



**National Emergency Management
Organization**

Damage Assessment and Needs Analysis

INITIAL DAMAGE ASSESSMENT REPORT



**TROPICAL DEPRESSION #16
FLOODING EVENTS**

As at 20TH OCTOBER, 2008

BELIZE

The Preliminary assessment of damages ideally be undertaken within 4-8 hours after the all clear has been given. The assessment will be informed by one or all of the following;

- *An aerial reconnaissance done by national or regional teams*
- *District/Local surveys*
- *The application of pre-established baseline vulnerability database*
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The objectives of this stage in the DANA process are to;

- *To obtain a general overview of the damage.*
- *Identify the initial needs of the impacted population including emergency response requirements*

From this stage a report will be generated on completion of the assessment. The damage and losses presented here reflect the available information, compiled during a brief period of time. This is not a final assessment of the damage and needs since it reflects information available at the time of the assessment.

This information is collected within 4-8 hours of the all clear and will therefore:

- *Provide a general overview of the extent and magnitude of the damage etc.*
- *Determine the need for a Disaster Declaration*
- *Provide information that would inform the responses of the International and Regional Donor Community*
- *Assist in determining the initial response to the event*
- *Help to determine the need for the second phase of the assessment process.*

Event Summary

Tropical Depression No. 16 (TD 16), which threatened Honduras, Guatemala and Belize made landfall in northern Honduras on Thursday, 16th October 2008. The remnants of TD 16 caused widespread rainfall across Belize resulting in life threatening floods in communities along the Mopan, Macal and Belize Rivers. All rivers in the country of Belize are in spate with the above mentioned rivers already overflowing their banks. Initial assessments of the impact zone indicate direct impacts to 18 communities, with communities within the CAYO district being most severely impacted. In total these communities support over 38,000 individuals. Some 269 individuals have been evacuated from their homes.

Communities hardest hit include Bullet Tree Falls, Calla Creek, Santa Familia, and Branch Mouth, Spanish Lookout, and surrounds, Blackman Eddy and Roaring Creek. Search and rescue operations conducted in the affected areas saved about 90 persons. Livelihoods affected are based largely on subsistence farming, trading, transportation, cottage industries and casual employment in the agriculture and tourism sectors. There were no related deaths and no immediate reports of illnesses; however there is a need to monitor and control vector and water borne related illnesses within the impact zones.

Significant losses were initially reported for the infrastructure, agriculture, petroleum and education sectors. It is expected that there will also be significant reductions in tourism revenues resulting from the flood events. The DANA writing team is predicting significant economic losses from the agriculture and petroleum industries, coupled with unprecedented food insecurity concerns resulting from losses of subsistence agriculture and disruptions in livelihoods.

Total Direct losses have been estimated as being \$19.1 Million based on October 20th 2008 information.

- Infrastructure: \$3.2 Million Dollars
- Agriculture \$7.2 Million Dollars
- Petroleum \$8.7 Million Dollars

******All estimates are presented in BZD***

Table 1: Summary Sheet

District	Village/Settlement	Population	Persons Evacuated	Persons in Shelters	Houses Flooded	Agriculture Land Affected (acres)	Types of Damages	Major Needs
CAYO	Arenal	447			4			
	Benque Viejo	5096	6		5			
	Bullet Tree Falls (Camelot and Paslow Falls)	1613	129	88 (Evacuated to CET)	100		Rising water, bridge under water and closed; strong current (about 23 houses submerged)	Food, water, chlorination, sanitary supplies (Clorox, soap and garbage bags)
	Calla Creek Area	233	65	(Evacuated to private residence)	25	300 (Corn)	Mopan River Flooded and Road transport cut off	Food, water, chlorination, diapers and milk (3 babies)
	Santa Familia Village	853				274 (Corn)	Area flooded	Food, water, chlorination, sanitary supplies (Clorox, soap and garbage bags)
	Billy White							
	Esperanza	1085				47 (Corn)		
	San Ignacio	12734					Businesses in Market Area flooded; septic tanks flooded	
	Roaring Creek	1645					Bridge flooded and closed at evening	
	Succotz Village	1812				1		
Spanish Lookout Area	1786					7250 (Corn) 150 (subsistence crops)	Road transportation cut off	
TOTAL		27304	200	88	135	Total acreage: 7871 (Corn); 150 (subsistence crops)		
STANN CREEK	Dangriga Town	8424			3	6 (Cassava) 17.6 (Corn) 0.5 (Yam) 1.75 (Yampi) 0.6 (Coco yam) 0.5 (Sweet pepper) 0.75 (Tomatoes) 0.5 (Cabbage)	1 house was blown off its supports	
	Hope Creek/ Melinda	481	35	35 (shelter closed Saturday 18th October)				
	Mullins River	198						Damage to causeways
	Kendal	95						Flooding at Kendal crossing
	Sittee River	312						Damages to causeways
TOTAL		9510	35	0	3	Total Acreage: 27.6 Subsistence Crops		
TOLEDO	Jordan	34	34					
TOTAL		34	34	0	0	Total Acreage: 0		



8-hour report
NATIONAL DISASTER SITUATION REPORT

Flooding Events associated with Tropical Depression No. 16

20th October, 2008

A. SITUATION:

1. Nature of the Disaster

Tropical Depression #16 which threatened Belize, Honduras and Mexico made landfall in Honduras on Thursday, 16th October, 2008. The remnants of TD 16 dumped over 15 inches of rain, mostly over the western and southern parts of Belize, causing life-threatening floods, and the saturation of soils increasing the potential for mudslides. Persistent surface low pressures over the northwest Caribbean and northern Central America will couple with unstable upper level conditions will work to contribute to continued showery weather conditions.

2. Area Affected

As a result of the intense rains, several surface water systems are at flood stages placing low lying flood plain communities at risk. All communities along the Macal, Mopan Belize North Stann Creek, Mullins, Sittee, the Rio Hondo, Sibun, Moho and Rio Grande Rivers remain in full alert. At present flooding is most intense within the Cayo District affecting the communities of Calla Creek, Bullet Tree Falls, Santa Familia, Succotz and Roaring Creek villages; the settlement of Spanish Lookout; and the Benque Viejo and San Ignacio towns. Within the Stann Creek District, local assessors have reported flood and water related damages in Dangriga Town, Hope Creek Village, and the communities of Mullins River and Sittee River. Jordan Village in the Toledo District was initially evacuated due to the treat of floods. The total population supported within these initially impacted areas is estimated at 36,848¹ persons.

It is expected that flooding will extend to communities within the lower Belize River Watershed within the upcoming days.

¹ Statistical **Institute of Belize**

3. Impact

3.1. Damage by Sector:

Infrastructure: Damages to the road networks within the broad impact zone contributes significantly to the reported losses within the infrastructural system. The Ministry of Works has calculated the initial estimate of damage as being 3.2 Million dollars. Major road systems which have sustained damages include the causeways at Crooked Tree, Mullins River and Sittie River, which are reportedly flooded, resulting in a disruption of access to these communities. The road entrance to Benque Viejo Village and the highway entrance to Succotz Village are currently under approximately 15 inches of water.

There have also been reports of damages to bridges in the impact zone. The cable bridge over Calla Creek was destroyed by the initial flooding, while the bridges at Bullet Tree Falls, Iguana Creek, and Roaring Creek are now completely submerged by flood waters. The low wooden bridge in San Ignacio is also under water. The temporary crossing at Kendal has undergone periods of flooding and resulting restoration by MOW. Assessors will need to wait until flood water subsides to make a final determination of the impact on the flooding on the integrity of the infrastructure.

There are reports on losses and damages to houses and the disruption of many households in the impact zone; however the numbers of damaged and/or destroyed homes have not been quantified by the local assessment team. Preliminary reports indicate water damages to the interior of homes, detailed assessments are required to determine impacts to the integrity of structures within the flood zone.

Table 2: Preliminary Road Infrastructure Requirements

PRELIMINARY ASSESSMENT- ROAD INFRASTRUCTURE		
COROZAL		
ROAD NAME	DESCRIPTION OF WORKS	COST
Tony's to Pueblo Nuevo	435 CY of spot patching To road approaches to ferry.	\$ 18,405.00
Diego Street	1000 feet spot patching / resurfacing and drainage improvement.	\$ 15,235.00
Patchakan to Xaibe	Flooded – a 300 ft. section requires patching / resurfacing.	\$ 18,400.00
Remate to San Pedro	300 feet section requires resurfacing.	\$ 18,400.00
San Narciso to San Victor	400 feet section requires resurfacing.	\$ 18,520.00
Buena Vista – San Victor	450 ft section requires resurfacing/patching	\$ 20,835.00

Copper Bank to Sarteneja	requires resurfacing of 4000 ft (Light flooding with road defects)	\$	45,600.00
Cerro Road	Spot patching of 100 feet	\$	4,700.00
Chunox – Little Belize	Spot patching – 300 ft	\$	21,125.00
Caledonia – Buena Vista	Minor replenishment of material 150 CY.	\$	6,350.00
Santa Cruz – Caledonia	Resurfacing with 25 loads of road material	\$	7,210.00
SUB TOTAL		\$	194,780.00

ORANGE WALK

ROAD NAME	DESCRIPTION OF WORKS	COST	
San Antonio Road	Requires resurfacing of 5000 ft section and grading.	\$	56,889.00
San Roman Road	requires resurfacing of a 5000 ft section and grading	\$	56,889.00
Guinea Grass Road	1000 ft section requires resurfacing	\$	31,633.00
Orange Walk – Blue Creek Road	Requires re-surfacing of a cumulative length of 2000 ft. cleaning of inlets /outlet channels.	\$	58,445.00
Old Northern Highway	Requires re-surfacing of a cumulative length of 4627 ft. and a 3 ft x 30ft culvert replacement	\$	55,707.00
Douglas Road and Village streets	A cumulative length of 1845 ft requires resurfacing. Cleaning of drain inlets / outlets and removal of debris from streets required.	\$	35,745.00
San Estevan Village Road	Ferry access road 200 ft (narrows sugar road) requires resurfacing.	\$	17,246.00
Pasadita Street	Require spot patching	\$	2,520.00
Trial Farm Streets	Require patching/ resurfacing 200 loads of materials.	\$	97,600.00
San Estevan Road	Requires premix patching.	\$	23,414.00
Indian Church – San Carlos	3000 ft section needs resurfacing & drainage cleaning.	\$	32,500.00
SUB TOTAL		\$	468,588.00

BELIZE

ROAD NAME	DESCRIPTION OF WORKS	COST
Manatee Road	Require spot patching / resurfacing.	\$ 135,168.00
Crooked Tree Causeway	3 miles Require spot patching / resurfacing.	\$ 295,675.00
Bomba Road	Requires resurfacing of a 500 ft section and 3 ft dia. culverts.	\$ 59,846.00
Northern Hwy	Premix Patching on between miles 2 and 15. – 100 CY Premix	\$ 90,695.00
Los Lagos Streets	Require resurfacing. Cumulative length is 2000 ft.	\$ 21,775.00
Western Highway	Premix Patching on between mile 1 – 3 – 50 C.Y Premix	\$ 25,395.00
Western Avenue	Premix Patching 25 CY	\$ 12,650.00
SUB TOTAL		\$ 641,204.00

CAYO

ROAD NAME	DESCRIPTION OF WORKS	COST
More Tomorrow Road	Spot patching, drain and culvert cleaning	\$ 46,000.00
Ibrahim Abdulah	Spot patching, drain and culvert cleaning	\$ 37,600.00
Franks Eddy Road	Premix patching and shoulder replenishment, drain and culvert cleaning	\$ 14,040.00
Valley of Peace	Spot patching, drain and culvert cleaning, base failure repairs debris cleaning at bridges	\$ 22,692.00
Roaring Creek Village Streets	Spot patching, drain and culvert cleaning	\$ 14,400.00
San Ignacio Town	Flooded near the Macal River. Market under water.	\$ 21,344.00
Baking Pot Ferry	Repairs to cable	\$ 9,400.00
Baking Pot Road	Repair to ferry and bridge approaches. Minor re-surfacing and grading.	\$ 19,420.00
Iguana Creek Bridge	Debris cleaning	\$ 7,500.00

Iguana Creek Road	Requires 20 C.Y of Premix. Shoulder replenishment for 1000 feet and washing of roadway approaches	\$	23,380.00
Calla Creek Road	Repairs to ford approach, approaches to cable bridge, and spot patching / resurfacing to two access roads, restoration of cable bridge	\$	78,908.00
Bullet Tree Road	Debris cleaning on bridge, 12 CY premix patching, base failure repairs, surface dressing 1000 feet. Drainage cleaning and culvert installation.	\$	97,656.00
Paslow Falls Road	1000 feet need lifting and resurfacing. Culverts installation required.	\$	15,140.00
Bullet Tree - Spanish Lookout	Inaccessible. 500 feet flooded. Need drain cleaning. Billy White bridge needs repair scouring of river bed. 1.5 miles need spot patching. Need grading.	\$	60,056.00
Santa Familia	Replacement of double 5 ft dia. culvert in suffered washout	\$	50,000.00
Branch mouth cable bridge	Replacement of pedestrian cable bridge and Slope stabilization	\$	85,000.00
Roaring Creek	Pavement over bridge deck damaged and need repairs. Debris cleaning and rail repairs.	\$	32,445.00
Santa Elena – San Antonio Road	700 feet requires base failure repairs. Cristo Rey causeway repairs. 10 CY Premix patching.	\$	40,841.00
Georgeville Road	1800 feet needs re-surfacing and base failure repairs and drainage restoration.	\$	42,667.00
Western Highway	At mile 72 (Succotz) requires drain cleaning, culvert replacement, shoulder replenishment and premix patching.	\$	69,049.00
Succotz Village Streets	Spot Patching, Premix Patching, Drain restoration.	\$	30,345.00
Savannah area Streets	San Ignacio requires premix patching of road way near taxi and bus parking areas	\$	33,000.00
Low Level Timber Bridge	requires replacement of fenders, decking, runners and debris cleaning.	\$	40,000.00
	Access road to Low Level Bridge requires surface dressing of approaches	\$	76,235.00
	George Price Ave. needs Premix Patching .	\$	8,000.00
	Slope stabilization on Santa Elena Side near George Price Ave.	\$	150,000.00

Other bridges - Cayo	Waterway and debris cleaning	\$	85,000.00
SUB TOTAL		\$	1,210,118.00

STANN CREEK

ROAD NAME	DESCRIPTION OF WORKS	COST	
	Cow-pen Road requires spot patching and cleaning of side drains and culverts.	\$	18,133.00
	Kendal Causeway requires resurfacing – 100 ft section.	\$	18,600.00
	Mullins River Causeway requires resurfacing – a 300 ft section	\$	12,060.00
	Hopkins – Sittee Road needs resurfacing of a cumulative length of 800 ft and premix patching (4 C.Y), slope stabilization and spot patching	\$	43,258.00
	Hopkins road requires premix patching – 4 C.Y and spot patching	\$	26,016.00
	Placencia Road flooded, near Riversdale, requires resurfacing – 2000 ft section.	\$	37,500.00
Manatee Road Mile 18 to Mile 36	Resurfacing, drainage restoration, spot patching	\$	196,741.00
SUB TOTAL		\$	352,308.00

TOLEDO

ROAD NAME	DESCRIPTION OF WORKS	COST	
Blue Creek Causeway	Require spot patching/ resurfacing, debris cleaning.	\$	9,750.00
Aguacate Road	Requires spot patching / resurfacing, culvert cleaning	\$	8,000.00
San Pablo Road	Requires major resurfacing and replacement of 2 No. 5 ft. diameter culverts flooded at two different locations due to 1000 ft. washout.	\$	75,679.00
Monkey River Road	Requires spot patching / resurfacing and side drain cleaning.	\$	65,865.00

Santa Anna Road	Bridge require spot patching / resurfacing to approaches	\$	15,868.00
Little Golden Stream	Debris cleaning	\$	5,500.00
Swasey Bridge	Debris cleaning	\$	3,500.00
Bladen Bridge	Debris cleaning	\$	3,500.00
San Jose Road	Spot patching and cleaning of debris	\$	28,875.00
San Antonio - San Jose Road	Spot patching and cleaning of debris	\$	44,750.00
Timber Bridges - Toledo	Waterway and Debris cleaning	\$	75,000.00
Sundaywood – Conejo Road	Spot patching and cleaning of culverts	\$	31,560.00
SUB TOTAL		\$	367,847.00

SUMMARY

DISTRICT	COST
Corozal	194,780.00
Orange Walk	468,588.00
Belize	641,204.00
Cayo	1,210,118.00
Stann Creek	352,308.00
Toledo	367,847.00
GRAND TOTAL	3,234,845.00

Source of Information: Ministry of Works

******The preliminary assessment was prepared using private sector unit rates based on assumptions made which considered both the immediate as well as long term effects on the road network.***

Tourism: Several major cruise tourism destinations have been rendered inaccessible due to flooding, this include Xunantunich, Jaguar Paw, and Actun Tunichil Muknal. Losses to the sector have not yet been quantified, however with each day of inactivity, it is expected that losses in revenue earnings and to livelihoods will increase substantially.

Agriculture: Initial reports indicate major losses in the agricultural sector particularly to national corn production. It is estimated that approximately 50% of mechanized corn crops remain unharvested in the fields. The Impacts to subsistence farms are also expected to be significant, of importance are reported losses vegetable and root crop systems. Initial cost estimate of the damages to the agricultural sector is 7.2 Million dollars.

Table 3: Preliminary Agricultural Losses

Agriculture Data	Initial Loss Estimate	
	Milpa	Mechanised
Corn	300	274
	47	7250
	347	7524
acre	1500	4000
price/lb	0.21	0.21
	315	840
per acre	\$350.00	\$900.00
Sub-total	\$121,450.00	\$6,771,600.00
Subsistence	177.6	
	\$1,600.00	
Sub-total	\$284,160.00	
TOTAL Agriculture Loss	\$405,610.00	\$6,771,600.00

Source of information: DEMO's (Cayo and Stann Creek Districts)

Business Places: The flooding has disrupted business operations country wide due to the inability of laborers to report to their work place. Certain areas of business, such as the San Ignacio Market Square remains inundated resulting in a suspension of services.

Rural Water Supply: It is reported that more than 50% of rural potable water systems in the Cayo district have been damaged by the floods. There is also concern as to the contamination of water supplies at its source.

Telecommunications/ Electricity: There has been no report of disruptions in the essential utilities. The reservoirs of the Chalillo and Mollejon dams continue to operate above their spill way levels, however dam operations remain normal.

Petroleum: The flooding at Iguana Creek and the temporary loss of Kendal has disrupted national petroleum exports. It is reported that BNE routine activities have been disrupted over the past 2 weeks resulting in initial losses being estimated as 8.7 Million dollars.

3.2. Effects on Population

There are no reports of casualties resulting from the rising waterways; the primary impacts on the population are related to their displacement due to damages and disruptions in the functionality of their homes. A total of 269 people have been evacuated nationally with the Cayo district reporting the greatest number of evacuees. Only a small percentage of evacuees remain in national shelters, most of the impacted residences have opted to temporarily move in with friends and families residing above the flood levels.

Disruption in access to some population centers are expected to result in degradation of the humanitarian situation as local water and food supplies are depleted over the upcoming days. The inability to access emergency or routine health care may also intensify this situation.

Losses of subsistence farms and disruption of livelihoods due to the floods are expected to create a situation of food insecurity for impact rural populations in the immediate to short term.

The floods and continuous rains have resulted in the suspension of classes in the Cayo, Belize, Stann Creek, and Toledo District. There is no indication as to when classes will resume. This suspension of classes impacts a total of 62,097 children and adolescents in these districts.

Table 4: Preliminary Impact Chart

Persons Impacted Cayo District				
Village/Community	Population	Percentage Affected (Estimated)	No. of Persons Affected	Remarks
Arenal	603	50	301	Farming
Banana Bank	40	50	20	Tourism
Benque Viejo del Carmen Town	6,880	10	668	Urban Area

Billy White	328	10	32	Farming
Black Man Eddy	552	1	5	Farming
Branch Mouth	350	70	245	Farming
Bullet Tree	1,747	80	1397	Urban Setting
Calla Creek	315	100	315	Farming
Cristo Rey	93	2	18	
Duck Run 1	973	40	389	Farming
La Clarissa Falls	10	10	10	Tourist Resort
Macaw Bank	-	-		Farming
More Tomorrow	162	5	81	Farming
Ontario	788	5	39	Farming
Paslow Falls	400	80	320	Farming
Plant Sucker	25	100	25	Farming
Providencia	-	-	-	Farming
Roaring Creek	2221	1	22	Farming
San Antonio	1893	2	38	Farming
Santa Elena	7,000	2	140	Urban
Santa Familia	1152	70	806	Farming
Spanish Lookout	-	-		Mechanised Farming
Succotz Village	2,446	10	240	Tourism/Farming
Unitedville	753	0.5	4	Farming
TOTAL			5115	

Source of Information: NEMO

NEMO has indicated that humanitarian assistance will be necessary to facilitate household return to normalcy.

4. Projected Evolution/Secondary Threats

Projected Evolution/Secondary Threats

A low pressure system approaching Belize is expected to dump more rain on the country over the next two days, exacerbating the current situation. Conditions are expected to worsen as flood waters from the Mopan and Macal Rivers empty into the Belize River, flowing from the Cayo District into the Belize River Valley Area and, subsequently, Belize City. The Crooked Tree Causeway is inundated, and the Belize River is already overflowing its banks in villages such as Willows and Flowers' Bank.

Persons living in communities within the Belize River Watershed are expected to move to higher ground as the situation progresses.

Health concerns, such as dead animals floating in water trafficked by humans and stagnant pools, will need to be addressed immediately in order to protect communities against possible outbreaks of diseases such as cholera and dengue fever, and amoebic dysentery.

Food security is another concern. Much of the season's corn crop is still in the fields, submerged in flood waters. It is expected that this commodity will have to be imported to satisfy national demand in the short to medium term. The destruction of subsistence crops means losses in household income and an additional burden on low-income families.

B. NATIONAL RESPONSE

5. Administrative Measures

There has been no declaration of emergency from Central Government. Security and Transport personnel are presently involved in directing traffic in inundated areas and search and rescue, and private citizens have been assisting with the transportation of persons from and through inundated areas.

NEMO continues to monitor the situation.

6. Operations/Mobilization of Resources

NEMO has been activated and district DEMO's authorized to coordinate assessment and response efforts. Search and rescue operations, evacuations, and damage assessments are being executed and undertaken at the local level. District Emergency Management personnel have been mobilized and temporary shelters staffed with Public Officers have been opened. Health care personnel have also been available to assist with medical situations arising in shelters.

Distribution of relief supplies has been undertaken by NEMO.

7. Constraints

- A full assessment of the situation and the needs on the ground cannot be achieved until the water recedes.
- The flow of information through official channels is slow and the information provided limited.

8. Priority Needs

Immediate needs in the affected areas, particularly the Cayo District, include food, water, chlorination tablets, cleaning and sanitary supplies (mops, brooms, buckets, Clorox, soap and garbage bags); clothing for children, babies and adults; interior infrastructure such as sheetrock, Plycem, and plywood to facilitate repairs to houses damaged by the flood after the waters recede. ULV spraying and larviciding will be urgently needed in the inundated areas.

Health personnel working in the affected areas will need to have medical kits containing Oral Re-hydration Salts (ORS), antipyretics, tetanus toxoide, anti-inflammatory drugs, anti-malaria drugs, and blood testing supplies.

This report is submitted to NEMO for its consideration and action.