



## **Resilience Through Recovery**

A Presentation by the Hon. Chief Secretary of the Cayman Islands to the  
Deputy Governors & Chief Secretaries Conference in Bermuda

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### **Introduction**

In 2003, the Cayman Islands commemorated an entire year of festivities and activities to mark the Quincentennial anniversary of our discovery. Few among us could imagine that within one year, we would be faced with the greatest challenge of the past 500 years in the form of Hurricane Ivan. Today, I am here to share the story of the Cayman Islands' experience with Hurricane Ivan with the intention of highlighting the importance of preparedness and recovery planning and their overall impact on a country's ability to recover -- or what we refer to as resilience.

### **What has history taught us?**

Hurricane Ivan by no means was the first hurricane that the Cayman Islands ever faced and, in certain categories, it was not the most devastating. In terms of casualties, the two deaths attributed to Ivan were dwarfed by the reported death toll of 109 in the infamous 1932 hurricane. Another hurricane in 1903 had an estimated total of 15 men lost at sea on vessels attempting to weather the storm. Reports of a hurricane in 1785 attributed great loss of life due to the collapse of houses in the strong winds, sailors lost at sea, and people drowning in a reported tidal wave. In 1876, it was reported that all churches and most houses were totally destroyed, while those still standing were severely damaged and barely habitable.

Hurricane Ivan was the ultimate test but not the worst case scenario. Fortunately, we did not have to deal with the effects of a tidal wave which occurred in the hurricanes of 1785 and 1932. Nor were our economic drivers wiped out as was often the case in previous hurricanes when the islands depended heavily upon agriculture and fishing for their sustenance.

It can be argued that some of the hurricanes in the late 1800's and early 1900's were more devastating than Ivan due to the severe overall loss of lives, property, crops, water sources, and economic productivity suffered by early inhabitants of the Cayman Islands. This would have been compounded by the greater logistical difficulties inhabitants faced as a result of poorer communication and transportation by sea only, slowing down the arrival of any aid.

However, it was in the face of such difficulties that early settlers displayed great resilience, ingenuity, and endurance in rebuilding time and time again. Indeed, assistance was received from Jamaica and at times from the United Kingdom. However, Cayman's relative isolation meant that precedence was set for self-initiative based recovery and rebuilding efforts. It is with the recollection of the heroic efforts of our Caymanian forefathers that we have embarked upon the task of rebuilding our beloved islands, and improving the way in which we prepare, respond, and recover from major hurricanes and other natural disasters.

### **The Need for a Planned Approach to Hurricane Preparedness**

The Cayman Islands, today, boasts of an economy based upon the dual pillars of financial services and tourism which have rapidly emerged over the past four (4) decades. In order to offer a first class internationally renowned product in both of these sectors, the proper infrastructure must be in place. The Cayman Islands Civil Service (of which I am head), can be described as the enabler of this growth and development. The Civil Service has been called upon to provide, coordinate, and regulate the various aspects of the infrastructure needed to ensure that development occurs in a planned manner with a long term perspective in mind.

The demand for this infrastructure has spurred rapid and unparalleled growth which has changed the landscape and physical appearance of these islands. Development and planning laws have

taken into account the direct threat of hurricanes we face in the Cayman Islands, producing the establishment of strict codes by which all buildings must be constructed.

As technology has improved, Islanders can be forewarned of a hurricane's possible strike days in advance. Residents can follow and plot its path via satellite-imaging-rebroadcast on television, internet, newspapers, and radio.

However, on September 9, 2004, as had been the case since 1989, the agency responsible for hurricane preparedness was the National Hurricane Committee under the Authority of the Hurricane Preparedness Plan.

The National Hurricane Committee, or NHC, is comprised mostly of senior civil servants trained in emergency operations. The NHC is responsible for approving and reviewing the Hurricane Preparedness Plan, and for the overall direction and control of the plan at all stages of a hurricane emergency. It comprises of 13 committees established in Grand Cayman under the direct control of the NHC, and is charged with the task of carrying out the Hurricane Preparedness Plan. In addition, there are four committees that report to the District Emergency Committee in the Sister Islands of Cayman Brac and Little Cayman.

The thirteen committees on Grand Cayman are comprised of:

1. Education and Training
2. Search and Rescue and Initial Clearance
3. Utilities and Communications
4. Transportation
5. Shelter Assessment and Damage Evaluation
6. Medical Relief
7. Essential Relief services
8. Evacuation
9. Coordination
10. Disasters and Records
11. Emergency Communications

12. Recovery

13. Civil Service Redeployment

### **From Preparation to Inundation**

It can be argued that our people had become somewhat complacent over the years. Nearly two generations had passed since Cayman's last and most severe hit from a hurricane had been experienced. Prior to hurricane Ivan, the last hurricane to touch ashore was hurricane Gilbert in 1988. However, Cayman was mercifully spared from the devastation suffered in Jamaica and the Eastern Caribbean. In more recent years, there were near misses by Hurricanes Mitch, Michelle and even Charlie which passed just prior to Ivan.

Nonetheless, as we watched the catastrophic force which pummelled the mountainous island of Grenada, a grave sense of urgency drove our residents into immediate preparations. Likewise, the NHC's plan was kicked into high gear on September 07, 2004 with the declaration of a Hurricane Alert, followed by a Hurricane Watch, and finally a Hurricane Warning as Ivan's course took a direct path for our shores.

The NHC was headquartered at the Fire Service Headquarters at Owen Roberts International Airport, as prescribed in the Hurricane Preparedness Plan. There the Emergency Operations Centre was established as an arm of the NHC.

Through information provided by Government Information Services, radio stations and local television informed the public of potential risks and precautionary measures to take. They also broadcast advice for hurricane preparedness, and types of essential supplies to purchase while providing frequent updates on the geographical position of Ivan.

Shelters were opened, and trained shelter wardens from the NHC and the Adventist Development and Relief Agency (ADRA) began to register those who were evacuated from flood prone areas, or who sought a more secure place to weather the storm.

As the hurricane intensified in its approach, concerns were raised about the location and structural soundness of particular shelters and these were, fortunately, not opened. At the time of the hurricane the 3000 available spaces at shelters were all taken. However, other public and commercial buildings became de facto shelters as the number of people seeking shelter climbed.

Department of Tourism officials coordinated with hoteliers and condo owners to advise their guests to attempt to get off of the island. Over 5000 people were evacuated in the days prior to the strike of Hurricane Ivan. Our national flag carrier, Cayman Airways, operated 11 flights on September 9<sup>th</sup>, and 16 flights on September 10<sup>th</sup> to the US mainland to accommodate the over 4900 tourists and residents seeking to evacuate.

On Saturday September 11<sup>th</sup>, the sole provider of electricity, Caribbean Utilities Company (CUC), cut off the electricity as a precautionary measure. Similarly, the Cayman Islands Water Authority, shut off water mains to prevent any potential contamination.

The Hurricane Preparedness Plan was in full effect, with the Governor announcing that he would assume full responsibility under the Emergency Powers Law, on the evening of Saturday, September 11<sup>th</sup>. The entire island braced itself and prayed, hoping that once again, we would be spared the wrath of what was now teetering between a Category 4 and 5 mega storm system.

Hurricane Ivan passed within 30 miles of the capital George Town at its closest approach, with sustained winds in excess of 150mph with gusts reaching over 220mph. This was accompanied by storm surge from the North Sound peaking at 10 ft, and another storm surge from the South Sound peaking at 6-9 ft with waves 15-20 ft high breaking on unprotected stretches of the south and west coasts. These surges caused widespread flooding, complete washouts of portions of roadways, and large deposits of sand.

The United Nations Development Programme (UNDP) undertook an ECLAC damage assessment of the impact of hurricane Ivan in the Cayman Islands which highlighted the following:

- The total impact of the disaster on the Cayman Islands was US \$3.4 billion. This is much greater than the total hurricane season damage last year to Grenada, Jamaica, Dominican Republic and Bahamas combined.
- The total amount of damage and losses is equivalent to about 183% of GDP
- Over 80% of the impact reflects damage and destruction of assets. Housing was the most significantly impacted.
- The amount of damage is estimated at \$75,700 per person, the highest ever encountered by ECLAC.
- The observed construction capacity for the best year in the past decade resulted in construction permits for about CI \$400 million, or one-sixth of the direct damage of CI 2.4 billion suffered by our housing and building stock.
- A mitigating factor in addressing the damage is the level of insurance coverage although there is a significant degree of under-insurance and a high proportion of the population that has no insurance.

### **Rising to Respond**

“Where do we begin?” was a question repeated time and time again on the morning of Monday September 13<sup>th</sup>, as the magnitude of the devastation left behind by Ivan became increasingly apparent. As far as the eye could see, downed power lines, broken and bent trees, flooded cars, and debris from damaged and destroyed homes were strewn in a seemingly endless array of destruction.

The people of the Cayman Islands were faced with their greatest challenge of all times. This would prove to be a defining moment, not only for the people of Cayman, but for the National Hurricane Committee. New challenges faced this organization that up until that point had only dealt with Hurricane preparations. As the rain clouds cleared, and the winds calmed down, the list of needs and demands grew as new problems and potential crises arose.

The NHC, subsequently assumed the role of managing and coordinating the immediate post-hurricane recovery efforts under the State of Emergency issued by H.E. the Governor. Matters of immediate concern included:

- Ascertainment of loss of life/injuries
- Search & Rescue
- Damage Assessment of Public Buildings, Shelters, Communication, and Utilities
- Consultation with the Private Sector
- Assessment of damage to Economic Sectors
- Evacuation
- Coordination of International Aid
- Reduction of Public Health hazards
- Addressing of security concerns
- Co-ordination and Re-establishment of communication throughout islands and with outside world

As the recovery efforts commenced, Cabinet identified Housing and Debris Management as the two priorities around which the recovery effort would set its axis.

The removal of debris had to commence immediately, and carried out in a timely and efficient manner. As you will, therefore, appreciate we had to take a completely new approach to dealing with a debris situation of this magnitude. This included identifying debris staging sites to alleviate the stress on the landfill, and hiring an international debris removal firm to coordinate the effort. For debris removal, government to date has spent over USD\$ 9.7 million dollars. This figure includes monies paid out for the processing of an estimated total of 450,000 cubic yards of material, the removal of over 3000 vehicles, and the screening of over 28,000 cubic yards of sand.

In regards to the issue of housing, the UN's ECLAC Report cited that 80% of the impact reflected damage and destruction of assets, with Housing being the most significantly impacted of these assets.

Government, again, had to develop creative means of dealing with the lack of adequate housing. This included measures such as offering grants to uninsured home-owners for post hurricane repairs, making of salary advances/small loans to Civil Servants, and for

the first time providing travel trailers as temporary housing for displaced families. These travel trailers are permitted to be on island for a maximum of 1 year, and are not to serve as shelter during the next hurricane season.

### **Major Lessons Learned**

Although the NHC had performed valiantly and continued to address needs as they arose, it became obvious that while the human capital existed to conduct proper damage assessments, and organize a coordinated national recovery plan, that capacity had not been developed within the public or private sector. Indeed, to sufficiently develop the capacity to deal with a disaster of the magnitude of Hurricane Ivan, it would take months, if not years, of planning. This time was not available in the days immediately following the passage of the storm.

In order to bridge the capacity gap, the Cayman Islands Government enlisted the assistance of JL Witt Associates, an Emergency Management Consultancy firm comprised of former employees of the American Federal Emergency Management Agency (FEMA), and received teams from the United Nations Development Program (UNDP), and the Economic Commission of Latin America and the Caribbean (ECLAC), who conducted comprehensive damage assessments of the losses suffered by all sectors in the community.

The major lessons that were learned from the passage of Hurricane Ivan were:

- A Hurricane Preparedness Plan is not complete without a complementary Recovery Plan.
- National Emergency Operation plans should be based on clearly agreed upon Concepts of Operation, Worst case Scenarios, and include Sector Plans.
- A fully organized Emergency Management system for the Cayman Islands must be developed.
- Hardened EOC facilities capable of functioning during and after a major disaster must be sought.

- Modification and change of the preparedness, response, and recovery process must be carried out to improve our ability to serve our citizens. This would include the constant review and updating of the Hurricane Preparedness Plan.
- The business sector needs to be broadly involved in the coordinated planning and oversight of economic recovery and disaster mitigation efforts.
- The Cayman Islands Government must remain committed to reinforcing the lessons learned from Ivan.

### **Reviewing the National Hurricane Preparedness Plan**

The old adage says “Experience teaches Wisdom”. Indeed, many of the gaps in the recovery aspect of our plan were due to a lack of experience in implementing a major recovery effort caused by a disaster of any sort.

It is now eight (8) months since the passage of hurricane Ivan. It is also less than one (1) month until the commencement of the Atlantic Hurricane Season. Whilst we continuously pray as a nation for God’s mercy to be spared from storms this season, we continue to keep a watchful eye on the predictions. We note that another very active season is being projected.

We therefore are taking an even more prudent and mindful approach to hurricane preparedness as we have the added factors of a battered and weakened physical infrastructure, and a recovering traumatized population.

Whilst we can chalk up many of the mistakes and lapses during the recovery phase to a lack of experience, in the future the public may not be as understanding. Expectations would have changed as it would only be natural to assume that our Hurricane Preparedness Plan would have been improved upon. The Civil Service will inevitably be called upon, again, to rise to the occasion and lead. It is with the hope of improving upon our service delivery that we have undertaken a review of our National Hurricane Preparedness Plan, not only to understand what didn’t work, but to know what did, and to prevent any re-invention of the wheel.

## **Background and context**

Prior to Hurricane Ivan, the Cayman Islands Government had a traditional National Hurricane Committee (NHC), and had invested in a reasonably 'hardened' Emergency operations Centre (EOC). The NHC Focus was mainly on the Mobilisation of Responders, Emergency Phase Management, and Immediate Response to SEVERE WEATHER / HURRICANE EVENTS.

The operational plan was sequential and not functionally focused, resulting at times in a lack of clarity of who should be doing what in certain instances. This was experienced more in the recovery phase when it was unclear what agency should be taking the lead with certain functions i.e. coordinating damage assessment to housing. There were anywhere between 3-5 surveys being conducted by the Children & Family Services, the Dept. of Planning, all seeking to collect more or less the same information.

The NHC, however, had recent hurricane experience, having mobilised and dealt creditably with several near misses including Gilbert, Mitch, Michelle, and Charlie. Key NHC members have had training in Emergency Operations and were also involved in preparation for other crisis situations such as Airport incidents. These skills served the NHC well, and members adapted to their roles in the recovery phase.

NHC members were involved in the preparation of the Cayman Islands "Vision 2008" Strategic Development document which included a commitment under 'Strategy 14' to move CI Disaster Management to another Level, and build links to Mitigation and Recovery Phases.

Fortunately, in contrast to Jamaica and Grenada, (due to the relatively low/slow turnover of staff in CIG NHC team) many key team members had been involved in EOC operations in previous hurricane events going back to Gilbert (1988). This experience benefited us tremendously in our greatest hour of need.

However, we have learned that plans made were not apparently always based on the absolute worst case scenario. Sector and coordination plans were uneven, leading to vital areas having to be addressed in an ad hoc manner at times.

Lessons Learned Included:

- National Emergency Operation plans should be based on clearly agreed upon Concepts of Operation, Worst Case Scenarios, and include Sector Plans
- National EOC should be hardened facilities capable of functioning before, during, and after a major event...including capacity for radio broadcasting
- An NHC/EOC Team with experience under stress is an asset to be guarded

### **Warning & Mobilization**

All warning systems worked effectively, as there was great response to warnings for citizens to prepare themselves for the storm. The forecasted track proved to be imprecise. This was due, in part, to the failure of the National Weather Service meteorological instruments during the heightened impact of the storm.

Most radio stations appeared unable to continue broadcasting during the storm, having experienced loss of broadcast antennas, damage to studios, or loss of back up generators. The public radio station, Radio Cayman, experienced a similar outage for a period of 32 hours. However, the EOC became Radio Cayman's back-up site, and direct broadcasts were conducted from there. This should be replicated in future EOC's.

Whilst, the lack of clear direction meant that full advantage was not taken of the human capital, the procedure for the phased mobilization of Civil Servants and their redeployment worked for the most part during the recovery phase.

The notable exception was the alarmingly low initial turnout of police officers during the recovery phase. Unexpected loss of their facilities and a disproportionately high loss of housing amongst police officers were major contributors to this problem.

Shortfalls in law enforcement manpower were bridged by the generous help of our neighbours from Turks and Caicos, British Virgin Islands, and Bermuda, including two large contingents from the Bermuda Regiment.

In compliance with the procedure documented for protecting vital government records, during the mobilization phase, Government Departments were required to transfer vital records to the National Archive for safe-keeping. This procedure was observed, however, many of these records ended up receiving severe damage. Ironically, most of these damaged records would have been secure at their original agencies location!

Lessons Learned included:

- Mobilization arrangements especially those involving uniformed groups need to be reviewed
- Regional contingency plans for critical services such as Police and Health Care need to be coordinated with other Caribbean Islands.
- Back up communications and meteorological systems need to be secured to ensure that broadcasts can continue during the direct impact of future storms to provide the public with vital and accurate information
- Public Sector agency contingencies (such as Vital Records, Personnel and Asset Protection necessary for continuity of Service etc) should be reviewed and revised annually, and the Public Sector Head/Central Govts of the Region must develop and maintain acceptable procedures for protection these vital assets.

### **Preparedness**

It must be repeated that the strongest focus was placed on emergency operations, search and rescue, and the immediate relief phase in the NHC plan. The EOC/Hurricane Preparedness Plan role in the wider continuity of Government's function was unclear, leading to some confusion and duplication of efforts in the recovery phase.

The location of the EOC at the Fire Service Headquarters proved to be a wise choice. The building proved to be physically sound, suitably manned, and adequately equipped for its vital function as a crisis centre.

It was clear that a 'worst case scenario' of severe storm surge effects was given prior consideration. However, the duration of the flooding associated with Ivan seemed to take even the NHC/EOC Team by surprise. Indeed, at one point it served for a few hours as a hurricane shelter for dozens of flood victims in nearby neighborhoods.

Lessons Learned included:

- Government needs to ensure that EOC arrangements plans are complimented by Policy/Strategy, and satellite operations at a Higher Level of Government
- Continuity of Government cannot be an EOC only function.

### **Response**

The response to the severe conditions largely followed the plans outlined in the National Hurricane Preparedness Plan. Unforeseen problems arose, including the need for Action at local/community level, and these exposed the relatively poor development of 'district level plans'. Ad hoc arrangements involving the NHC teams, community leaders (including elected representatives), churches, and local contractors/hardware suppliers, however, resolved many of these problems.

The NHC had sufficient authority to make decisions and exercised this authority in a timely manner, implementing intermediate measures when unexpected circumstances arose. Communication links with appropriate sectors worked well until these systems were closed to Grand Cayman when many phone providers' systems subsequently failed, creating a log jam.

Lessons Learned included:

- The need for response plans should extend to district levels and should involve, wherever possible, respected leaders in those communities.

- There is a need for clarity of roles and functions in the emergency plan
- A strong and resilient telecommunications network is invaluable as cellular and mobile IT systems are playing an emerging role in emergency communications and crisis management

### **Evacuation and Shelter- Off Island**

The severity of Ivan led to the decision to transfer thousands of people to the U.S. mainland. This exercise, which has become standard operating procedure for the NHC, originally involved mainly visitors and dependents/family members of non essential staff of Tourism and Financial Services Sectors. However, many Caymanians sent vulnerable family members off island. This included a mass evacuation of dialysis patients for whom interruptions in treatment due to power loss could prove fatal.

It must be noted that the logistics including reception facilities for the overseas evacuees were not always perfect, although special dispensation was sought, and found, with U.S. Immigration and Naturalization Services for special family situations. This served to ease the already high stress levels of those who had to be evacuated.

Lessons Learned included:

- The exercise included responsibility for cost recovery by the air carriers (namely Cayman Airways) and the effectiveness of the operation needs to be further evaluated
- More formalized agreements for evacuation should be arranged with other carriers from the countries of origin for the larger expatriate groups residing in Cayman.
- The Tourism/ Financial Services sectors should develop a coordinated plan to cover this activity in future events
- The Regional Tourism sector (CTO etc) should develop 'Best Practices' to guide Tourism destinations on Pre-Hurricane off Island Evacuation Systems
- Arrangements with health care providers overseas should be made to include scenarios of mass evacuations

## **Evacuation, Shelter and Mass Care – On Island**

The severity of Ivan forced many residents to utilize the designated shelters for an extended period. However, not all persons in insecure locations or vulnerable housing went to designated shelters prior to the first impact of the storm.

As is the practice in many Caribbean islands, many families – based on experiences in previous but less severe storms – chose to ride out Ivan at a family home considered secure in many cases with family members/ neighbors.

Greater stress was placed on shelter facilities as more people arrived during the early impact of the storm, creating less than perfect conditions. Some commercial buildings were used as informal ‘public’ shelters for staff and their families (and neighboring residents).

Some designated shelters experienced flooding/water damage with one shelter in particular suffering the loss of the entire roof, forcing a daring rescue of shelterees in the midst of the storm.

While many of the shelters had been constructed over 20 years ago to the standards of the building codes of the day, it was heartening to note that the newest shelter, the Prospect Primary School, performed exceptionally well during the storm, justifying the improvement in standards.

Lessons Learned included:

- The Evacuation/ Shelter system, and Plan, must be based on ‘Worst Case Scenarios’ and exercised regularly. The possible use of robust private buildings must be explored as must the requirement that strata/ apartment / planned community development complexes must incorporate shelter provisions for their residents

- The Tourism/Financial Services sector which employ significant numbers of expatriate workers must participate in a Shelter/ Evacuation planning process, and develop a Coordinated Plan to cover this activity with the NHC in future events
- New standards for shelter construction as well as revision of the locations of some shelters must be implemented.
- Shelter needs of Special/Vulnerable groups should be addressed with input from key stakeholders in the public and private sector, with special concerns for the welfare needs of such groups including the elderly, disabled, and marginally housed

### **Mass Care and Relief**

The Cayman Islands Government encouraged the decantation of non- essential expatriate/contract workers post Ivan which had the effect of relieving the stress on scarce and precious resources of food, water, fuel, and shelter.

The lack of a highly structured District Welfare plan was compensated by the very strong response of traditional provision of welfare by extended families, neighbors, and local community organizations such as churches and service clubs.

Amazingly, there was a very low demand for medical care due to the heeding of pre-hurricane warnings, and successful shelter mobilization during the impact of the storm. Relief arrangements were facilitated by the knowledge that food and water supplies had been secured, and this was repeatedly communicated to the public, preventing any mass panic.

Transportation and communication resources were compromised and limited, but most residents understood from the formal information flow from the EOC, via Radio Cayman, the overall conditions that existed after the Hurricane. This communication was reinforced by the limited cellular telephone contacts.

The NHC/EOC Team had the authority and was able to take decisions and improvise solutions to many of the operational issues that arose.

Lessons Learned included:

- Warning, Mobilization, Sheltering in resistant structures during the extreme conditions can ensure minimal loss of life/injury even in severe hurricanes
- The NHC/EOC Teams were clear on their mandate and functioned credibly
- Notwithstanding the low casualty/mortality figures during Ivan, improvements are needed in all aspects of the Mass casualty/care arrangements
- Community strengths such as the affinity for family members/neighbors needs to be coordinated into the future plans for mass care and relief

### **Clearance - Continuity and Resumption of Critical Public/Private Services**

The clean up / Clearance of roads & the airport runway / Reopening of Critical facilities was undertaken as soon as it was physically possible by:

- EOC Teams with pre-positioned heavy equipment
- Local operators of heavy equipment
- Local residents acting out of a traditional care for community
- Staff elements, once their domestic situations were stabilized

Some of the Government Service agencies may not have had 'formal' continuity/resumption plans, nor the capacity for quick resumption. Some Government departments were found to have 'placed all their eggs in one basket'.

Such was the case in the private sector as well, with many essential services being crippled due to a lack of comprehensive risk management, and disaster mitigation planning. Loss of business facilities, supply lines, and essential staff proved overwhelming for many public and private services.

However, when called upon for assistance by the NHC, the private sector responded valiantly by providing communication services and fuel, and supplying and distributing

food and potable water. Displaying a spirit of national interest, their assistance came even without 'formal' arrangements to do so.

Lessons Learned included:

- The Hurricane planning process must cover in better detail the POST Hurricane period
- A seamless transition from Emergency to Recovery phases is only possible if more attention is devoted to structured and coordinated Continuity Planning in both Public and Private Sectors.

### **Continuity of business: Tourism /Financial Services Sectors**

The Tourism and Financial Services Sectors have emerged as critical elements of the Cayman Islands economy. Their hurricane experience is varied and their special vulnerabilities, needs, and sensitivities have not yet been comprehensively integrated into the National Disaster Planning Process and the National Hurricane Plan. Both sectors experienced interruptions as a result of Ivan. The degree to which these interruptions can be prevented or reduced in the future depends on the effectiveness of the plans to address the major concerns of each sector.

Tourism Sector concerns include:

- The exposure of plant
- The special evacuation and welfare needs of guests and expatriate workers
- Marketplace communication, both locally and internationally
- Recovery plans

Financial Services Sector concerns include:

- Continuity of utility and communication services
- Business interruption
- Welfare of staff and families

The NHC may not be fully aware of all the concerns of these private sector elements as NHC arrangements are largely public sector driven. The impact on revenue and jobs due to business interruptions in these sectors has significance for the entire country.

While public/private sector cooperation in regards to disaster preparedness, mitigation, and recovery has not always been an area of strength for the Cayman Islands, the passage of Hurricane Ivan marked unprecedented collaboration, and a spirit of togetherness between the public and private sectors. This underscored the need for further cooperation in the future preparedness planning phases.

Lessons Learned included:

- New/emerging economically important sectors need to be engaged in the contingency planning and recovery processes
- The lessons from these sectors in Cayman and other Caribbean islands need to be compiled into a best practice guide
- The impact of Natural Disasters on jobs, and national revenues, need to be analyzed and responded to by stakeholders in a more systematic manner across the region

### **Transitional Operations: Debris Clearance**

The solid waste system was overwhelmed by the sand, vegetative waste, and with building and roofing material strewn across the landscape by Ivan. The large number of destroyed vehicles further compounded the problem. Special efforts were made to address this issue.

While the actual removal of debris operated in a timely and efficient manner, there was great controversy surrounding this issue, including the awarding of contracts and the location of debris collection sites. However, this was for the most part anticipated and resolved as we had to take a completely new approach to dealing with a debris situation of this magnitude.

Lessons Learned included:

- A debris clearance sub plan including pre-approval of disposal sites needs to accompany the National Hurricane Preparedness Plan

### **Social Sector Impacts**

Ivan was often referred to as the great equalizer, for immediately after its passage it was a common sight to see rich and poor alike walking along the roads, hitching rides, and lining up outside grocery stores and gas stations. The social sectors most severely impacted by the hurricane included Education, Health, and Housing.

Education was particularly hard hit. Most schools, both public and private, suffered heavy losses, preventing re-opening for almost 3 months in some cases. Much of this was due to structural failures. However, staff retention, as was the case in other sectors was a critical issue as many teachers found themselves homeless.

Although two fatalities were recorded, there were an amazingly low number of serious injuries reported. Immediately after the hurricane, speculation of Public Health risks was rife. Concerns were raised about the safety of the drinking water supply and sanitary conditions as many septic tanks had flooded. Mosquito borne illnesses were of significant concern due to the widespread pools of stagnant water left behind by Ivan's floods and rains. Similarly, fly and rodent issues were raised as large amounts of debris, piled up along roadsides, became potential nesting grounds for blight.

Public awareness campaigns via radio and printed literature became key tools in the fight against Health risks. Clear warnings and advisories on the proper storage and disposal of food, and the handling of generators, fibre glass from insulation, construction material, and household cleaning chemicals undoubtedly prevented further injuries and illness in Ivan's aftermath.

While a significant portion of the population had home insurance, actual settlement amounts received had not always equalled the level of claims. Furthermore, a significant

portion of the population was uninsured, leaving many with few options for assistance. With a significant portion of housing developments being within one (1) mile of the coast, or on re-claimed wetlands, much of the housing stock was set in the direct path of the storm's fury.

Whilst strict building codes contributed to reduction in loss of life, the location of some homes, and some communities, must be revisited as they undoubtedly are in high risk areas. The actual housing standards of vulnerable populations such as the indigent, elderly, low income single parent, and the marginally housed was often found to be inadequate, and highly vulnerable to the destruction caused by Ivan.

Lessons Learned included:

- Building standards for schools must be reviewed, especially as schools often serve as hurricane shelters
- Contingency planning for the emergency housing of key personnel, including health care professionals and teachers, must be created
- Implementation of risk reduction strategies for the vulnerable segments of our population must be enacted

### **Natural Resource/ Environmental Impacts**

The UN ECLAC report noted that large amounts of sand blanketed most of the coastal areas of Grand Cayman as a result of the strength of the hurricane winds and the storm surges. Storm surges and water accumulation in ponds and wetlands led to flooding, and in many low lying areas water and debris moved from the beaches inland, and from ponds and marshes into the sea.

Most of the trees were blown down in the most heavily inhabited districts throughout the island. This, has had the effect of not only reducing the amount of local fruit, and shade from the sun, but has displaced the natural habitats of many of our birds and wildlife, some of which are indigenous to Cayman.

Large portions of agricultural lands were also over-saturated with salt water, hindering the rejuvenation of these lands and creating a dire situation for the islands' farmers.

To a great extent, environmental impacts must be viewed as directly correlated to the development patterns in the Islands. Traditionally, as is often the case in other Island states, development has been focussed along the coastal areas. As these developments have become more lucrative and, with coastal lands sky rocketing in value, these upper end coastal communities have often come at the expense of failing to retain our mangroves: the coastlines natural defence system. The lack of this buffer was evident in the type of damage experienced in the housing sector.

Lessons Learned included:

- Greater consideration must be taken for the protection of our coast-line natural defence systems such as barrier reefs and mangroves during development.

### **Conclusion**

Local capacity to carry out comprehensive and integrated multi-sector impact assessments was insufficiently developed and, as a consequence, had to be supplemented by the UN ECLAC team. This certainly became an issue as we attempted to tell our story and to make appeals for international assistance with the rebuilding of particularly devastated sectors such as Education and the Environment. Internationally recognized standards for damage assessments are a necessity to merely approach a door.

ECLAC has since led training to develop the capacity to carry out comprehensive multi-sector impact assessments here in Cayman. Additional training will focus on strengthening data collection and analysis for more robust financial planning and economic forecasting.

Going forward, the focus is on building a national culture of community disaster resilience. This will involve development, expansion, implementation, and institutionalization of disaster reduction programs and processes throughout government

and the private sector. As a result, we are hoping to be better prepared to deal with any future disasters, whether natural or manmade.

In the hurricane prone region of the Caribbean, planning for post-disaster recovery must take into account the potential for disasters substantially worse than Hurricane Ivan. Indeed, it has been a very sobering reality that we in Cayman cannot consider Ivan a worst-case scenario.

In fact, whilst risk reduction and disaster mitigation plans will be from now on a part of the National Hurricane Preparedness Plan, more efficient Emergency Management Systems and Agencies must be developed to address other disasters such as Earthquakes, Oil-Spills, and even responses to acts of terror.

Whilst this is a daunting task, we as survivors of Hurricane Ivan can attest to the fact that it can be accomplished. When we look back upon our history, utilizing and improving upon existing human and social capital has always been and, still is, the Caymanian way of recovery. Indeed it can be said that this is the Caribbean way, for we are a proud, creative and capable people with an indomitable spirit. As leaders of the Civil Service, we will be called upon to ensure that the Government is sufficiently prepared for any disaster, and that our preparation, response, and recovery systems promote resilience.