# Solomon Islands Fish Kill and Shellfish Poisoning

# Background

- Remote community
- Limited government outreach

# Subsistence

- Reef fish
- Gardening
- Pelagic
- Bush foods

- Pigs
- Chickens
- Mangrove shells
- Crustaceans

# Economy

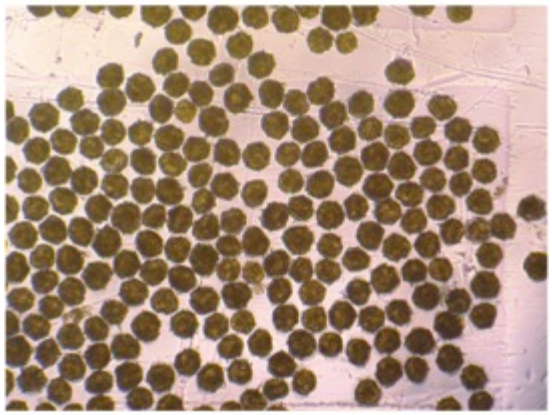
- Logging
- Fish to capital Honiara

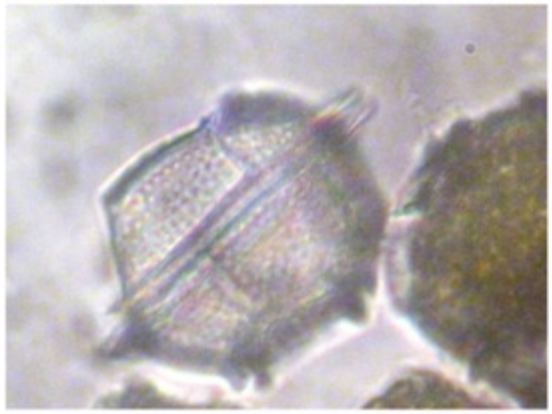


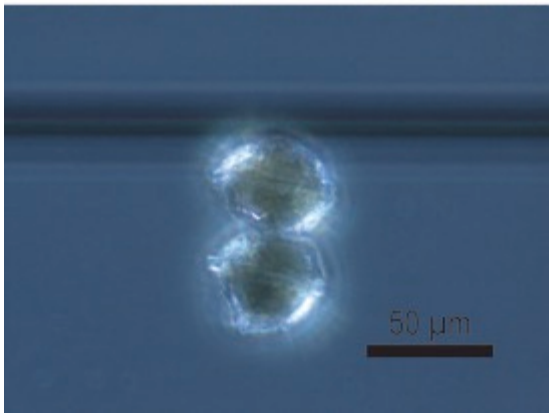
# 2011 HAB Fish Kill

# History of HAB based on TEK

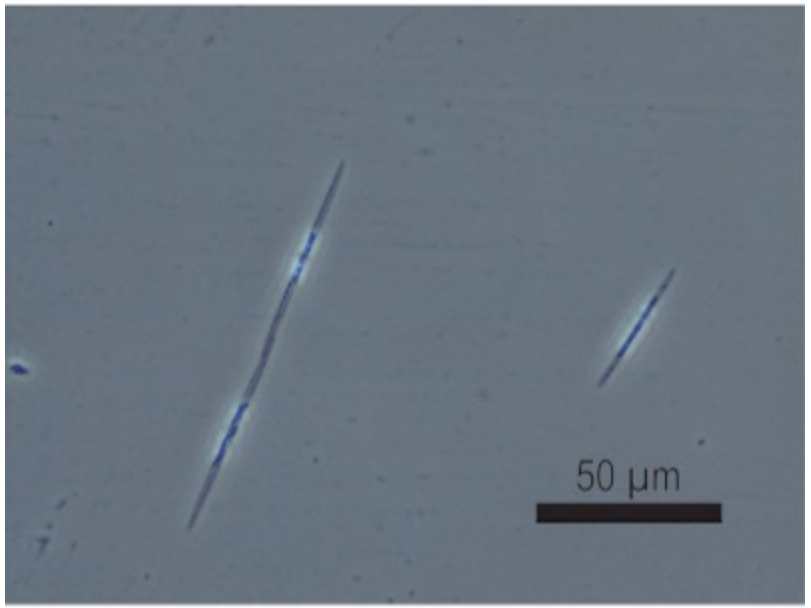
Pyrodinium bahamense var. compressum







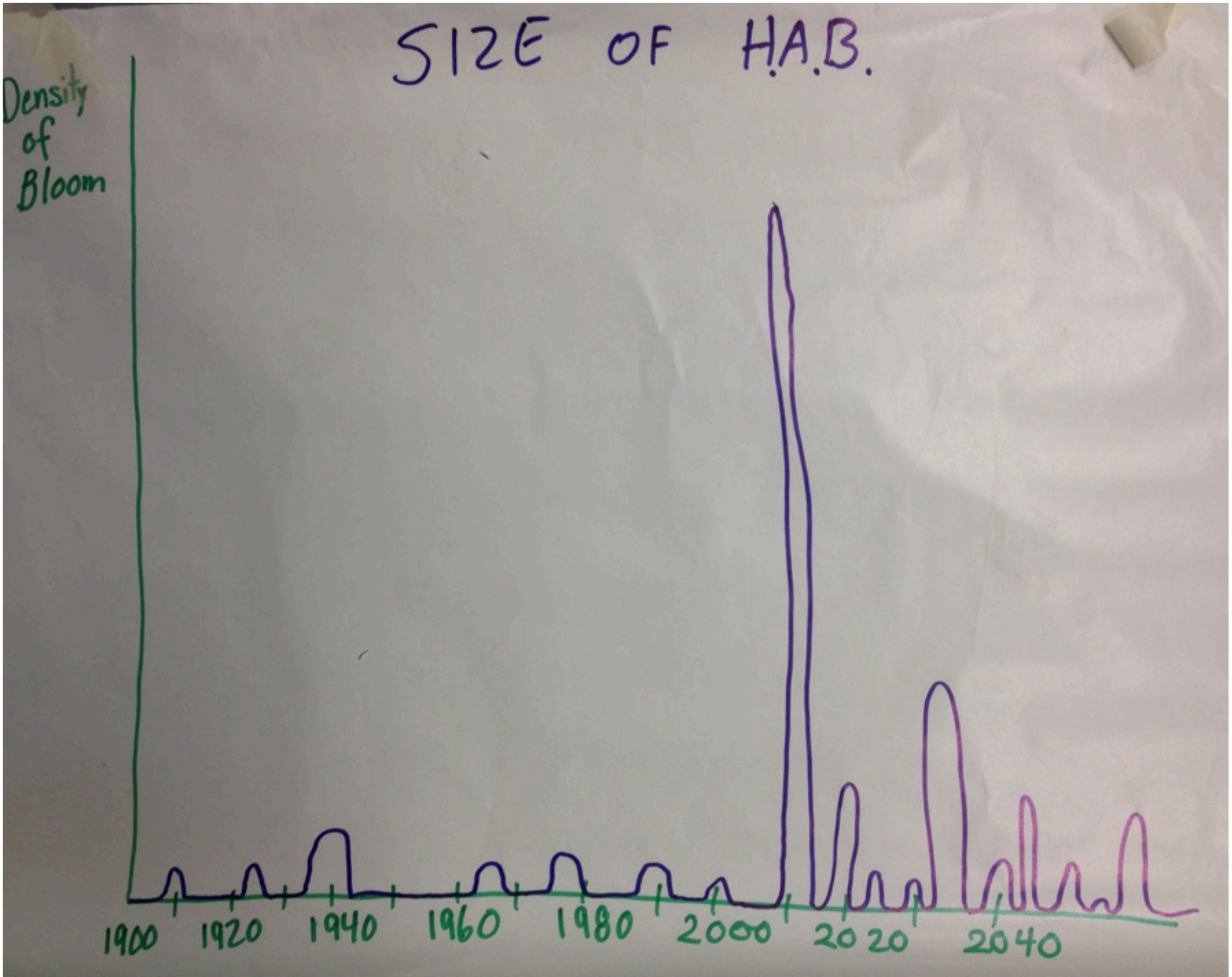

Psuedo-nitzschia spp.




**Toxins**

**Pyrodinium:** Saxitoxin
Paralytic shellfish poisoning (PSP)
Highly lethal (1000 times lower LD50 than cyanide)
Dozens of human fatalities in region

**Psuedo-nitzschia:** Domoic acid
Amnesic shellfish poisoning (ASP)
Neurotoxicity in marine mammals/fish
Large fish kills
>1 M cell per litre in June 2011


SIZE OF H.A.B.
Density of Bloom
1900
1920
1940
1960
1980
2000
2020
2040

# Social impacts

**HEALTH**

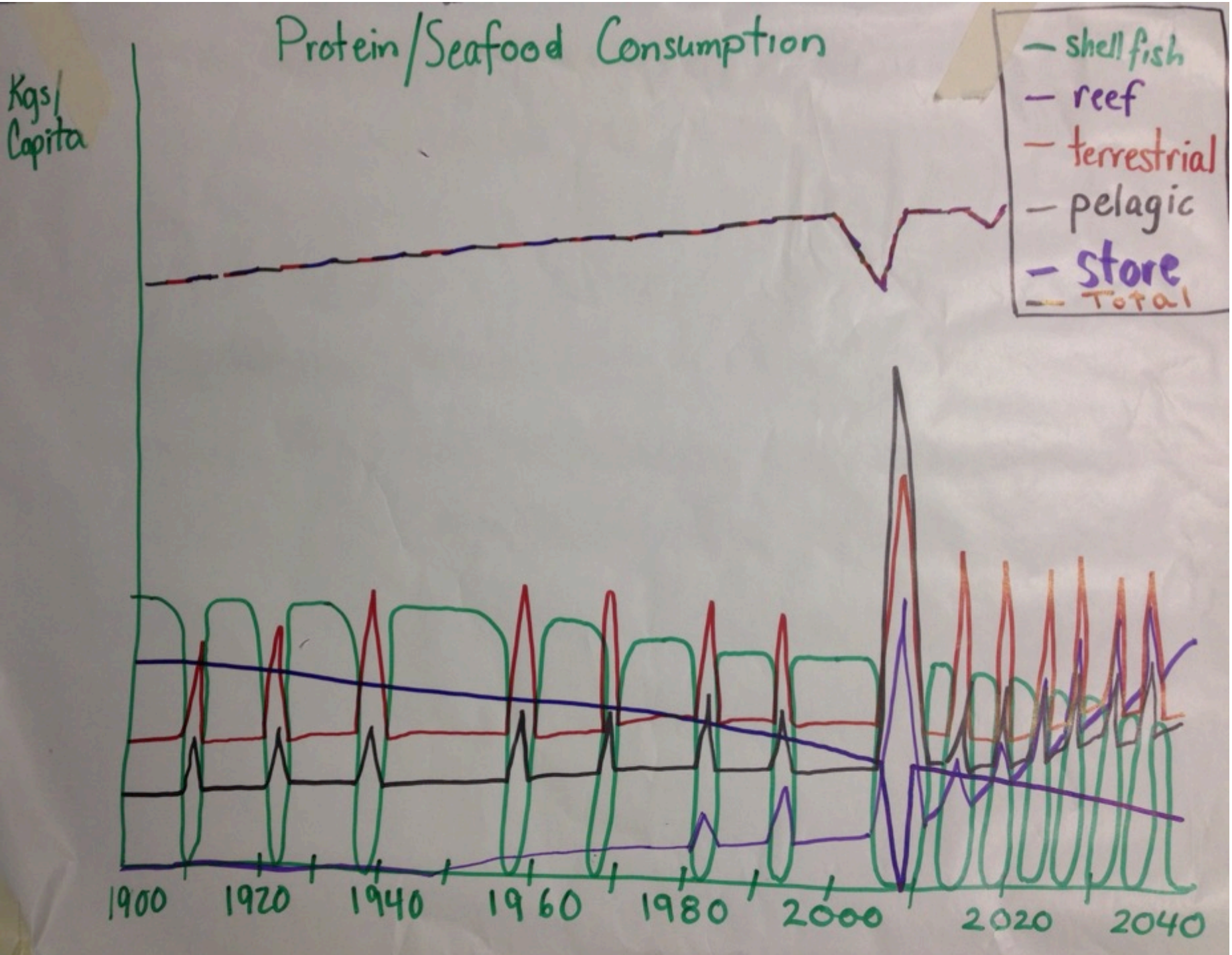
- Vivid dreams, head spins and aching joints from eating seafood (especially shellfish)
- 60% increase in infant fever/diarrhoea cases after event

**DIET**

- 1 500 people loss of primary fishing grounds
- Prolonged fear of seafood consumption

**ECONOMIC**

- Loss of income from fish sales
- Reliance on store foods


Protein/Seafood Consumption
Kgs/ Capita
shellfish
reef
terrestrial
pelagic
store
Total
1900
1920
1940
1960
1980
2000
2020
2040

# Ciguatera poisoning and impacts in Kiribati

# Background


Betio


Naa
Buariki
Tearinibai
Notoue (Eretibou)
Abaokoro
TARAWA
Biketawa
Nabeina
Tabiang
Tabiteuea
Bonriki
Bikeman
Bikenibeu
Betio
Betio
Eita
Temaiku
Banraeaba
Bairiki
0
Kilometres
10

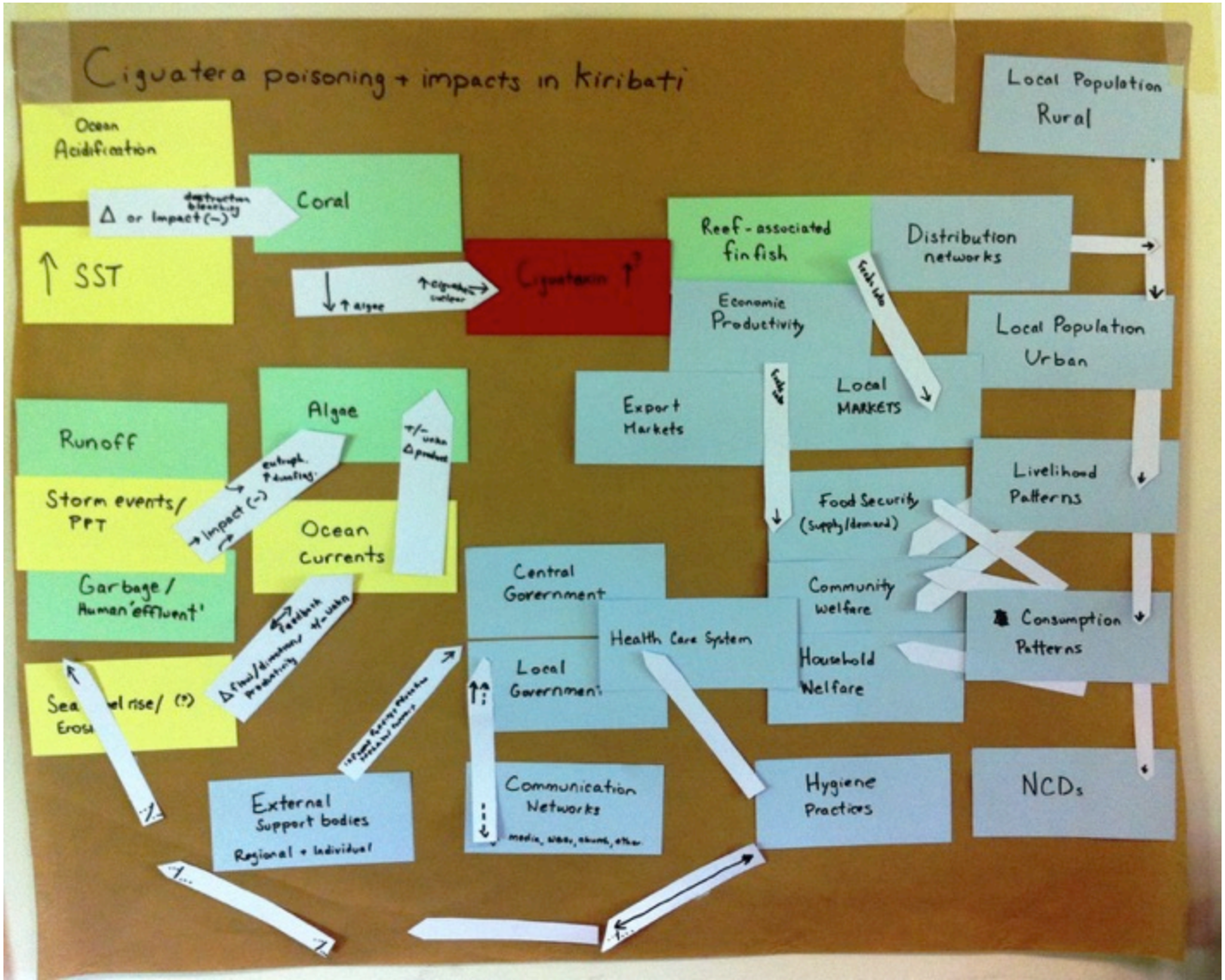
# Background (continued)

- Heavy dependence on coastal, reef fisheries resources for food - particularly in rural areas (up to 90%)
- Strong reliance on tuna fisheries access revenue, limited processing, few exports
- Largely subsistence-based domestic economy
- Geographic and climate profile provide limited food and livelihood alternatives
- Projected to meet future food fish demand but problems with distribution, reef fish sources

# Key Issues

- Ciguatoxic events have been present and constant since the 1970s
- Climate change drivers affecting health and productivity of reefs, expected to intensify
  - Increases to reef fish production not expected
  - Expected to increase prevalence of ciguatera
  - Increased public health risk
- Need to increase and diversify food fish sources
- Limited baseline data, a few studies, some local monitoring capacity, underreporting of cases
  - Difficult to understand who, what, where, when, why, how and respond

# Understanding the complexity of system interactions and responding appropriately



# Social-economic impacts

- Changes to fish consumption patterns
  - Expected future knock-on effects to public health, e.g., increase in NCDs as 'negative' substitutions occur
- Affects where fishers can fish, food fish can be sourced from
- Effects to exports? E.g. live reef trade to HK in 90s
- Negative effects to household, community welfare
  - reduced socio-economic contribution


RAIN

# Synthesis of the two case studies: problems/gaps, what works, & priorities in research, T&I for reduction in ciguatera hazards

Group 4: Societal, cultural and economic aspects – covering nutrition/dietary aspects and changes, food security, changes to traditional behaviour, practices, communication/prevention, trade, economic impacts and innovation

# Actors & Factors of Two Case Studies & How They Interact


# Typical Problems /Gaps & What Works Well

- Problems/Gaps
  - No historical records/ baselines
  - Disjointed flow of information
  - Lack of knowledge about diagnosis of outbreaks
  - Lack of proactivity
  - Lack of reliable tests
  - Lack of diagnostic tools
  - Lack of curative measures
- What works well
  - Human ability to adapt
  - Local traditional knowledge
  - Identified well known species of fish with ciguatoxin
  - Some Govt capacity exists e.g. monitoring
  - Some trainings on ciguatoxin extraction have taken place

# Research, Technology & Innovation Opportunities for the Reduction of Ciguatoxin Hazard for health, environment & economy

- Technology& Innovation
  - Monitoring systems
  - Communication networks
  - Rapid assessment tools
  - Diagnostic tools
  - Data repositories
- Research
  - Dietary/consumption pathways
  - Baseline surveys
  - Curative treatments
  - Policy coherence
  - Effectiveness of monitoring & evaluation
  - Dose-response /Threshold levels?
  - Remanence of toxicity in food
  - Quantify/collate traditional knowledge
  - Driving factors
  - Practical livelihood alternatives
    - Markets, food security, revenue sources

# Priorities for Action

- Problems/Gaps
  - No historical records/baselines
    - Lack of quantitative information
  - Disjointed flow of inter and intra country information
    - No organised mechanism to 'sound the alarm'

- What's working well
  - Human ability to adapt
    - Change consumption patterns in response to outbreak
  - Traditional knowledge
    - Local awareness of outbreaks from previous experiences

- Technology and Innovation
  - Monitoring systems
    - Includes biophysical and socio-economic
  - Diagnostic tools
  - Accessible data repositories

- Research
  - Baseline surveys
    - Includes biophysical and socio-economic
  - Practical livelihood alternatives
    - Markets, food security, revenue sources