



# COASTAL ZONE MANAGEMENT – MANGROVE RESTORATION PROJECT/MPI

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# **PRESENTATION OUTLINE**

- ◉ **Guyana's Coastal Zone**
- ◉ **Climate change and the Coastal Zone**
- ◉ **Guyana's Coastal Mangrove Ecosystem**
- ◉ **Climate Impacts**
- ◉ **Mitigation and Adaptation methods**
- ◉ **Mangroves: Nature's Sea Defence**
- ◉ **Guyana's Mangrove Restoration and Management Programme**
- ◉ **Challenges**
- ◉ **Lessons Learned**
- ◉ **Recommendations**

# GUYANA'S COASTAL ZONE



- Guyana has a total land mass of **214,970 km<sup>2</sup>**.
- Coastal zone represents about **5%** of the total land mass.
- Narrow strip of fertile land measuring **430km** and varies in width from 26 km to 77 km.
- Coastal zone is between **0.5m to 1.4m below mean high tide level** and is protected by a complex system of canals, sea walls, mangroves.
- **90%** of population and 5 of 6 urban townships are located on the coast.
- It is the economic and administrative hub of the country.
- Guyana's main agriculture production is concentrated on the coast. Agriculture represents 20% of GDP and 40% of Guyana's export earnings.

# COASTAL GEORGETOWN

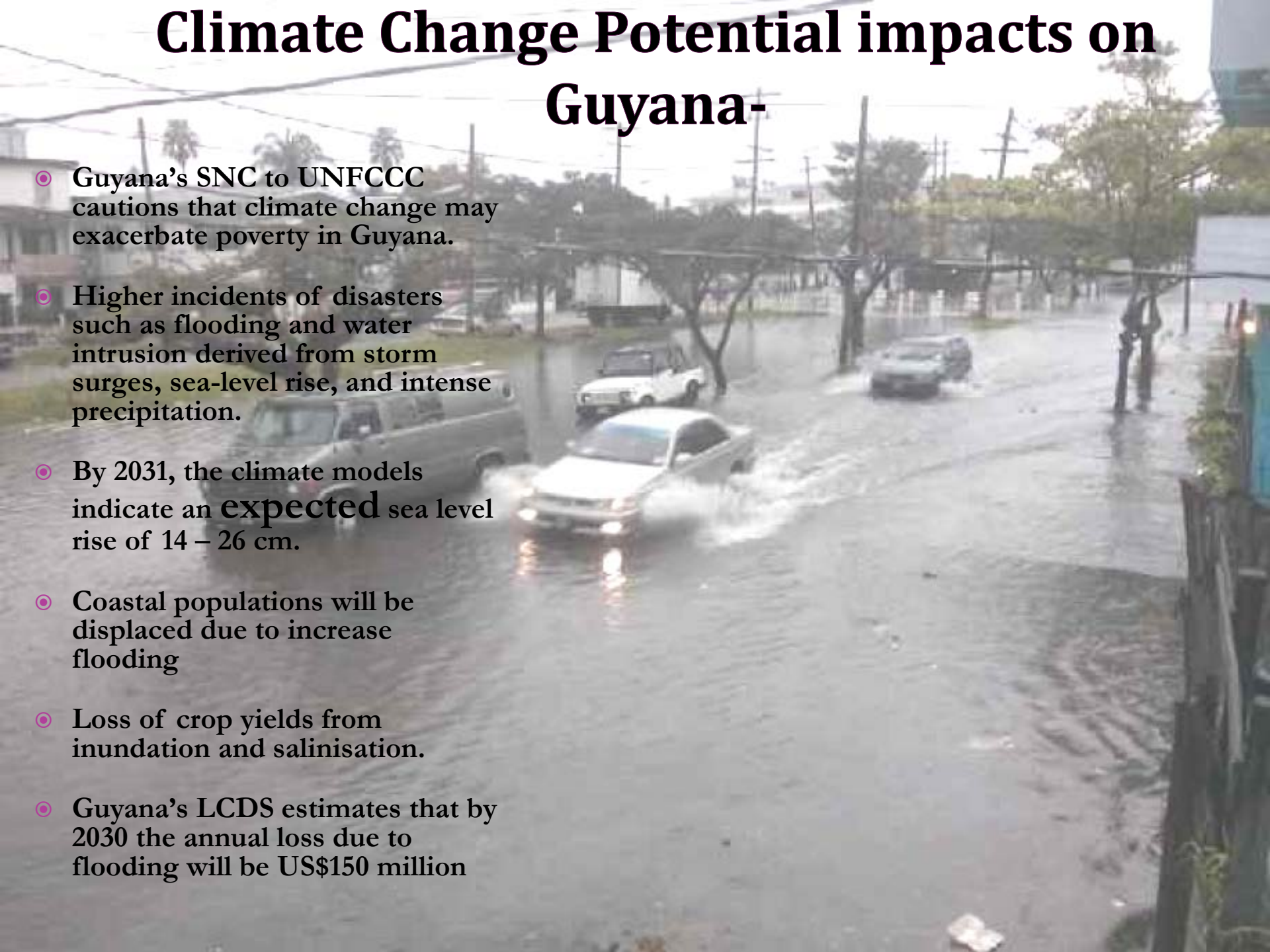


# Climate Change and its potential impact on Guyana- Can we stop this?



# Climate Change Potential impacts on Guyana-

- Guyana's SNC to UNFCCC cautions that climate change may exacerbate poverty in Guyana.
- Higher incidents of disasters such as flooding and water intrusion derived from storm surges, sea-level rise, and intense precipitation.
- By 2031, the climate models indicate an **expected** sea level rise of 14 – 26 cm.
- Coastal populations will be displaced due to increase flooding
- Loss of crop yields from inundation and salinisation.
- Guyana's LCDS estimates that by 2030 the annual loss due to flooding will be US\$150 million



# MITIGATION OR ADAPTATION? BOTH ARE NEEDED

## Mitigation

- options limited in coasts and marine areas

Reduce GHG

## Adaptation

- more options

Reactive

Proactive

# BEST PRACTICES WITH A CLIMATE CHANGE LENS

- ◉ Integrated coastal management
  - Set backs
  - Infrastructure
  - Access
  - Development/planning/urbanization
  - Disaster Preparation
- ◉ Strengthening traditional coping mechanisms
- ◉ Habitat restoration and protection
- ◉ Fisheries reconstruction and ecosystem approaches
- ◉ Marine Protected Areas



# Responding to Coastal Change

(including sea level rise)

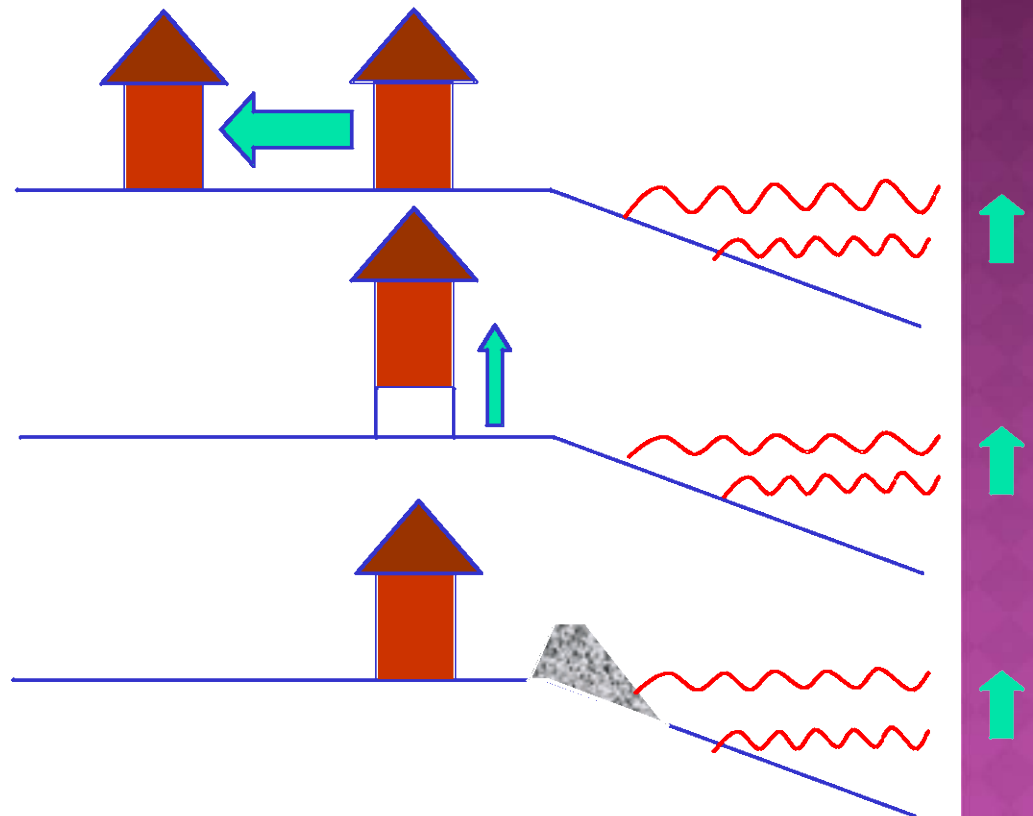
- Retreat

- Accommodation

- Protect

- Soft

- Hard



# PROACTIVE

- ⦿ Payout
- ⦿ Rebuild
- ⦿ Retro-fit
- ⦿ Accommodate
- ⦿ Retreat



# REACTIVE

## Protection

### ⦿ Soft

- mangrove restoration
- beach nourishment
- dune rehabilitation

### ⦿ Hard

- Seawalls
- Gryones



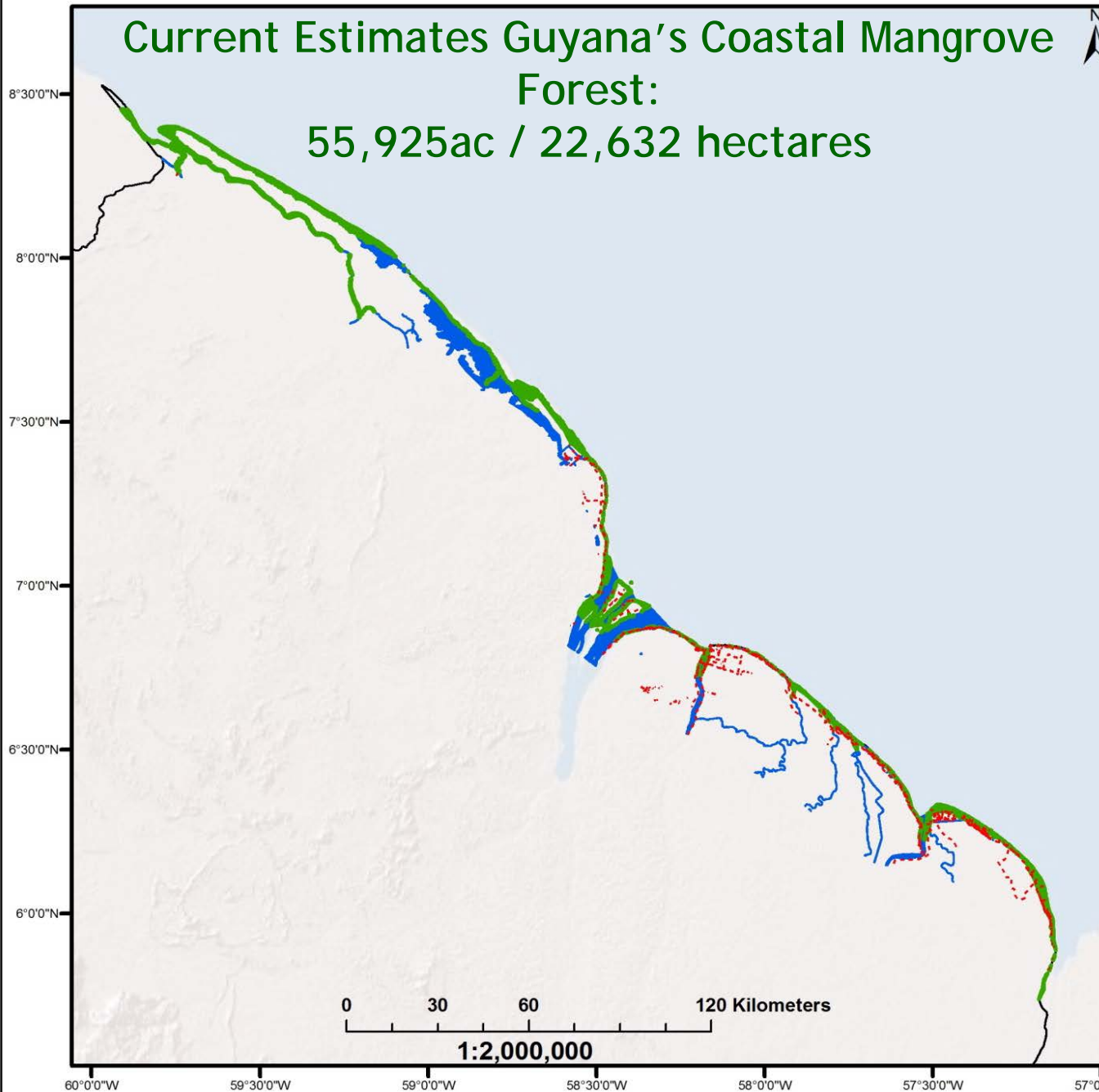
# MANGROVES: NATURE'S SEA DEFENCE



- ◉ Mangroves are trees or large shrubs which grow adjacent to the intertidal zone.
- ◉ Act as wave breakers to protect coasts, coastal communities and infrastructure from the onslaught of strong waves and winds.
- ◉ Roots help to reduce and prevent coastal erosion
- ◉ Shield inland areas during storms
- ◉ Per hectare, mangrove forests store up to **five** times more carbon than most other tropical forests around the world.
- ◉ Good breeding, feeding and nursery areas for many species of terrestrial and aquatic species.

# Current Estimates Guyana's Coastal Mangrove Forest: 55,925ac / 22,632 hectares

Map Showing Coastal Zone Forest In Guyana



## Legend

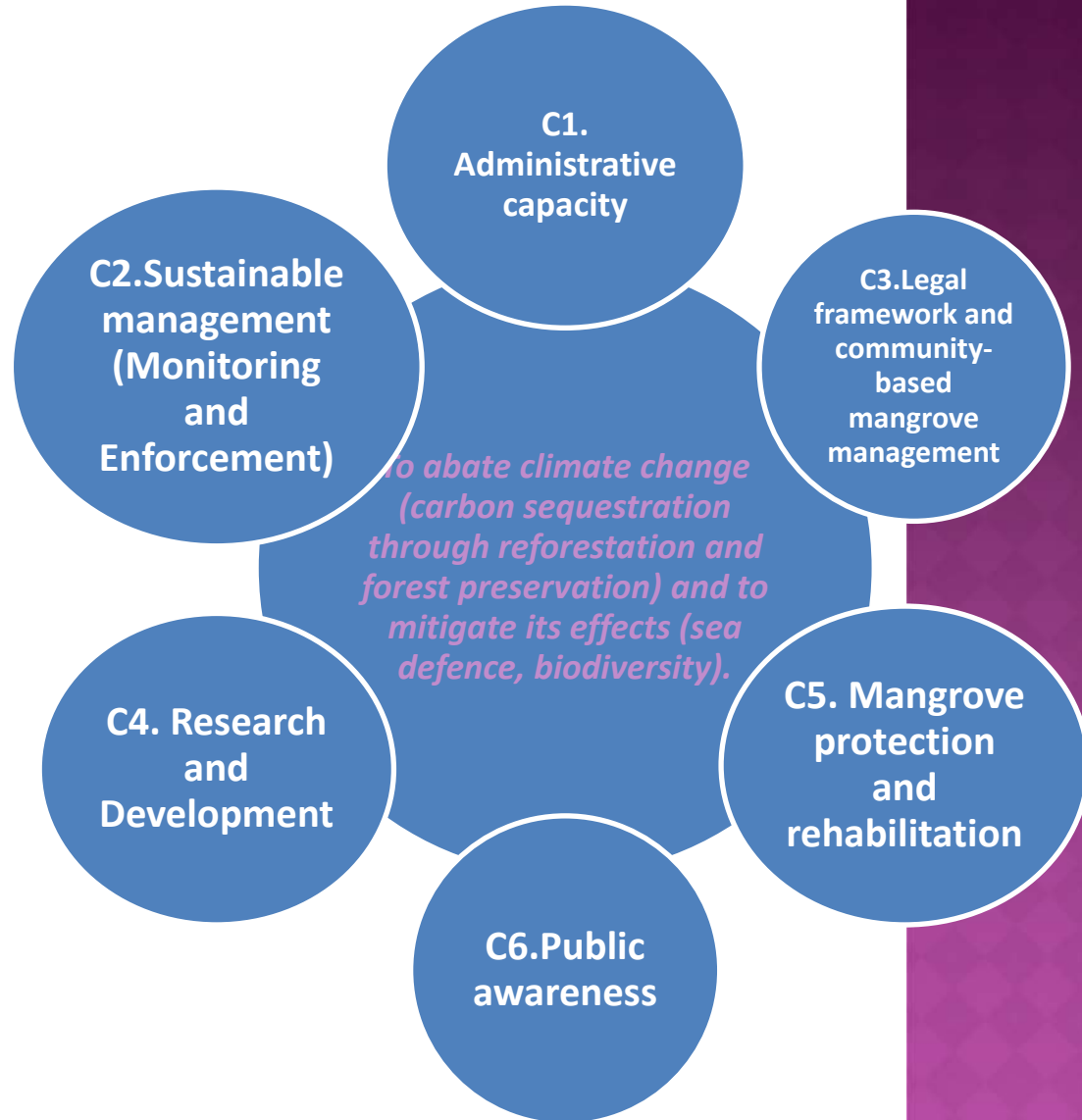
- Access\_Roads
- Coastal Zone Forest
- Hydro\_Network
- Administrative\_boundary





# THREATS TO GUYANA'S MANGROVES

# GUYANA'S MANGROVE RESTORATION PROGRAMME



# COMMUNITY BASED MANGROVE MANAGEMENT

Training and capacity building



2015. 08. 08 12: 50

The establishment and operationalizing of the community-based, mangrove committees is integral to the success and implementation of a sustained mangrove management programme.

Community Seedling nurseries



Community beach enhancement



2014. 09. 14 08: 50



# ECOLOGICAL MANGROVE RESTORATION

1

- Which mangrove species belongs at the planting site?

2

- What condition the species needs to grow successfully?

3

- What the existing conditions at the site are and What is preventing the normal growth of mangroves there?

4

- What can be done to amend the site conditions such that they meet the needs of the mangroves?

5

- Only utilize actual planting of propagules, collected seedlings or cultivated seedlings after determining through Steps 1–4 that natural recruitment will not provide the quantity of successfully established seedlings.

# Mangrove restoration interventions Implemented along Guyana's coastline

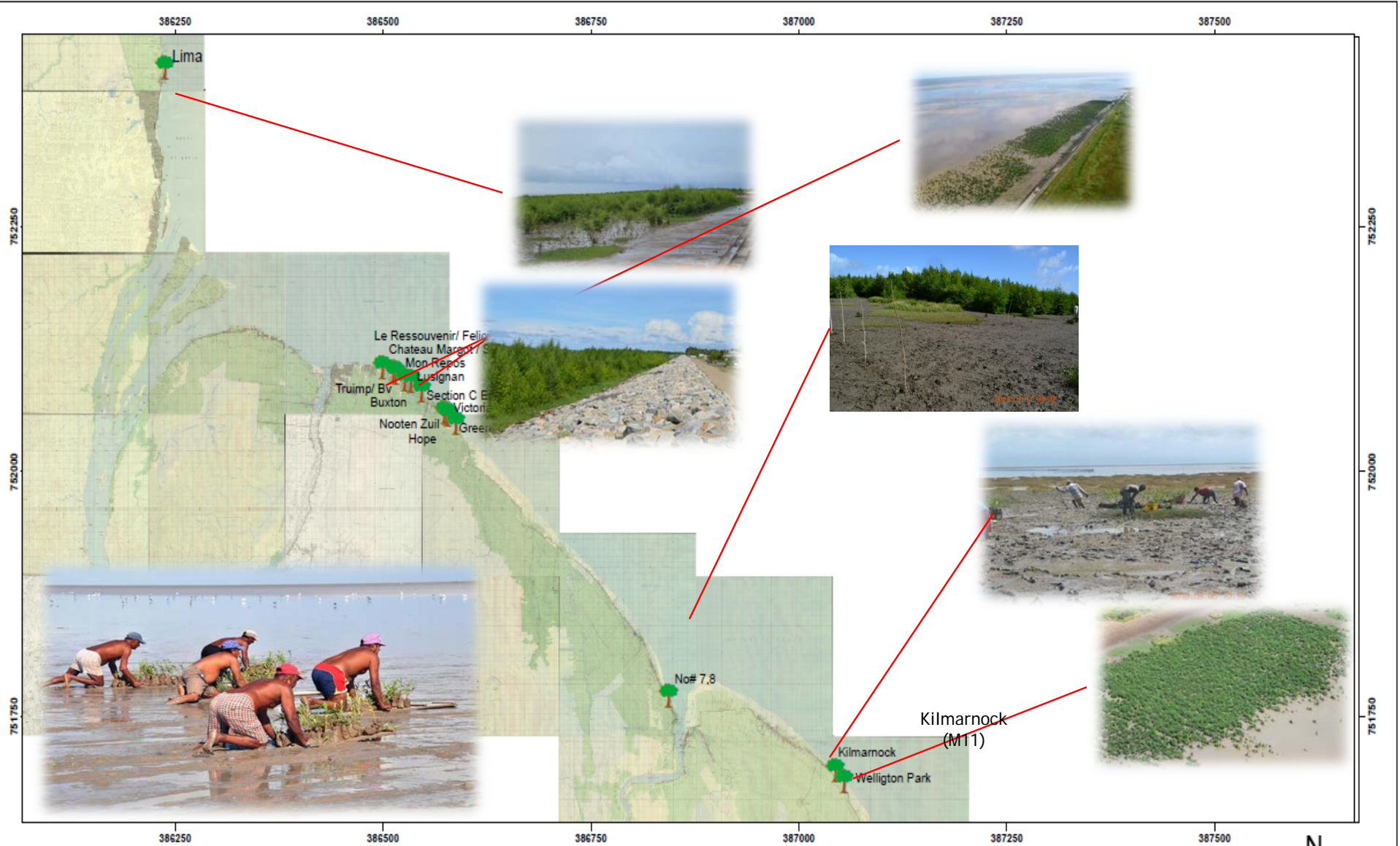
Mangrove  
seedling  
planting

Coastal  
Engineering  
Structures


*Spartina*  
Grass  
Planting

Hydrologic  
restoration





**Legend**

 Restoration\_Sites

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Mangrove Department**

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Date: March 2018



**All *Avicennia germinans* Restoration Sites (2010 -2015)**



# RESULTS OF SEEDLING PLANTING



Village #6-8 Restored mangrove forest, West Coast Berbice

- **496,771** mangrove seedlings produced in community nurseries
- **142ha** of coastal mangrove forest restored through plantations and natural regeneration

## Results can be summarized into three scenarios:

### ✓ *Fast growing and high survival*

(Wellington Park, Village #6-8, Chateau Margot, Success, Lima). Mud elevation 2.13 – 2.49cm above CD

### ✓ *Slower growing and high survival*

(Greenfield, Hope Beach, Le Ressouvenir, Felicity). Mud elevation 1.61 – 2.37cm above CD

### ✓ *Low or no survival*

(Hope, Greenfield, Victoria, Section C Enterprise, Mon Repos, LBI/Triumph, Buxton, NootenZuil, Lusignan). Mud elevation 1.9 to 2.4m above CD

January 2011 – Site prior to planting

<b>Location</b>	<b>Chateau Margot/Success, East Coast Demerara</b>
Region	Region #4
Total seedlings planted	20,529



# Chateau Margot/Success, East Coast Demerara, Region 4, December 2015



# COASTAL ENGINEERING

- Devonshire Castle has shown the best results to date.
- Significant changes to the shoreline line conditions.
- Rapid colonization of planted *Spartina*.
- Natural colonization of and mangrove seedlings.



# SPARTINA GRASS

Transplanting Spartina to locations where the mud elevation is not suitable for mangrove cultivation.

Supports mud consolidation

Traps mangrove seeds and promotes natural regeneration





# CHALLENGES

- ⦿ Limited number of suitable sites available for restoration.
- ⦿ Extensive erosion occurring at sections along the coastline.
- ⦿ Keeping community volunteer groups actively engaged and motivated.
- ⦿ The lack of baseline data on the impact of anthropogenic activities made it difficult to quantitatively estimate the reduction in these threats.
- ⦿ Limited research completed on the movement and mapping of mud banks along Guyana's coastline.
- ⦿ The laws protecting mangroves are vested in sister agencies and continue to prove challenging to enforce.

# LESSONS LEARNED

- ◉ Community based mangrove management proved to be critical to the success of the project.
- ◉ The restoration of Guyana's coastal mangroves is possible if planned properly with the collection of detailed baseline data on potential restoration sites.
- ◉ Thorough site analysis should be conducted prior to any intervention and baseline data such as, wave energy, shoreline elevation and anthropogenic activities should be collected and analysed before any intervention is undertaken.
- ◉ Implementation of the EMR principles increases success rates significantly and has the potential to reduce restoration cost.
- ◉ When conducted on accreting sites of the right mud elevation, and soil consolidation, restoration of a protective belt of mangrove forest can be established rapidly.

# RECOMMENDATIONS

- ◉ In order to restore the mangrove belt in the scale and timeframe required in Guyana, mangrove seedling planting should be carried out in combination with other methods of mangrove restoration. A combination of both hard and soft engineering solutions should be implemented.
- ◉ The Government of Guyana should maintain focus on community based mangrove management and expand on the creation of alternative livelihoods for communities living in close proximity to the mangroves to promote income generating activities that will not destroy the forest.
- ◉ An examination of the potential for Carbon sequestration/REDD+ to assist in sustainable mangrove management should be completed with the Guyana Forestry Commission.
- ◉ To continue monitoring and evaluation
- ◉ Completion of a study on mud bank movement along the Guyana's coastline should be completed to guide future restoration activities.

# Thank You



Village #6, West Coast Berbice, restored mangrove forest