

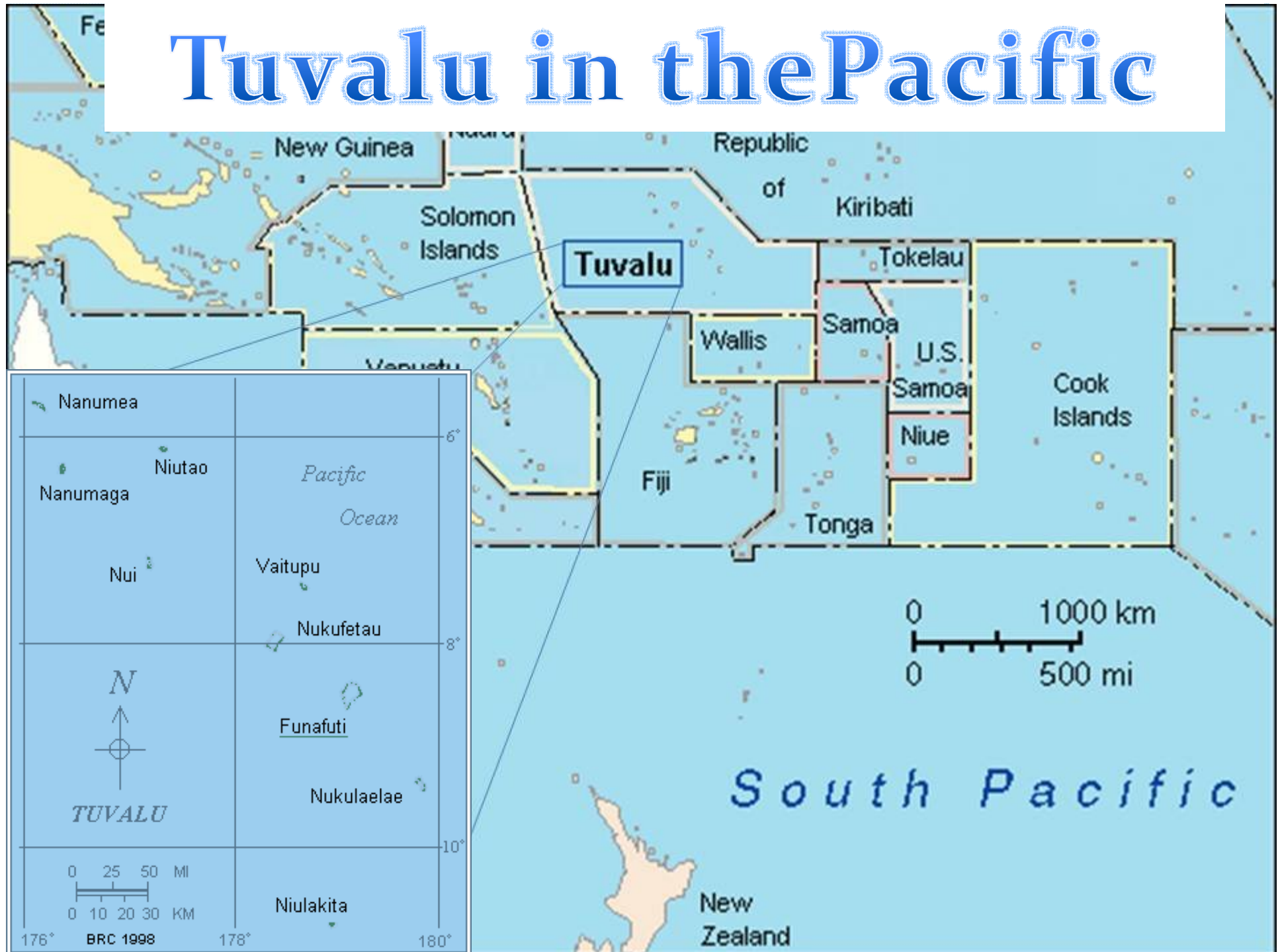
# Climate Change and Corals: Threats to corals in Tuvalu and Community-based initiatives

25<sup>th</sup> General Meeting of the International Coral Reef  
Initiative

8 -12<sup>th</sup> November 2010: Millenia Hotel, Apia, Samoa

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Tuvalu

# Tuvalu in the Pacific



# Outline

- Introduction
- Natural Threats to corals
- Human Threats to corals
- Challenges
- Coral Reef Initiative in Tuvalu
- Measures to reverse impacts to corals
- Conclusion
- Next Steps
- The Future?

# Introduction

- Tuvalu's islands are composed mainly of:
  - Coral atolls with fringing reefs – Funafuti, Nukufetau, Nanumea, Nukulaelae, & Nui
  - Patched reefs – Nanumaga, Niutao, Niulakita
  - Vaitupu has characteristics of both coral atolls and patched reef islands.
- Fringing reefs are found throughout Tuvalu
  - On top of exposed reef flats, a few live corals can be seen and various algae species are now becoming prominent.
- Numerous patch reefs can also be found at different depths but these are restricted to islands with lagoons.
- Seamounts of varying sizes are scattered throughout the Exclusive Economic Zone (EEZ), some of them rising to within 30 m of the sea surface (Sauni 2000).



# Natural threats to corals

High sea temperature –  
Bleached coral



Crown of thorn starfish  
infestation



# Natural threats to corals

## King Tides



## Cyclones & storm surges





# Human Threats – Increasing population

Overexploitation of marine resources

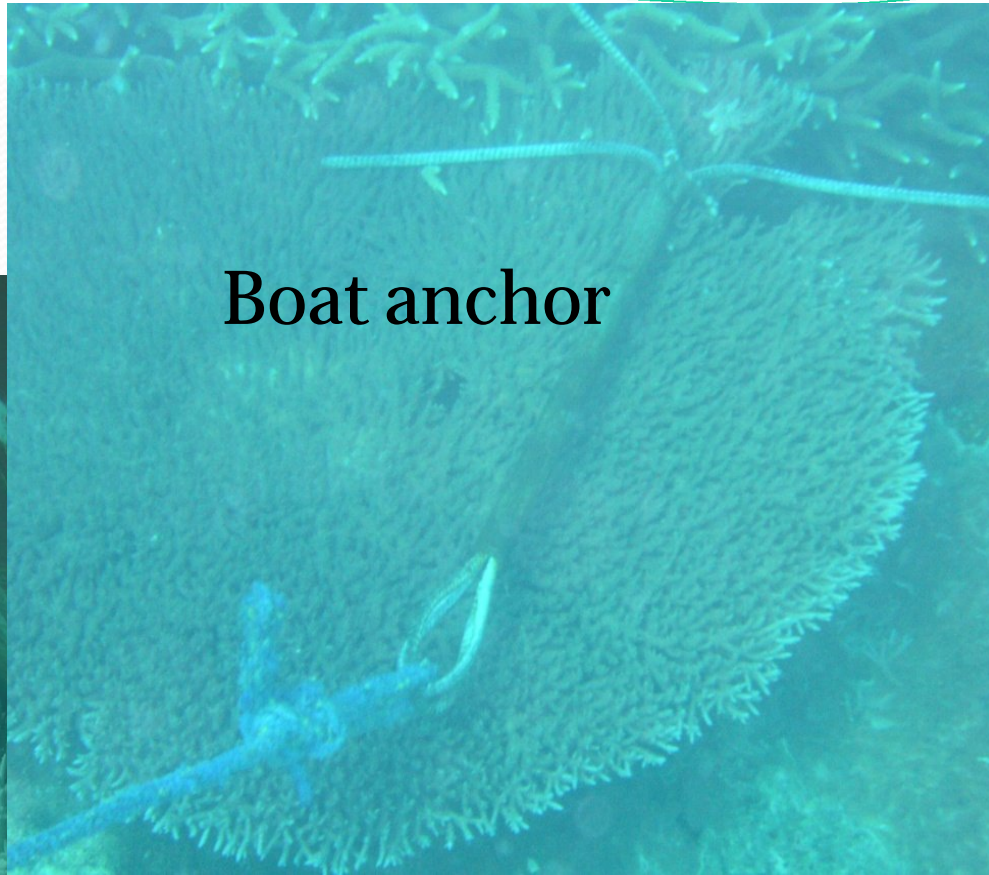
- Too many nets & spears
- Smaller fish sizes & catches





# Wreck on Corals

Boat anchor





# Wastes from Ships

Ship discharge



Rubbish





# Waste from land

- Waste leaches into the lagoon
- Increase algal bloom
  - Affects health of fish, eventually eaten by humans

Health related issues caused by dumping excessive animal and other wastes into the lagoon

*Taisala (Landfill on Funafuti)*



# Challenges for coral monitoring

- Very little has been done on enforcement, monitoring and conservation of marine resources programmes.
  - lacks manpower and funding for periodic monitoring.
- Little work has been done on research on coral bleaching.
- No existing standards for coral reef ecosystems against which performance and compliance can be evaluated.
  - Difficult to evaluate the extent of damage in marine communities caused by shipwreck, spills, hurricanes or crown-of-thorn infestation.
- Lack of adequate and consistent data gathering required for accurate monitoring of the state of local fisheries resources and activities
  - Poses potential threat of deteriorating coastal resources as a result of over exploitation by the large population on Funafuti atoll.



# Coral Reef Activities

- Coral reef initiative in Tuvalu
  - 2001 -Tuvalu became part of the GCRMN; which focused on:
    - Survey of changes to the status of coral reefs in Tuvalu and why these changes occur;
    - The study includes counting of corals, seagrass, fish, other living organisms, and causes of change (bleaching/diseases etc.)
    - Those involved in this research are: Fisheries Department, Funafuti Kaupule (local government), TANGO;
    - Survey was conducted on Funafuti
    - 4 surveys have been done so far(2002, 2003, 2007, 2010)
- Other projects involving coral reefs:
  - Coastal rehabilitation (Japan); 2009-2013
  - Fish biodiversity (NZ aid) 2008
  - Biodiversity study (Alofa Tuvalu) 2010
  - Integrated Island Biodiversity study (GEF-PAS/SPREP: 2011 - 2014)



# Comparing data between 2010/2003

Live corals in 2003 range  
from 5 – 22%



In 2010 the range is  
between 6 – 30%



# How do these changes occur?

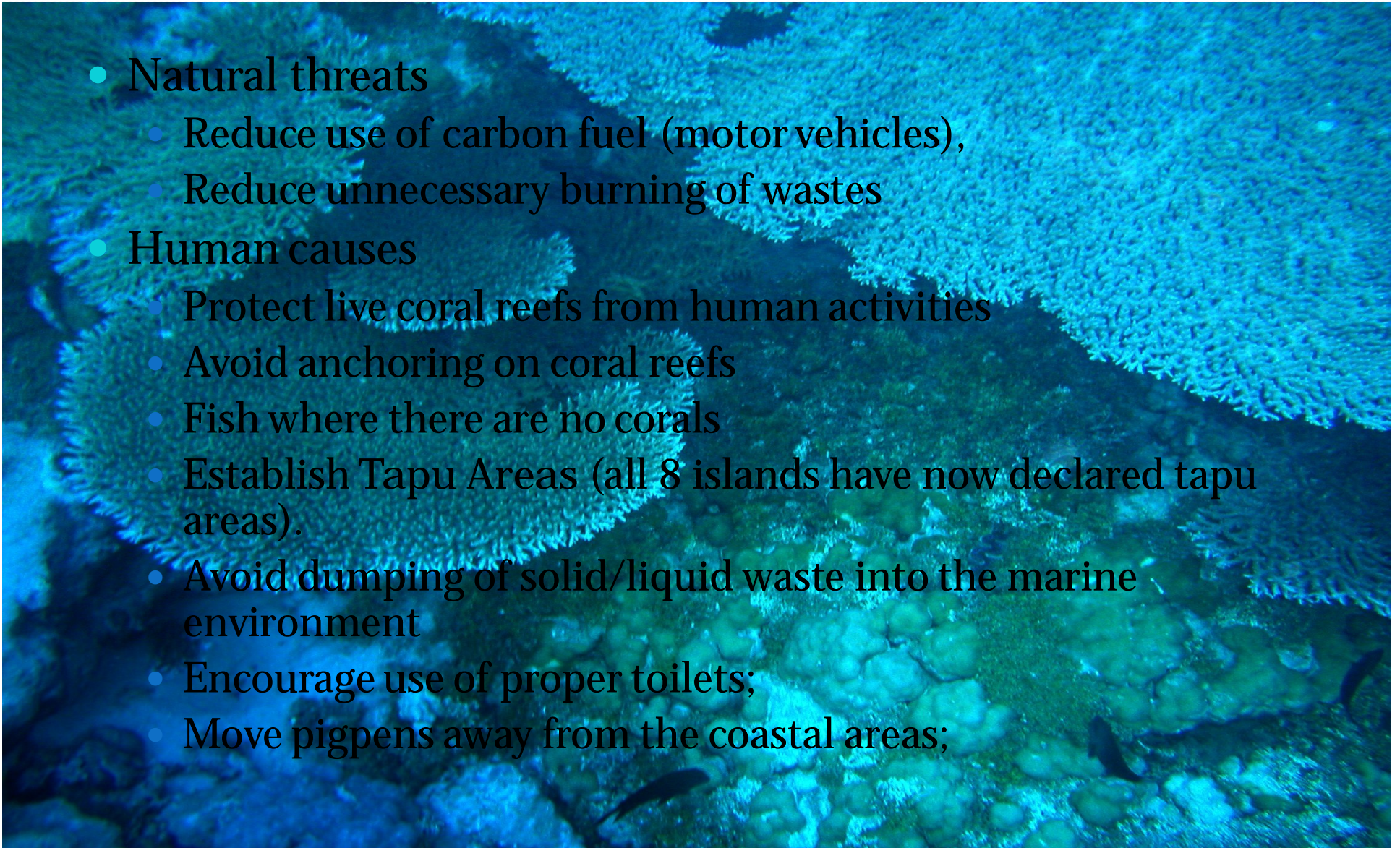
Could happen under two broad circumstances

- Natural causes
  - High sea temperature – 2002 bleaching event
  - Cyclones & storms
  - Crown of thorn starfish (COT)
  - Sick
- Human induced
  - Pollution of the marine environment (solid/liquid)
  - Fishing out fish that feed on the substrate (grazers)
  - Breaking of corals by shipwrecks, boat anchors, or when gleaning the reef



# Measures to reverse these effects?

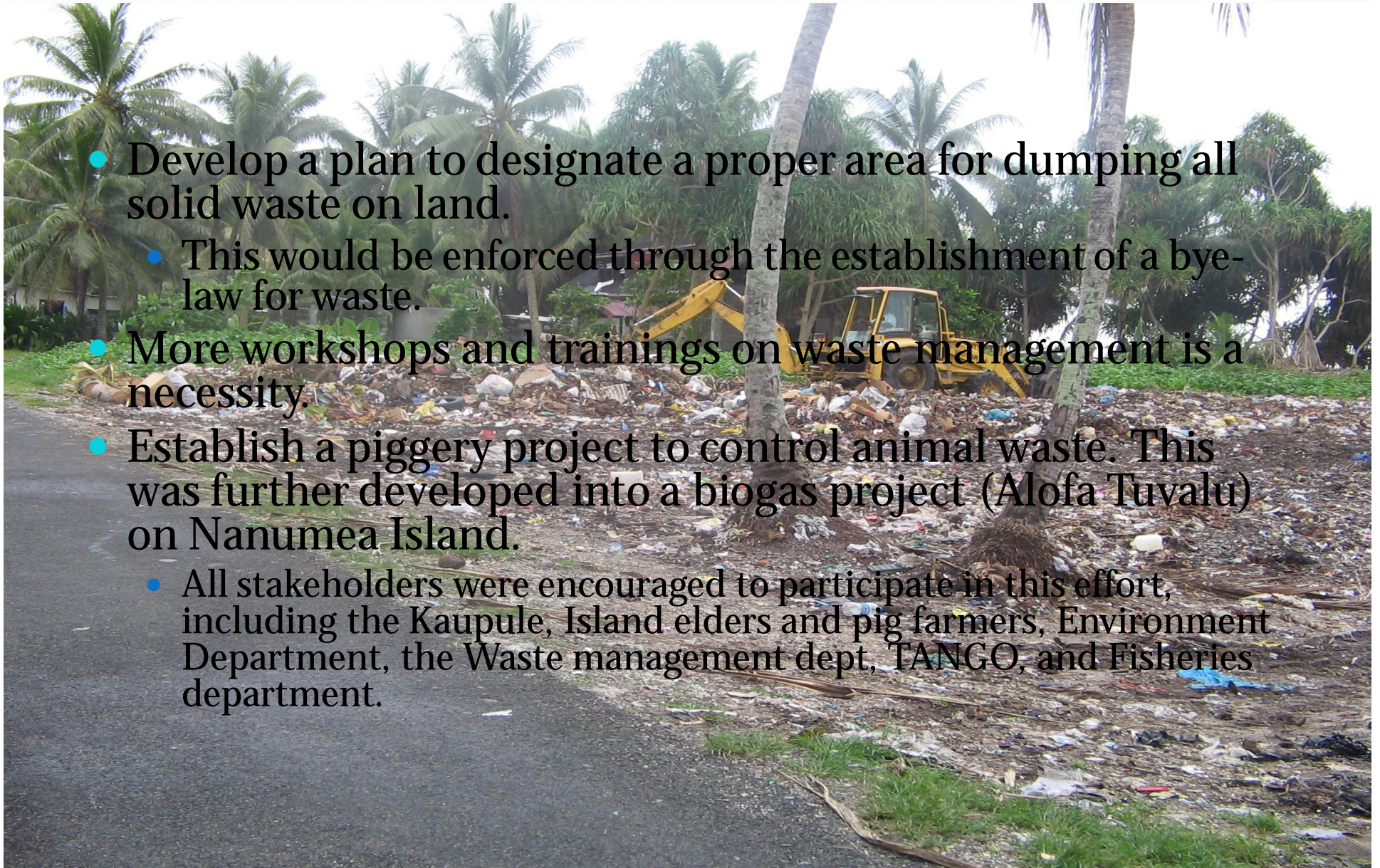
- Natural threats
  - Reduce use of carbon fuel (motor vehicles),
  - Reduce unnecessary burning of wastes
- Human causes
  - Protect live coral reefs from human activities
  - Avoid anchoring on coral reefs
  - Fish where there are no corals
  - Establish Tapu Areas (all 8 islands have now declared tapu areas).
  - Avoid dumping of solid/liquid waste into the marine environment
  - Encourage use of proper toilets;
  - Move pigpens away from the coastal areas;





# Measures to address waste from land

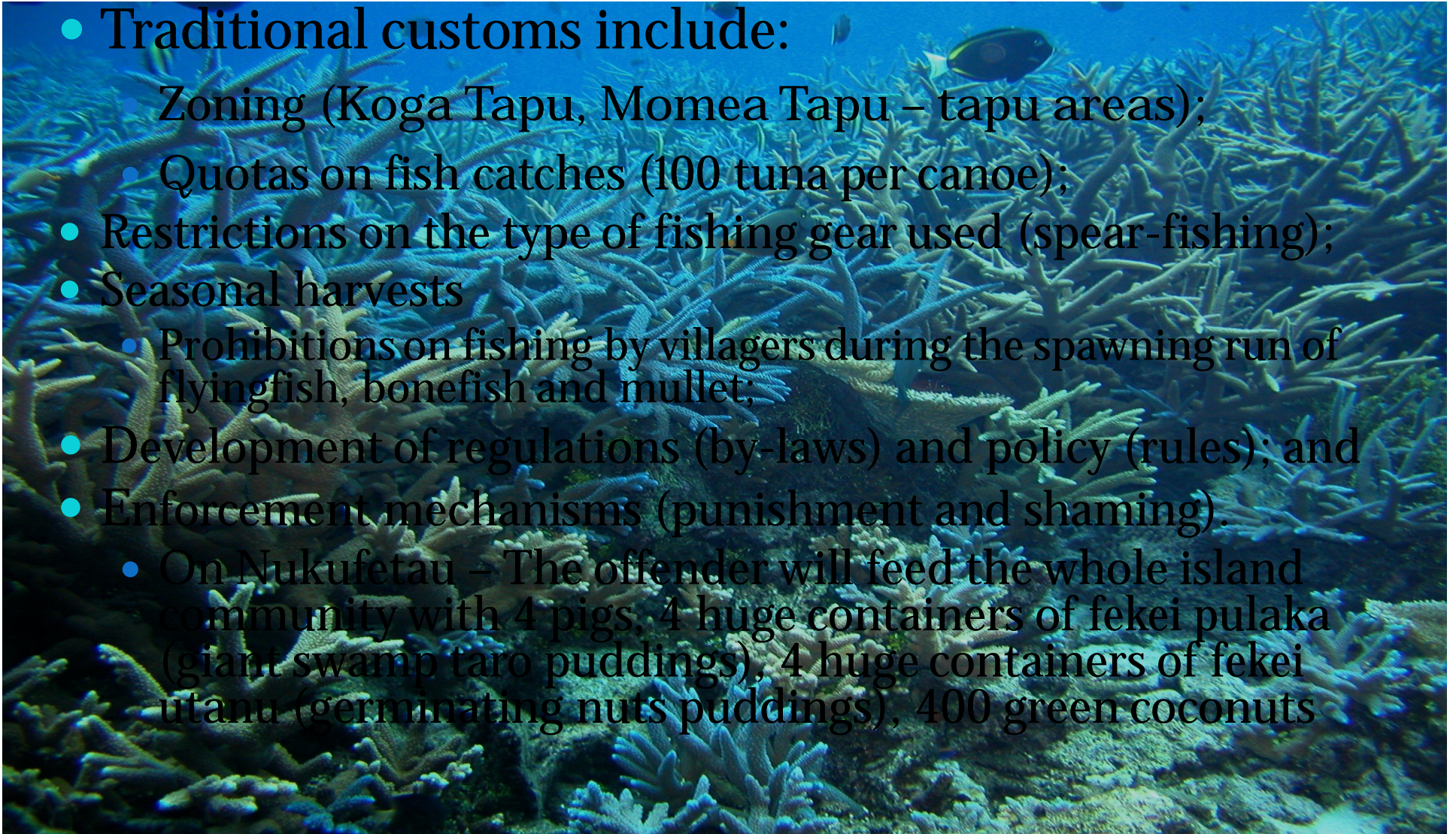
- Develop a plan to designate a proper area for dumping all solid waste on land.
  - This would be enforced through the establishment of a by-law for waste.
- More workshops and trainings on waste management is a necessity.
- Establish a piggery project to control animal waste. This was further developed into a biogas project (Alofa Tuvalu) on Nanumea Island.
  - All stakeholders were encouraged to participate in this effort, including the Kaupule, Island elders and pig farmers, Environment Department, the Waste management dept, TANGO, and Fisheries department.





# Community-based measures for overexploitation of marine resources:

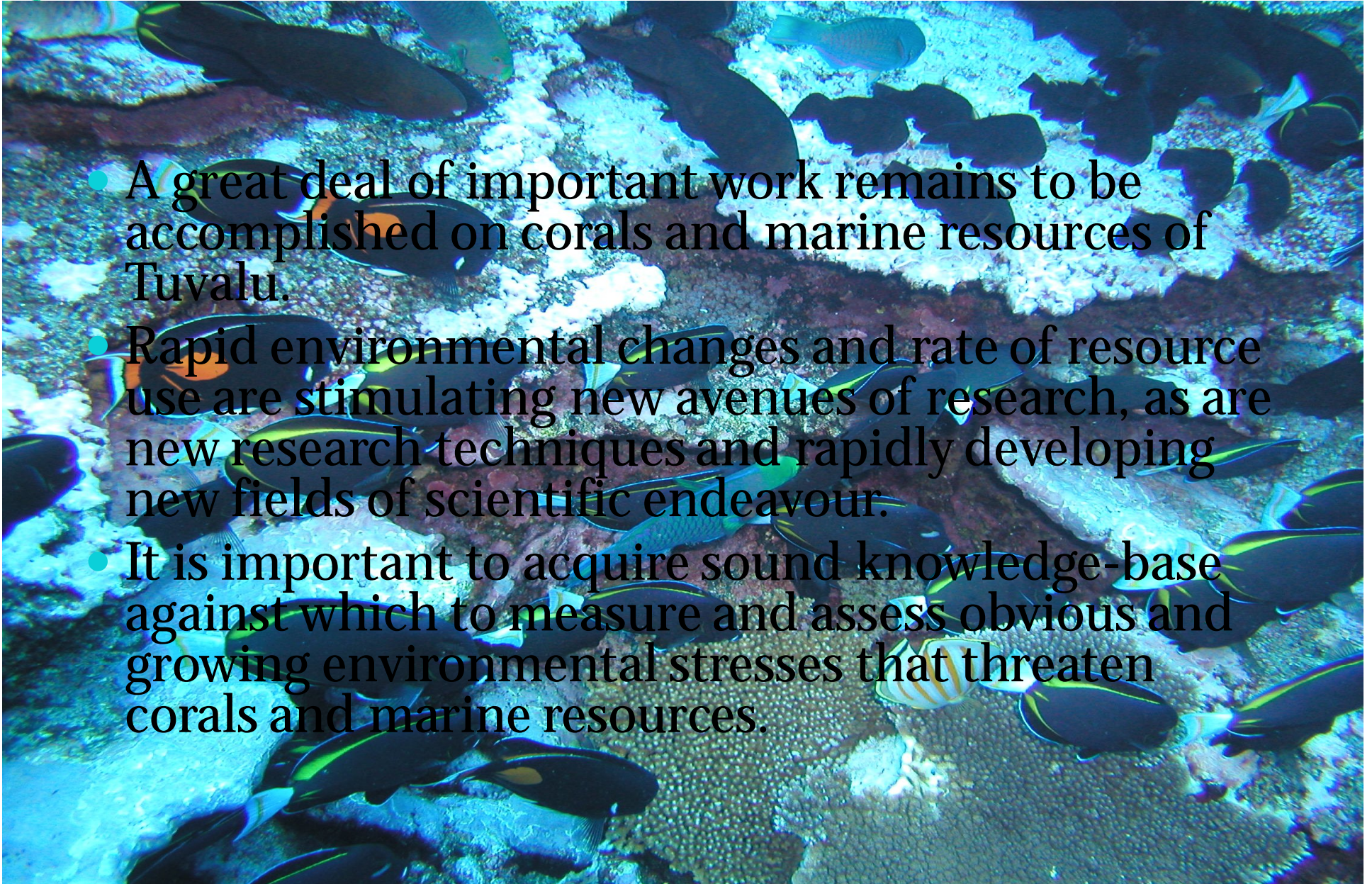
- Traditional customs include:
  - Zoning (Koga Tapu, Momea Tapu – tapu areas);
  - Quotas on fish catches (100 tuna per canoe);
- Restrictions on the type of fishing gear used (spear-fishing);
- Seasonal harvests
  - Prohibitions on fishing by villagers during the spawning run of flyingfish, bonefish and mullet;
- Development of regulations (by-laws) and policy (rules); and
- Enforcement mechanisms (punishment and shaming).
  - On Nukufetau – The offender will feed the whole island community with 4 pigs, 4 huge containers of fekei pulaka (giant swamp taro puddings), 4 huge containers of fekei utanu (germinating nuts puddings), 400 green coconuts



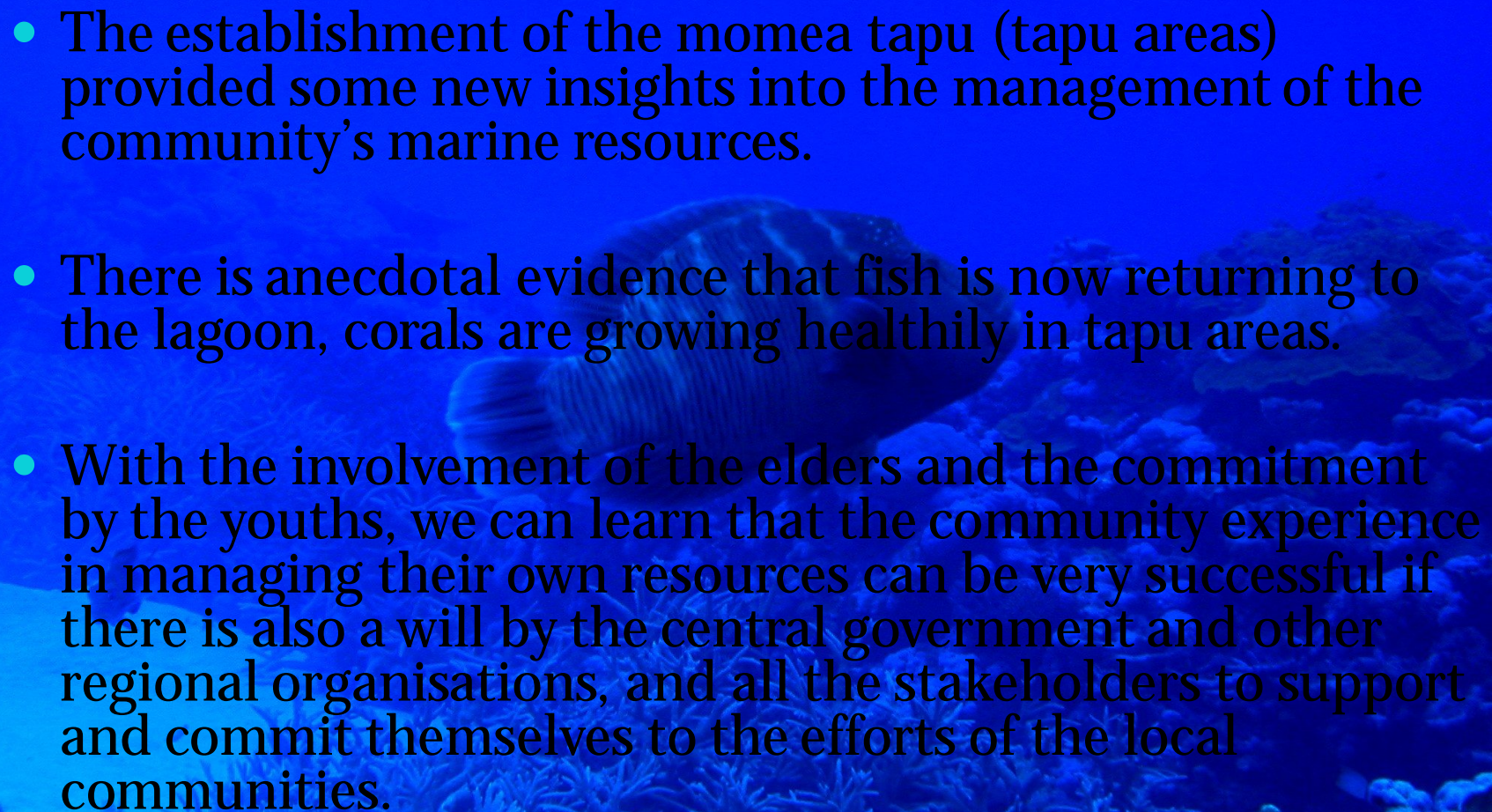


# Conclusion

- A great deal of important work remains to be accomplished on corals and marine resources of Tuvalu.
- Rapid environmental changes and rate of resource use are stimulating new avenues of research, as are new research techniques and rapidly developing new fields of scientific endeavour.
- It is important to acquire sound knowledge-base against which to measure and assess obvious and growing environmental stresses that threaten corals and marine resources.





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- An underwater photograph of a coral reef. In the foreground, there is a dense patch of branching coral. A large, brownish-orange fish with vertical stripes is swimming in the middle ground. The background shows more coral and the blue water of the lagoon.
- The establishment of the momea tapu (tapu areas) provided some new insights into the management of the community's marine resources.
  - There is anecdotal evidence that fish is now returning to the lagoon, corals are growing healthily in tapu areas.
  - With the involvement of the elders and the commitment by the youths, we can learn that the community experience in managing their own resources can be very successful if there is also a will by the central government and other regional organisations, and all the stakeholders to support and commit themselves to the efforts of the local communities.



# The next step?

- Regional organisations to fully explore possibility of working with outer island communities
- More support from regional organisations is needed for the assessment of coral bleaching
- Other island communities in Tuvalu to fully commit to the management of their marine resources.
- Only through self-determination can we successfully protect and manage our very fragile marine environment and its resources from deteriorating.
- Through community participation, commitment, and determination, we can successfully improve the state of our marine environment.



# The future?

To have healthy live corals



Not dead ones





# The future?

To have more fish



Not fewer fish





THANK YOU





# Acknowledgement

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