence of a disaster episode.

Project objectives:

1 Enhanced institutional capacity development of national, regional and district government and civil society stakeholders to contemporary approaches, methods and techniques in disaster risk reduction.
2 National policy, legislation and plans, informed by knowledge from a national risk analysis, adopt an all-risk approach to disaster management.
3 Effective multidisciplinary, multi sectoral and inter-governmental disaster response and mitigation systems for all-risk disaster risk reduction formulated and applied.

Duration of services: Three years
Date of initiation: Immediate

National Executing Agency: Office of the President, the Civil Defence Commission

Description of activities and tasks:

1 Training
2 Public Education
3 Social Mobilization
4 Disaster Risk Management print/media materials

Expected results and products

1 Proactive interest in adopting disaster risk management as part of the national development planning strategy.
2 New legislation/policies that empower disaster risk management within the national governmental infrastructure.
3 Creation of an institutional mechanism for dissemination of disaster risk management skills within the public sector.

Total required investments: US$200,000

- Labour requirements – (work/months =6 months)
- National inputs – Nomination of a national focal point institution/Staff
- Imported inputs – Consultant/Technical support from UNDP/BCPR

Financial requirements (dollars)

- Local – n/a
- External – US$200,000
- Donation/Loan/Funding – n/a

Potential source of funding

- External credit: n/a
- Donor: To be determined

Special remarks: The UNDP Bureau of Crisis Prevention and Recovery has expressed interest in providing support for the Disaster Risk Management sector project profiles.

GUYANA

DRM 4

Project Title: INSTITUTIONAL CAPACITY BUILDING AT THE CIVIL SOCIETY LEVEL

Sector: **DISASTER RISK MANAGEMENT** Subsector: Infrastructure support

Background: Creating a culture of prevention is essential to address everyday hazards and to meet the consequences of a disaster episode. The Disaster Risk Management profiles have been proposed as a means to illustrate ways to enhance and incorporate more efficient and effective mechanisms at the National, Regional and community levels by management of both the risk and consequence of a disaster episode.

Project objectives:

Enhanced institutional capacity development of national, regional and district government and civil society stakeholders to contemporary approaches, methods and techniques in disaster risk reduction.

Duration of services: Three Years
Date of initiation: Immediate

National executing agency: The Civil Defence Commission

Description of activities and tasks:

1 Training
2 Public Education
3 Social Mobilization
4 Disaster Risk Management print/media materials

Expected results and products

1 Proactive interest in adopting disaster risk management as part of the national development planning strategy.
2 New legislation/policies that empower disaster risk management within the national governmental infrastructure.
3 Creation of an institutional mechanism for dissemination of disaster risk management skills within the public sector.

Total required investments: *US$400,000*

- Labour requirements – (work/months =12 months)
- National inputs – Nomination of a national focal point institution/Staff
- Imported inputs – Consultant/Technical support from UNDP/BCPR

Financial requirements (dollars)

- Local – n/a
- External – US$400,000
- Donation/Loan/Funding – n/a

Potential source of funding

- External credit: n/a
- Donor: To be determined

Special remarks: The UNDP Bureau of Crisis Prevention and Recovery has expressed interest in providing support for the Disaster Risk Management sector project profiles.

GUYANA

DRM 5

Project Title: ESTABLISHMENT OF DISASTER RISK MANAGEMENT PLANS

Sector: **DISASTER RISK MANAGEMENT** Subsector: Capacity building

Background: Creating a culture of prevention is essential to address everyday hazards and to meet the consequences of a disaster episode. The Disaster Risk Management profiles have been proposed as a means to illustrate ways to enhance and incorporate more efficient and effective mechanisms at the National, Regional and community levels by management of both the risk and consequence of a disaster episode.

Project objectives:
Raise the capacities of urban and rural communities to address risks from natural and human-induced hazards.

Duration of services: Three Years
Date of initiation: Immediate

National executing agency: Office of the President, the Civil Defence Commission

Description of activities and tasks:

1 Vulnerability and Capacity Analyses, Hazard and Risk Mapping, Resource Inventory development.
2 Training
3 Public Education
4 Social Mobilization
5 Disaster Risk Management print/media materials

Expected results and products:
Community, district and regional level disaster risk management plans completed and developed into a national disaster risk reduction strategy.
Preparedness strategies offer greater assurance of timely and effective mechanisms to respond to identify threats from natural and human-induced hazards.

Total required investments: US$1,200,000

- Labour requirements – (work/months =24 months)
- National inputs – Nomination of a national focal point institution/Staff
- Imported inputs – Consultant/Technical support from UNDP/BCPR

Financial requirements (dollars)

- Local – n/a
- External – US$1,200,000
- Donation/Loan/Funding – n/a

Potential source of funding

- External credit: n/a
- Donor: To be determined

Special remarks: The UNDP Bureau of Crisis Prevention and Recovery has expressed interest in providing support for the Disaster Risk Management sector project profiles.

GUYANA

DRM 6

Project Title: SUPPORT FOR THE DEVELOPMENT OF NEW EARLY WARNING SYSTEMS

Sector: **ENVIRONMENT**

Subsector: Early Warning

Background: Creating a culture of prevention is essential to address everyday hazards and to meet the consequences of a disaster episode. The Disaster Risk Management profiles have been proposed as a means to illustrate ways to enhance and incorporate more efficient and effective mechanisms at the National, Regional and community levels by management of both the risk and consequence of a disaster episode.

Project objectives:

1. Strengthened capacity to track, collate, monitor and disseminate information on phenomena and activities known to trigger disaster events. Support for the development of new early warning mechanisms, for the Guyana Meteorological Department, to prepare for and respond to tropical storms in Guyana
2. The creation of interactive forums on disaster management will offer decision-makers, researchers and scientists, development planners and humanitarian agencies the opportunity to meet in discussion of disaster related topics.
3. The involvement of youth groups, teachers, medical professionals and women counselors will expand on the important dimension of gender into disaster management dialogues.
4. A role for the private sector, including the insurance sector in Guyana, in risk reduction initiatives shall be addressed in forums.

Duration of services: Three years
Date of initiation: Immediate

National executing agency: Office of the President, the Civil Defence Commission and the Department of Meteorology

Description of activities and tasks:

1 Training
2 Procurement and installation of equipment for the Meteorological Department.
3 Disaster Risk Management print/media materials Public Education

Expected results and products:

1 National capacities to monitor meteorological data and predict rainfall and pending tropical storms shall be enhanced.
2 National communication systems to support a rapid early-warning mechanism will be established.
- 3 Wider audience better informed on disaster risk management

Total required investments: US$800,000

- Labour requirements – (work/months =18 months)
- National inputs – Nomination of a national focal point institution/Staff
- Imported inputs – Consultant/Technical support from UNDP/BCPR

Financial requirements (dollars)

- Local – n/a
- External – US$800,000
- Donation/Loan/Funding – n/a

Potential source of funding

- External credit: n/a
- Donor: To be determined

Special remarks: The UNDP Bureau of Crisis Prevention and Recovery has expressed interest in providing support for the Disaster Risk Management sector project profiles.

GUYANA

HEALTH 1

Project Title: TRAINING OF HEALTH WORKERS FROM HEALTH CENTERS IN FLOOD COMMUNITIES

Sector: HEALTH

Subsector: Training

Background: More than 25 health centers in Georgetown, East Coast Demerara and the West Bank Demerara were flooded. By the end of January 2005, Georgetown was able to restart services in 60% of its flooded health centers. At the East Coast, which was hardest hit, 80% of the centers were closed until February 2005. While some of the health centers were able to restart services after clean up actions, others with substantial damage will need restoration first. Five temporary sites for services will be set up at the East Coast and two in Georgetown in addition to the affected communities. .

Project objectives: Training of staff at the health centers in order to re-orient the services and build the capacity for an intensified focus on flood health issues.

Duration of services: Three Years
Date of initiation: Immediate

National executing agency: Ministry of Health

Description of activities and tasks: Training workshop for health workers in flood communities

Expected results and products:
1 Improved capacity for the management of flood related health conditions improved at health centers
2 Public health approaches towards health service provision strengthened including health education and alertness on outbreaks
3 Early detection and improved treatment of suspect leptospirosis cases
Health centers fully integrated in the epidemiological surveillance system

Total required investments: US$100,000
- Labour requirements
- National inputs
- Imported inputs

Financial requirements
- Local
- External
- Donation/Loan/Funding

Potential source of funding
- External credit
- Donor:

Special remarks:

GUYANA

HEALTH 2

Project Title: REHABILITATION OF THE HEALTH INFRASTRUCTURE

Sector: HEALTH

Subsector: Infrastructure

Background: More than 25 health centers and other buildings related to the health sector in Georgetown, East Coast Demerara and the West Bank Demerara were severely damaged by the flooding. By the end of January 2005, Georgetown was able to restart services in 60% of its flooded health centers. At the East Coast, which was hardest hit, 80% of the centers were closed until February 2005. While some of the health centers were able to restart services after clean up actions, others with substantial damage will need restoration first. Five temporary sites for services will be set up at the East Coast and two in Georgetown in addition to the affected communities. .

Project objectives: To restore to optimal operations the damaged health institutions in the affected areas.

Duration of services: Three Years
Date of initiation: Immediate

National executing agency: Ministry of Health

Description of activities and tasks: Restoration of the damaged buildings in the health services.

Expected results and products:
1 Improved capacity for the management of flood related health conditions improved at health centers
2 Public health approaches towards health service provision strengthened including health education and alertness on outbreaks
3. Rehabilitation of health centers and other buildings which provide services to the health sector

Total required investments: US$2,900,000
- Labour requirements
- National inputs
- Imported inputs

Financial requirements
- Local
- External
- Donation/Loan/Funding

Potential source of funding
- External credit
- Donor:

Special remarks:

GUYANA

HEALTH 3

Project Title: **SOCIAL REHABILITATION OF CHILDREN**

Sector: Health

Subsector: Social rehabilitation

Background: Disasters affect children in different ways, yet the psychosocial impact remains invisible and goes untreated. The recent flooding has affected more than 60% of the population many of primary school age. The intensity of the disaster is not a normal occurrence and many were unprepared for the fallout effects of the event. There is a need to sensitize he community, especially teachers, caregivers and parents on how to identify signs of psychosocial trauma in children. They also need to be sensitized towards issues of prevention and care for the psychosocial impact of disasters.

Project objectives:

1 To develop a cadre of trained teachers, caregivers and parents
2 Integrate psycho-social rehabilitation of children into the curriculum as well as into the community and parent empowerment programs
3 Create public awareness on the psycho-social impact of natural disasters on children

Duration of services: Three years
Date of initiation: immediate

National executing agency: Ministry of Education, Civil society organizations

Description of activities and tasks:

1 Develop training materials, train teachers nation-wide and especially in the vulnerable areas
2 Develop and produce public service announcements
3 Train teachers, school administrators and caregivers in psycho-social trauma and rehabilitation
4 Sensitize parents and community leaders

Expected results and products:

1 Package of training materials for psycho-social rehabilitation aimed at teachers, caregivers, parents and children
2 TV, radio spots and programs
3 Workshops at national and district levels

Total required investments: US$50,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

WATER 1

Project Title: IMPROVED WATER QUALITY, FOOD SAFETY AND SANITATION

Sector: SOCIAL

Subsector: Water and Sanitation

Background: Some 72% of the population residing in Regions 3, 4 and 5 were severely affected by the flooding. For a considerable amount of time the living conditions were exacerbated by the deteriorating environmental conditions. This resulted from the proliferation of garbage overcrowded dumpsites, animal carcasses, sewer overflows, lagoons, canals and excreta from latrines and septic tanks which all washed into the residential areas, mixing with debris from damaged houses. A contaminated water distribution system only worsened the situation since chemical contamination from the dumpsites and rotting garbage, storage areas and gas stations also occurred in certain areas.

Project objectives: Improved environment and conditions for personal hygiene

Duration of services: Three years
Date of initiation: Immediate

National executing agency: Ministries of Health

Description of activities and tasks: Purchase of testing equipment, reagents, and water storage tanks, contracting of services to repair community sanitary facilities and training of staff

Expected results and products: Water sources will be tested and contaminated sources treated. Water storage will be provided and sanitary facilities will be restored. Food processing facilities will be inspected

Total required investments: US$4,600,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

HOUSING 1

Project Title: REPAIR AND CONSTRUCTION OF HOUSES

Sector: HOUSING

Subsector: Buildings

Background: Many houses have been badly damaged or suffered extensive or partial water damages due to the unseasonable January/February floods. An estimated 0000houses need urgent and immediate repairs or rebuilding. Residents in the areas of East Coast Demerara, Georgetown and West Demerara were most affected
Lack of building materials and the lack of a plan that could provide alternatives for securing financial assistance have been barriers for the reconstruction of houses in the period following the disaster.

Project objectives: To restore the livelihoods of persons affected by the January/February flooding, especially in Georgetown, East Coast Demerara and West Bank Demerara. The provision of safe and suitable housing to the affected population.

Duration of services: Three years
Date of initiation: Immediate

National executing agency: Office of the President, Ministry of Public Works and Communication, Ministry of Housing and Water

Description of activities and tasks:

1 Conduct a needs assessment review of the affected areas
2 Contracting of services and construction or repair of destroyed and damaged houses

Expected results and products: Houses repaired and constructed taking into account the potential effects of future disasters

Total required investments: US$3,200,000
Labour requirements
- National inputs
- Imported inputs

Financial requirements
- Local
- External
- Donation/Loan/Funding

Potential source of funding
- External credit
- Donor:

Special remarks.

GUYANA

HOUSING 2

Project Title: DEVELOPMENT OF A PROGRAMME FOR SHELTERS

Sector: HOUSING

Subsector: Shelters

Background: The flooding disaster brought into sharp focus the vulnerability of the poor and underprivileged to withstand the effects of flooding and other natural disasters. Persons living in houses, which were unsuitable for withstanding the ravages of, flood waters, especially in Regions 4 and 5, were most affected. Many of the buildings were not suitable for shelters and as result many of the schools were used, some also not suitable as shelters. Therefore the construction of shelters/community centers will provide suitable buildings for community use, such as training, capacity building, and extension programs activities.

Project objectives:

1 To provide shelters for vulnerable parts of the population that will also serve as centers for community development
2 To create a better quality of life for the population so affected

Duration of services: Three years
Date of initiation: immediate

National executing agency: Ministries of Public Works Communication

Description of activities and tasks:

1 Conduct needs assessment determine the number of shelters which are required and select the appropriate sites for their construction
2 Purchase of basic furniture and equipment, identifying local leaders, capacity building and promoting local management of the shelters/community Centers and the use of them for training activities and community development proposed in other projects

Expected results and products: Shelters constructed and equipped, taking into account the suitability of the building for the areas where they would be situated. Organization for local management of the centers.

Total required investments: US$2,500,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

D & I 1

Project Title: **INSTITUTIONAL STRENGTHENING OF THE DRAINAGE AND IRRIGATION BOARD**

Sector: Drainage & Irrigation

Sub sector: Infrastructure

Background: Given the potential for catastrophic failure of the East Demerara Conservancy Dam during the January 2005 extreme floods, it is essential that the utility of the conservancy and associated sluices and drainage canals be restored. Further, given the geographically extensive nature of this hydraulic system, it is beneficial that a comprehensive understanding of these systems be gained.
In order to ensure that the ability to maintain and/or make modifications to this system resides in Guyana, it is essential that capacity be built within the D&I Board. This project therefore seeks to promote the development of that capacity through appropriate training mechanisms.

Project objectives:

1 Develop support for the Director of the D&I Board, so that sound decisions may be made in the future, regarding the safe operation of the system of conservancy dams in Guyana.
2 Provide a strengthened institutional base that would enable prudent management of the level of funding that is required to rehabilitate the drainage and conservancy systems, particularly in the East Coast of Demerara area and for the MMA project area.
3 Improve the qualifications of D&I staff, to be more focused in the disciplines of hydrology, hydraulics and computer modeling of these systems.
4 Facilitate the development of a hydraulic/hydrologic computer model that would predict the behaviour of any component of that system, given variations in any other component. Due care should be taken in the calibration of this model, and the model should reside in Guyana with the D&I Board.

Duration of services: Date of initiation. Project should run for a three (3) year period, commencing in September 2005.

National executing agency: Drainage and Irrigation Board

Description of activities and tasks:

1. Identify suitable candidates for training. Candidates should have a BSc. Degree in Civil Engineering and/or Mechanical Engineering. A minimum of two (2) candidates should be selected through an interview process.
2. Applications should be made to appropriate universities in the US, Canada, the UK and Holland on behalf of these candidates, with funding to be provided by the D&I Board.
3. A suitably qualified firm should be commissioned to undertake the setting up, calibration and running of a hydraulic/hydrologic computer model of the conservancy area, with outfall canals, etc. The firm may be selected through an appropriate process of short listing.
4. Liaison should be made between the selected consulting firm, the university or universities to which they will be attending and the post-graduate students, such that the students may undertake as a part of there

programme (e.g. thesis research) a component of the conservancy modeling exercise. Supervision for their research could therefore be jointly done between university staff and consultant staff.

5. Upon completion of the prescribed course of study, the graduates will be required to return to Guyana to work for a period of not less than three (3) years.
6. The consultant will be required to also return to Guyana for a period of training, during which the two graduates will be expected to become familiar with the day-to-day operation and running of the model. It is anticipated that following this, the consultant may be required to provide input to the model on an as-required basis, until familiarity with the model is entrenched in the D&I Board.

7. It will be the responsibility of the Government of Guyana to ensure that the process of training and familiarity is repeated, so that staff changes may be accommodated without undue trauma to the day-to-day operations of the Board.

Expected results and products:
1 A strengthened D&I Board that will be able to properly manage and administer the large projects that are presently being anticipated.
2 Computer modeling capability resident within the staff of the board, so that day-to-day queries and water management issues may be handled in-house, without having to bring in outside expertise in each case.
3 It is anticipated that on some occasions, external expertise will be required.

Total required investments: US$300,000

- Labour requirements: Minimum two Engineers and technical support staff.
- National inputs: Support for the two candidates in obtaining acceptance and funding to renowned universities specializing in the hydraulics/hydrologic disciplines
- Imported inputs: The commissioning of a consulting team to set up, calibrate and operate a computer model of the Conservancy and its related sluices and canals; to provide supervision and training of the two post-graduate students during their courses; and to provide hands-on familiarization training on the use of the selected model once the post-graduate training is complete.

Financial requirements

- Local: G$2,000,000
- External: US$200,000 for the first three years
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor: PAHO
- IADB
- USAID

GUYANA

D & I 2

Project Title: **REHABILITATION OF THE DRAINAGE CANALS**

Sector: Drainage & Irrigation

Sub sector: Canals

Background: Given the potential for catastrophic failure of the East Demerara Conservancy Dam during the January 2005 extreme floods, it is essential that the utility of the conservancy and associated sluices and drainage canals be restored. Further, given the geographically extensive nature of this hydraulic system, it is beneficial that a comprehensive understanding of these systems be gained.
In order to ensure that the ability to maintain and/or make modifications to this system resides in Guyana, it is essential that capacity be built within the D&I Board. This project therefore seeks to promote the development of that capacity through appropriate training mechanisms.

Project objectives:

1 Develop support for the Director of the D&I Board, so that sound decisions may be made in the future, regarding the safe operation of the system of conservancy dams in Guyana.
2 Provide a strengthened institutional base that would enable prudent management of the level of funding that is required to rehabilitate the drainage and conservancy systems, particularly in the East Coast of Demerara area and for the MMA project area.
3 Facilitate the development of a hydraulic/hydrologic computer model that would predict the behaviour of any component of that system, given variations in any other component. Due care should be taken in the calibration of this model, and the model should reside in Guyana with the D&I Board.

Duration of services: Date of initiation Project should run for a three (3) year period, commencing in September 2005.

National executing agency: Drainage and Irrigation Board

Description of activities and tasks: Rehabilitation of drainage canals

Expected results and products: Efficient operations of the drainage canals

Total required investments: US$6.5 million

- Labour requirements:
- National inputs:
- Imported inputs:

Financial requirements

- Local:
- External:
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor: PAHO
- IADB
- USAID

GUYANA

D & I 3

Project Title: **REHABILITATION OF SLUICES AND KOKERS**

Sector: Infrastructure

Sub sector: Drainage & Irrigation

Background: Given the potential for catastrophic failure of the East Demerara Conservancy Dam during the January 2005 extreme floods, it is essential that the utility of the conservancy and associated sluices and drainage canals be restored. Further, given the geographically extensive nature of this hydraulic system, it is beneficial that a comprehensive understanding of these systems be gained.
In order to ensure that the ability to maintain and/or make modifications to this system resides in Guyana, it is essential that capacity be built within the D&I Board. This project therefore seeks to promote the development of that capacity through appropriate training mechanisms.

Project objectives:

To rehabilitate the sluices and kokers to operational status

Duration of services: Date of initiation . Project should run for a three (3) year period, commencing in September 2005.

National executing agency: Drainage and Irrigation Board

Description of activities and tasks:

To rehabilitate the ineffective sluices and kokers

Expected results and products: Rehabilitation of sluices and kokers

Total required investments: US$3.5million

- Labour requirements:
- National inputs:
- Imported inputs:

Financial requirements

- Local:
- External:
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor: PAHO
- IADB
- USAID

GUYANA

D & I 4

Project Title: **REHABILITATION OF CONSERVANCIES**

Sector: Drainage & Irrigation

Sub sector: Conservancies

Background: Given the potential for catastrophic failure of the East Demerara Conservancy Dam during the January 2005 extreme floods, it is essential that the utility of the conservancy and associated sluices and drainage canals be restored. Further, given the geographically extensive nature of this hydraulic system, it is beneficial that a comprehensive understanding of these systems be gained.
In order to ensure that the ability to maintain and/or make modifications to this system resides in Guyana, it is essential that capacity be built within the D&I Board. This project therefore seeks to promote the development of that capacity through appropriate training mechanisms.

Project objectives:

Facilitate the development of a hydraulic/hydrologic computer model that would predict the behaviour of any component of that system, given variations in any other component.
To rehabilitate the conservancies to functional status

Duration of services: Date of initiation. Project should run for a three (3) year period, commencing in September 2005.

National executing agency: Drainage and Irrigation Board

Description of activities and tasks:

To rehabilitate the conservancies to optimal operations

Expected results and products: Operational conservancies.

Total required investments: US$6.8million

- Labour requirements:
- National inputs:
- Imported inputs:

Financial requirements

- Local:
- External:
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor: PAHO
- IADB
- USAID

GUYANA

D & I 5

Project Title: ROAD REHABILITATION

Sector: INFASTRUCTURE

Sub sector: Roads

Background: The flood disaster resulted in the submersion of the entire road transportation system in the attached communities. The effect was significant with major damages to wearing surface and configuration. It is estimated that more than 415 miles of roadway sustained extensive damages.

Project objectives:

To restore the road transportation system in communities affected by the devastating floods of December 2004 and January – February 2005

Duration of services: 3 years
Date of initiation: June 2005

National Executing Agency: Ministry of Public Works, WSG, SIMAP

Description of activities and tasks:

1. Review assessment of post flood status of road transportation system by affected communities
2. Rehabilitation of all roads, unsurfaced, surfaced and municipal which were severely affected by the floods

Expected results and products:

.Restored road transportation

Total required investments: US$16.75million

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External

Donation/Loan/Funding

Potential source of funding

- External credit

GUYANA

D & I 5a

Project Title: REHABILITATION OF SURFACED COMMUNITY ROADS IN AFFECTED REGIONS

Sector: INFASTRUCTURE

Sub sector: Community Roads

Background: The flood disaster resulted in the submersion of the entire road transportation system in the attached communities. 80 miles of surfaced (paved) roads in NDC were submerged and damaged during the flood.

Project objectives:

To restore the components of the paved road network in affected communities

Duration of services: Three years
Date of initiation: June 2005

National Executing Agency: Ministry of Public Works, WSG, SIMAP, Ministry of Housing and Water

Description of activities and tasks:

1 Mapping
2 Rehabilitation of 80 miles of the following categories of paved roads, 6 miles of DBST and 72 of AC

Expected results and products:

.Restored surfaced road transportation in the affected communities

Total required investments: US$6.0M

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External

Donation/Loan/Funding

Potential source of funding

- External credit

GUYANA

D& I 5b

Project Title: **REHABILITATION OF MUNICIPAL ROADS**

Sector: INFRASTRUCTURE

Sub sector: Municipal Roads

Background: The entire roadway in Georgetown was submerged by the floods. Extensive deterioration to wearing surfaces and supporting structures occurred.

Project objectives:

To restore the paved road network in the City

Duration of services: Three years
Date of initiation: immediate

National Executing Agency: Ministry of Housing and Water, M&CC, Donor Agency

Description of activities and tasks:

1. Mapping of affected municipal road (surfaced)
2. Rehabilitation of 140 miles of surfaced municipal roads, 18 miles of DBST, 107 miles of AC and 19 miles of C

Expected results and products: Restored road network in the City

Total required investments: US$8.5M

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

D & I 5c

Project Title: REHABILITATION OF UNSURFACED COMMUNITY ROADS IN AFFECTED REGIONS

Sector: INFASTRUCTURE

Sub sector: Unsurfaced Roads

Background: The flood disaster resulted in the submersion of the entire road transportation system in the attached communities. The effect was significant with major damages to wearing surface and configuration. It is estimated that more than 415 miles of roadway sustained extensive damages.

Project objectives:

To restore the road transportation system in communities affected by the devastating floods of December 2004 and January – February 2005

Duration of services: 3 years
Date of initiation: June 2005

National Executing Agency: Ministry of Public Works, WSG, SIMAP

Description of activities and tasks:

3. Review assessment of post flood status of road transportation system by affected communities
4. Rehabilitation of all roads, unsurfaced, surfaced and municipal180km of the following categories of unsurfaced road in affected communities, 35km of mud, 2 km of white sand, 43 km of white sand and clay, 32 km of burnt earth and 28km crusher run

Expected results and products: .Restored unsurfaced road transportation

Total required investments: US$2.25million

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External

Donation/Loan/Funding

Potential source of funding

- External credit

GUYANA

INCOME 1

Project Title: EMPLOYMENT REGENERATION AND BUSINESS REACTIVATION

Sector: ECONOMIC GROWTH

Sub sector: Employment

Background: The January floods caused extensive damages to the small and medium sized enterprises and small farmers. The cost of repairs, rebuilding and relocation would be expensive> in many instances these small business people would need to replace machinery and equipment, furniture and vehicles and considerable inventory. The floods, which caused severe losses in revenue to these entrepreneurs thus placing an extreme burden on them to effect their own recovery and rehabilitation process. As such it is imperative that a well-planned programme of employment regeneration and business reactivation is initiated as soon as possible.

Project objectives:

4 To foster an efficient and inclusive business sector through sourcing financing to recommence business and farming operations
5 To increase labour and resource productivity
6 Provide financing and enabling environment, including security and adequate infrastructure
7 To prevent the closure of small businesses and farms affected by the floods

Duration of services: Three years
Date of initiation: immediate

National executing agency: Ministries of Finance and Social Development

Description of activities and tasks:

1 Establish emergency temporary income support
2 Assistance in rescheduling debt repayments
3 Consultations among the key stakeholders
4 Information campaign to manage expectations through the media
5 Conduct need assessment of the affected persons to determine the eligibility criteria for assistance and to assist in identifying the target groups for further assistance and their needs

Expected results and products:

1 To ensure the continuity of productive capacity in the affected areas
2 To increase the capacity of these group engage in continuing income-generating activities

Total required investments: US$4,000,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks:

GUYANA

INCOME 2

Project Title: STRENGTHEN WOMEN'S CAPACITYFOR INCOME GENERATION ACTIVITIES IN THE POST DISASTER PHASE

Sector: ECONOMIC GROWTH

Subsector: Women in development

Background: The disaster demonstrated the vulnerability of poor people, living in areas with poor infrastructure. It is estimated that 30 percent of the household in Guyana is headed by women and account for some 39% of the working population yet the unemployment rate of women is estimated at about 18%. Many are engaged in the so-called informal sector, which suffered extreme hardship as a result of the floods. Income generation activities need to be introduced in order to reduce the vulnerability and create opportunities allowing the women themselves to improve their situation.

Project objectives: Reduce the economic vulnerability of women who have suffered as a result of the disaster. Assistance to women who are micro entrepreneurs who work from their home

Duration of services: Three years
Date of initiation: immediate

National executing agency: Ministry of Labour, Human Services & Social Security

Description of activities and tasks:

1 Training and capacity development activities for women
2 Establishment of a Micro-credit facility to support, in the recovery period, the welfare of women in the informal sector

Expected results and products: Increased capacity of women to engage in income generation activities

Total required investments: US$60,000

- Labour requirements
- National inputs
- Imported inputs

Financial requirements

- Local
- External
- Donation/Loan/Funding

Potential source of funding

- External credit
- Donor:

Special remarks