



Whole of Island Approach

Abaiang Atoll, Kiribati



Integrated Vulnerability and Adaptation Assessment

Synthesis report



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Key definitions

Adaptation: Making changes in order to reduce the vulnerability of a community, society or system to the negative effects of climate change. Includes building skills and knowledge as well as making practical changes such as strengthening coastal infrastructure, adjusting farming systems, and improving water management.

Climate change: Changes in the Earth's climate, due to human activities (anthropogenic climate change) or natural processes, that are already occurring or predicted to occur. These include changed rainfall patterns, and more frequent and more intense extreme events such as droughts, floods and tropical cyclones. Anthropogenic climate change is expected to happen much more rapidly than natural changes in the climate, posing an enormous challenge to both natural and human systems.

Biodiversity: The variability among living organisms from land, marine and freshwater ecosystems and the range of environments that they are found in.

Kiribati National Expert Group: National Expert Group on Climate Change and Disaster Risk Management (KNEG), the main advisory body and coordination mechanism for climate change and disaster risk management initiatives in Kiribati.

Mwaneaba: Village meeting house.

Office of te Beretitenti: Office of the President of Kiribati

Resilience: The capacity of a community, society or natural system to maintain its structure and functioning through stress or change.

Unimane: Elders who closely manage community activities.

Whole of Island approach: Government of Kiribati approach to Implement climate change and disaster risk projects to support and promote sustainable development. This approach aims to address capacity constraints in Kiribati's outer islands and to strengthen coordination among partners at the national level, local government level and community level.

Abaiang: The People And Place

Abaiang lies one degree north of the equator and is the closest outer island to Tarawa, the capital of Kiribati.

Over 5,000 people live on Abaiang, making it the fourth largest population of any atoll in the nation. The unique culture of Kiribati is evident on Abaiang. Limited external influences have meant that the traditional way of life and village governance is largely intact.



Governance

The current governance of Abaiang is represented by three significant institutions and associations: the Island Council, the *Botaki ni Unimwane* (which is made up of village elders) and the *Mwaneaba* system. The traditional governance system of the *Botaki ni Unimwane* and the *Mwaneaba* government are still very influential.

The mayor of the Island Council is elected every four years and chairs a monthly council meeting. Abaiang has three elected members of Parliament who represent the interests of the island. The central government, through the Ministry of Internal Affairs has the overall management role of island governments.

Tradition and faith

The Kiribati language is almost exclusively spoken and traditional songs and dances are routinely performed. First time visitors to the island are asked to visit Ribono village for a customary welcome called *Te Karaun*.

More than three quarters of the islands population are of the Catholic Faith, whilst the majority of the remainder are Protestant. There is also a small number of followers of a range of other faiths and Christian denominations.

The atoll

A large lagoon dominates Abaiang that opens into the ocean through several passes in a barrier reef on the western side of the atoll. Abaiang's land area is about 17 km² and the atoll is approximately 37 km long, but no more than 1km wide.

16 of Abaiang's villages are accessible by road. Ribono and Nuotaea are located on separate islets in the north and can only be accessed by boat. The smaller islets of the west are mostly used for fishing, collecting copra, and tourism.



5,502

Population recorded
in 2010 census

18

Number of
villages

240km²

Total lagoon
area

17km²

Total land
area



Integrated Vulnerability Assessment

Whole of Island Approach Site Selection

The Government of Kiribati selected Abaiang and Tabiteuea North from a group of atolls considered 'most vulnerable'. Then due to factors such as the inland shift of 80 metres of the coastline threatening Tebunginako village and the comparatively large population size and proximity to Tarawa, Abaiang was selected as the first atoll for the Whole of Island approach to take place.

The following criteria, developed by the Kiribati National Expert Group and the Office of *te Beretitenti*, were used to assess the vulnerability of the various islands using information sourced from existing databases, such as the Kiribati national census:



Assessment on Abaiang

This report assessed the capacity of Abaiang to adapt to environmental change and reduce community vulnerability to climate change and disaster risks.

Abaiang's ability to do this was determined by the natural, infrastructural, financial and human resources the atoll community has, and the ability of local institutions to utilise accessible resources efficiently and effectively to adequately meet livelihood (settlement, water, food, income) needs on a daily basis, as well as in periods of climatic and disaster-related stress.

Data Collection

The following process was used to collect all the information required by the assessment:

- National consultation with sector experts on vulnerability indicators, data needs and appropriate methods of assessment.
- Reviews of previous research, field assessments, policies and reports relating to climate change, disasters and development in Kiribati and Abaiang.
- Participatory appraisals divided amongst men, women and youth in eight villages on Abaiang to gather information about local perceptions of climate and disaster risks on livelihood assets (September 2013).
- Household surveys in 17 of Abaiang's 18 villages, covering 10% of the island's 425 households (September 2013).
- Field assessments of housing, water and local food production systems via observations, and soil and water quality testing (September 2013).

Analysis

Preliminary results were shared with the people of Abaiang (Participatory Planning Workshop, November 2013) to validate findings of the integrated vulnerability assessment. These results were then analysed by the Kiribati National Expert Group, with support from Whole of Island partners (SPC, GIZ and SPREP).



Participatory appraisal led by Government of Kiribati staff



Local enumerators conducted household surveys



Water testing during field assessment in Ewena village



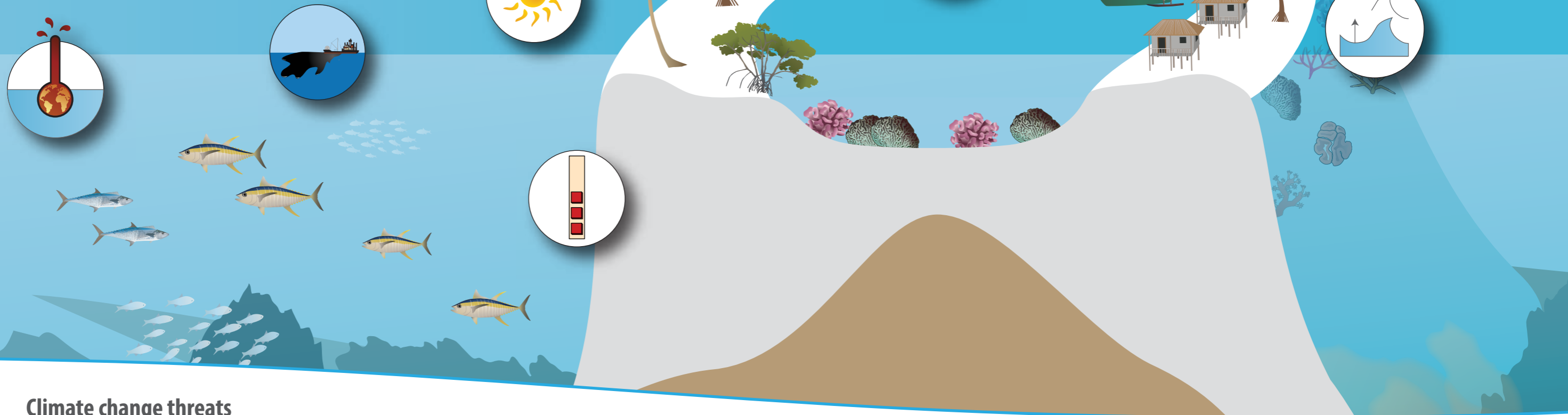
Participatory Planning at Council Mwaneaba in Taburao

Climate Change and Other Threats to Abaiang

When the patterns of temperature, rainfall and other climate elements change from what is considered normal, communities and ecosystems are exposed to the impacts of these changes.

The key concerns of communities included accessing drinking water, coastal erosion, increasing temperature and diminishing land and marine resources.

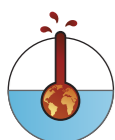
Abaiang's exposure to the effects of climate change and disaster risks was assessed from a technical as well as local community perspective.



Climate change threats



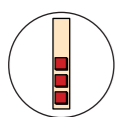
Air temperature increase: Communities in Abaiang reported generally hotter days. This is consistent with long-term weather records in Tarawa. Abaiang, like the rest of Kiribati, can expect a continuous increase in air temperature. There is high confidence that average temperature will increase by 0.3–1.3°C for the Gilbert Islands by 2030. Increases of over 3°C by 2090 are considered possible.



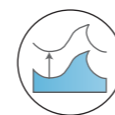
Sea temperature increase: Sea surface temperatures have risen gradually since the 1970s in the waters around the Gilbert Islands by approximately 0.15°C per decade with the rise in air surface temperatures. There is high confidence that sea surface temperature will increase by 0.6–0.8°C by 2035. Increases between 1.2°C and 2.7°C by 2100 are considered possible.



Rainfall and drought: The majority of communities on Abaiang noted a decrease in rainfall, especially during the wet season over the last three decades. According to weather records and observations, the impact of droughts, usually associated with La Niña years, can be severe in Kiribati. But in the future, it is predicted that average rainfall will increase during both the wet and dry seasons, and there is moderate confidence that the number of droughts will decrease.



Ocean acidification: When the ocean absorbs carbon, it leads to seawater becoming more acidic. There is very high confidence that this acidification in Kiribati will continue to increase, putting precious marine ecosystems at risk. Abaiang communities did not specifically mention ocean acidification, but they did notice damage to fish habitats, reefs and a decline in fish stocks.



Sea level rise: Past measurements around nearby Tarawa show that sea level has risen by 1–4 mm per year, which is higher than the global average. Sea level rise will increase the impact of storm surges and coastal flooding in Abaiang. There is moderate confidence that sea levels will continue to rise by approximately 5–15 cm by 2030 and 20–60 cm by 2090. But currently not enough is known to make predictions confidently.

Other non-climate threats:

Apart from climate-related hazards such as sea level rise and drought, Abaiang is exposed to other natural and human-caused hazards. The following threats were identified by Abaiang communities and the National Disaster Risk Management Plan:



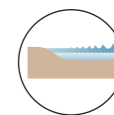
Epidemics



Fire



Maritime disasters



Tsunami

Epidemics and health issues (skin diseases, non-communicable diseases and diarrhoea are most common) **fire** (considered low risk by communities), **maritime disasters** (can lead to oil spills that threaten marine and coastal ecosystems and fisheries), **tsunamis** (though historical records of tsunami events suggest that Kiribati has a lower risk than other Pacific Island countries).

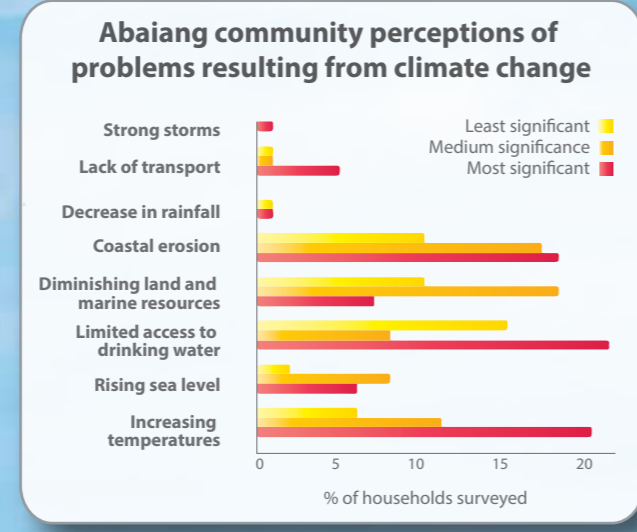
Nature Supports Daily Life in Abaiang

This section describes the natural assets that the 18 villages on Abaiang have access to for meeting their basic water, food, housing and income needs and the sensitivity of these assets to climate change and disasters.

Natural assets refer to marine and land-based natural resource stocks, flows and services that support people's livelihood needs, ranging from public goods such as the atmosphere and biodiversity to the more dividable assets such as fishing grounds and land used for food production and water sourcing.

Communities on Abaiang are highly reliant on natural resources to meet their basic daily needs. In addition, the natural environment also provides recreational, aesthetic and spiritual benefits associated with cultural identity (*'te aba'*).


Natural assets on Abaiang were found to be the most exposed and sensitive of all areas assessed, (the other three being infrastructure, human resources and finance). This was also reflected in local community perceptions.



Water and Sanitation

Human habitation on the atoll is only possible due to the presence of an underground freshwater lens. Sanitation is a major issue with most people defecating on the beach, though the use of improvised composting toilets has been increasing. The following key issues were identified:

- **56% of households use open wells. 18 of 19 groundwater sites tested found dangerously high levels of bacterial contamination**
- **Freshwater lens becomes salty during drought and is vulnerable to saltwater intrusion caused by storm surges and king tides**
- **Lack of improved sanitation infrastructure**

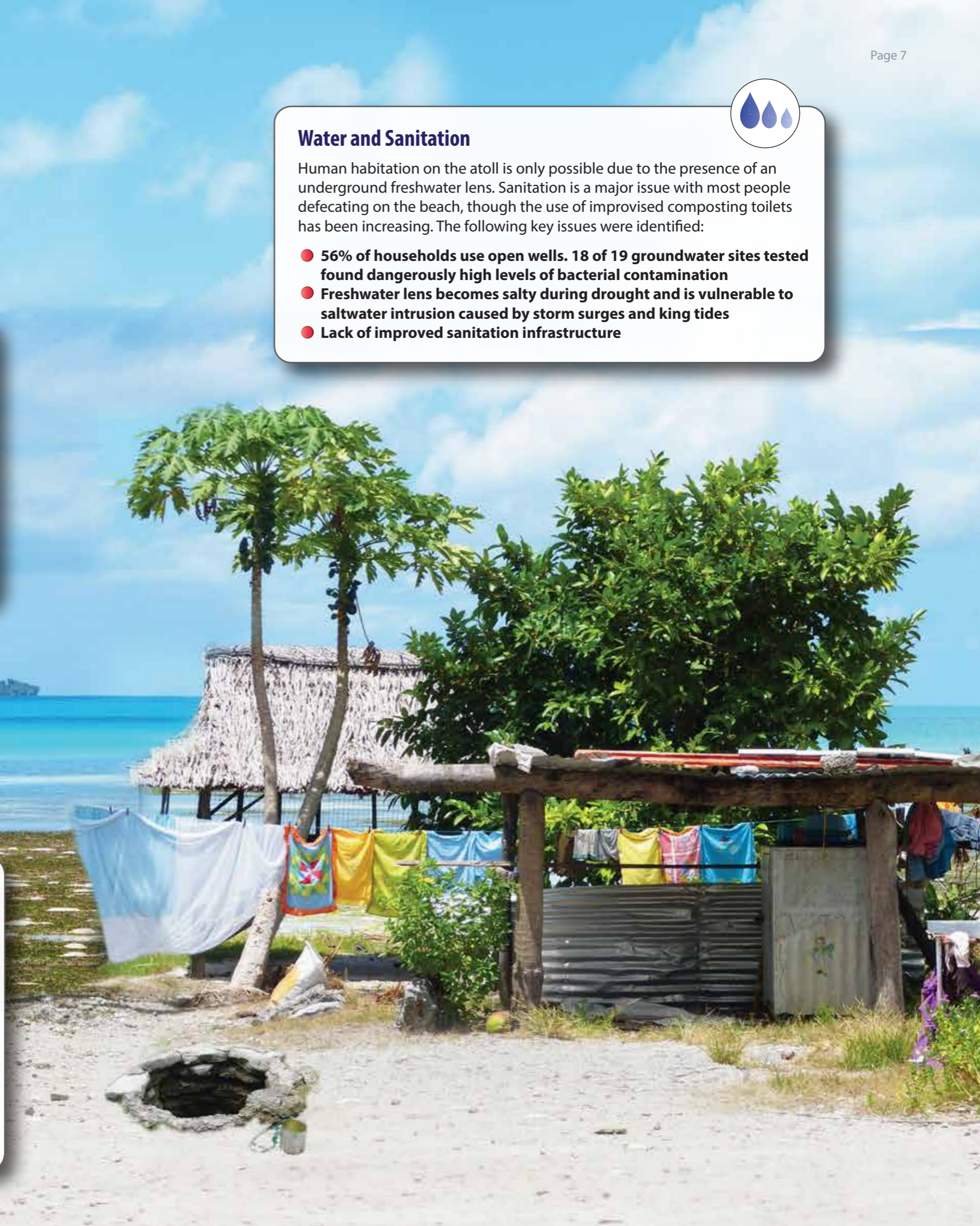


Marine Food Security

Coastal fish and invertebrates provide the main protein source for communities on Abaiang. Invertebrate are also harvested for sale in Tarawa. In-water surveys have revealed a high abundance of fish species suggesting healthy ecosystems and fish stocks, though communities reported decreasing numbers of the giant clam (*te were*), trochus, pearl oyster and ark shell (*te bun*) invertebrates.

The following key issues were identified:

- **Overfishing and over harvesting of invertebrates**
- **Lack of proper resource management**
- **Crown-of-thorns starfish outbreaks**
- **Potential increase of ciguatera fish poisoning and shellfish contamination**
- **Rubbish washing up on shoreline**



Mangroves and Coastal Plants

Mangroves and coastal vegetation provides natural protection from coastal erosion. Analysis has found that only small areas of Abaiang have mangrove forest cover, though coverage has been increasing since mangroves were first studied there in 1961. The following key issues were identified:

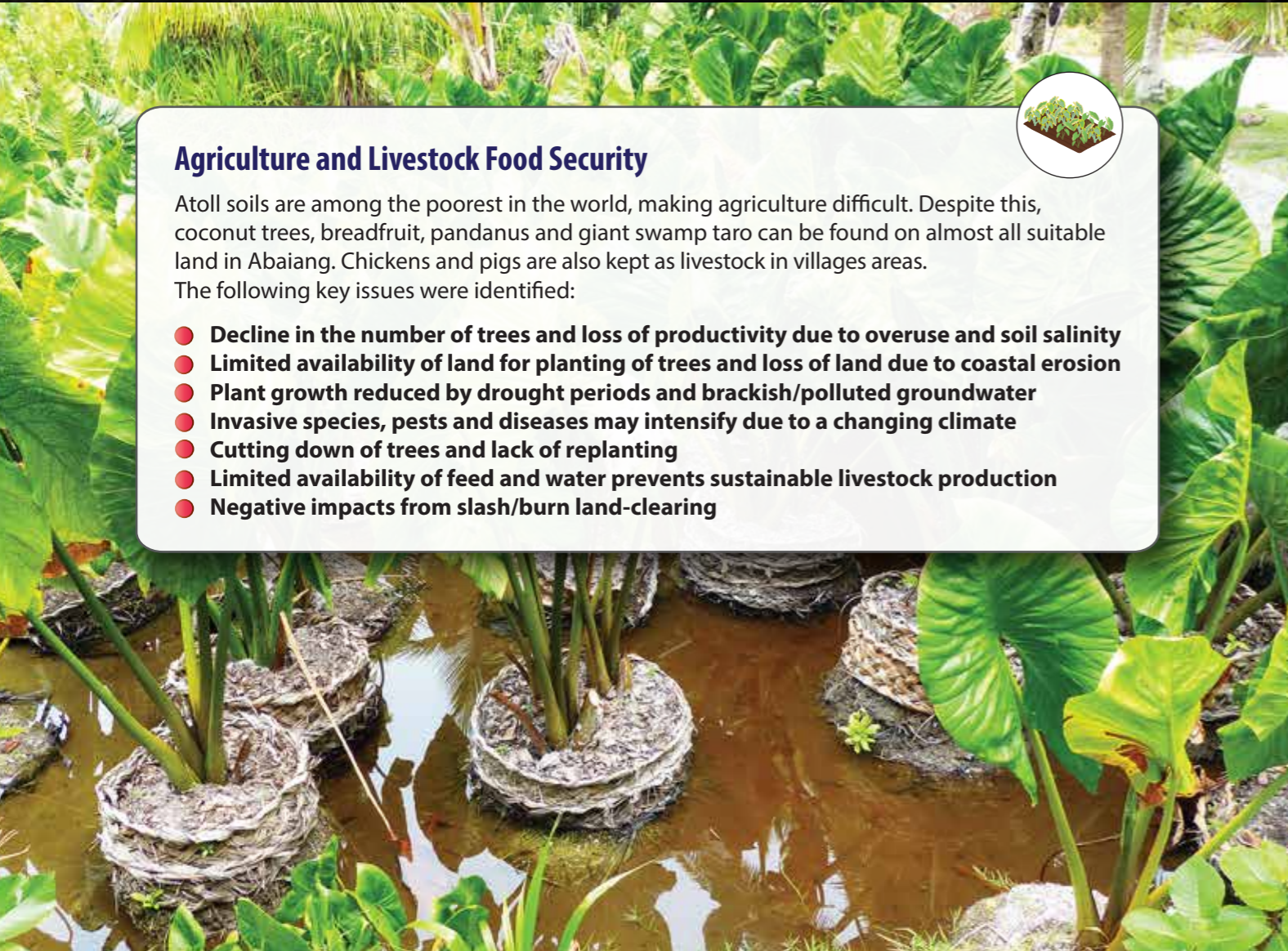
- Low awareness of ecosystem benefits that come from mangroves and coastal plants
- Limited area for mangrove regrowth
- Road construction limits landward migration of mangroves
- Community preference for seawalls that can cause coastal erosion



Agriculture and Livestock Food Security

Atoll soils are among the poorest in the world, making agriculture difficult. Despite this, coconut trees, breadfruit, pandanus and giant swamp taro can be found on almost all suitable land in Abaiang. Chickens and pigs are also kept as livestock in villages areas. The following key issues were identified:

- Decline in the number of trees and loss of productivity due to overuse and soil salinity
- Limited availability of land for planting of trees and loss of land due to coastal erosion
- Plant growth reduced by drought periods and brackish/polluted groundwater
- Invasive species, pests and diseases may intensify due to a changing climate
- Cutting down of trees and lack of replanting
- Limited availability of feed and water prevents sustainable livestock production
- Negative impacts from slash/burn land-clearing



Security of Place

There were 926 households recorded in the 2010 census on Abaiang. The vast majority are on the eastern side of the atoll. They are almost all constructed from traditional materials and use coconut fronds or pandanus thatch for roofing. 97% rely on locally sourced firewood and coconut shells as fuel for cooking. The following key issues were identified:

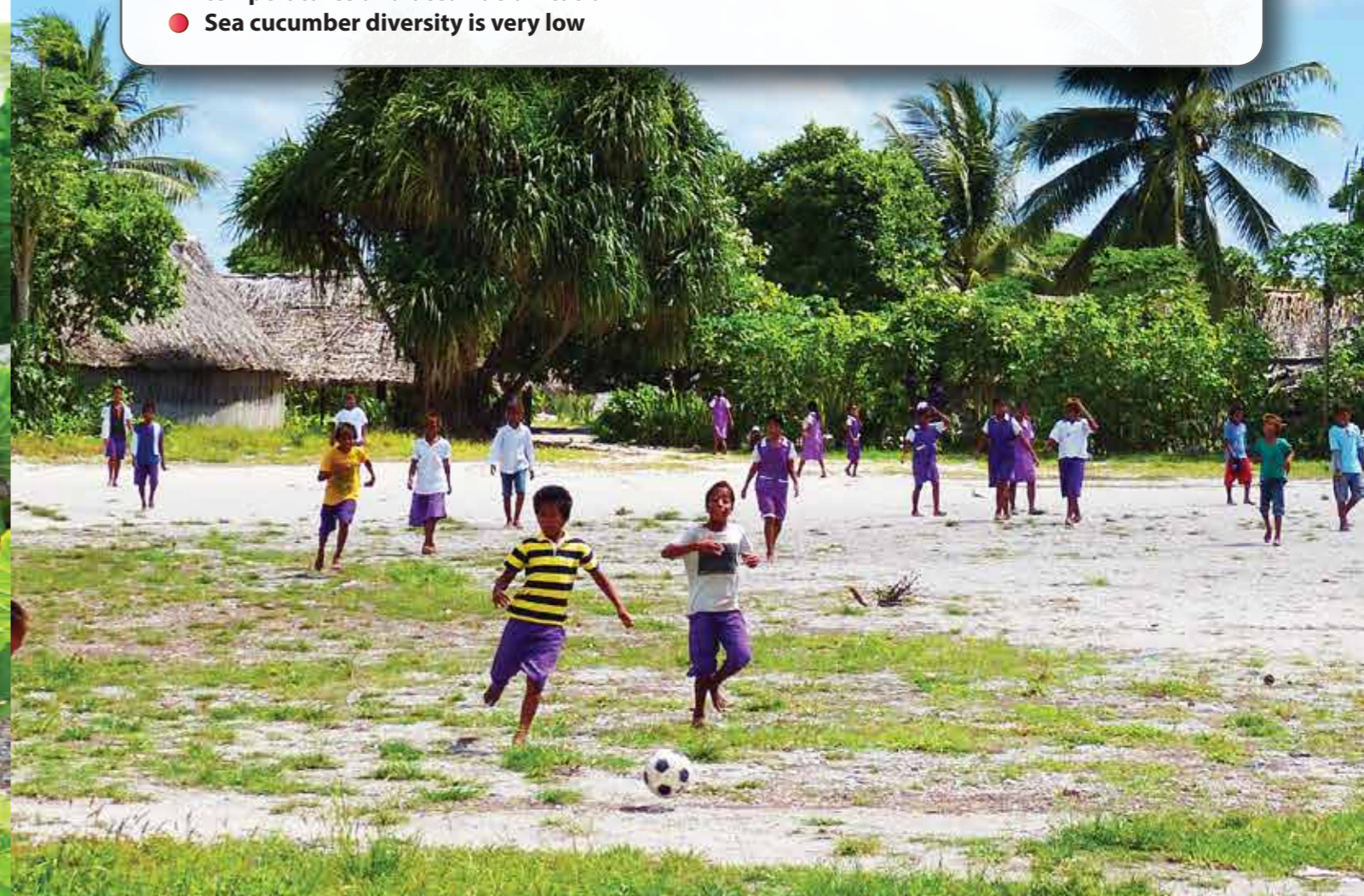
- Loss of trees and mangroves due to demand for building materials and cooking fuel
- Villages expanding towards vulnerable coastal areas
- Majority of houses have a thatched roof making them unsuitable for rainwater tanks
- Any decrease in the productivity of palms, trees and shrubs will negatively impact on the supply of traditional construction materials and cooking fuels



Livelihood Income Security

Commercial production of copra, sea cucumbers and seaweed for export provides valuable income in Abaiang. In addition, cocosap sugar and virgin coconut oil, which have a higher value than copra, are now also being produced. Approximately 50 seaweed farmers are operating in lagoon areas. The following key issues were identified:

- Decline in coconut productivity reported due to reduced coconut size and number
- Copra income varies greatly due to market price changes and low production due to droughts
- Younger coconuts palms should be planted as they are more productive than older palms
- Reduction in health and productivity of seaweed and sea cucumbers due to higher water temperatures and ocean acidification
- Sea cucumber diversity is very low



People, Governance and Infrastructure

Aside from natural resources, the integrated vulnerability assessment identified key features of society in Abaiang and how the people view the world, how decisions are made, and the ability of local leaders to mobilise the community.

This is greatly influenced by the infrastructure (public buildings, services and transport), finances (income, debt, savings, access to credit, insurance) and human resources (health, education, population, knowledge and skills) available.

Institutions

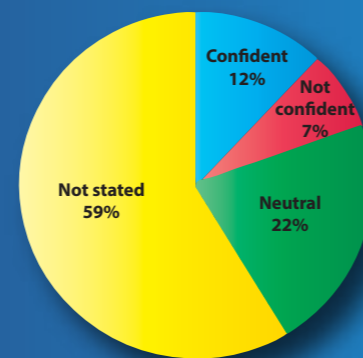
The 'Mwaneaba' system of governance is highly regarded in Kiribati. 81% of the population surveyed in Abaiang value this traditional practice of collective action in each village. Despite these strong traditions, progressive solutions can be embraced: 78% surveyed felt that new ways of solving problems are always accepted by the community. Many also believe that women and youth actively participate in decision-making processes.

36 organisations were named by communities as 'agencies, groups and countries that were considered by communities to be important'. These included churches, donors, government agencies, sports groups, gender-based groups, youth groups, international development agencies and individual projects.

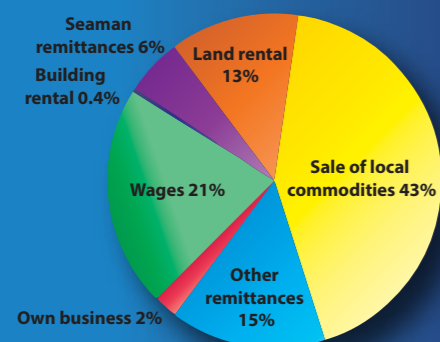
The links between 'Mwaneabas' and the Island Council are strong, but engaging with external organisations is seen as more challenging. Only 12% of those surveyed were confident of their local leader's ability to work effectively with other agencies. To gain support for climate change adaptation and disaster risk management in Abaiang, it will be vital to bridge this issue by supporting networks that link key decision-making bodies to all external stakeholders.



Community confidence that local leaders can work well with other agencies



Sources of household income



Abaiang's local economy is largely semi-subsistent, this means that people build, catch, harvest or grow what they need instead of buying it or paying for a service. The majority of cash income comes from the sale of local natural resources such as handicrafts, fish, copra, cocosap sugar, sea cucumbers, giant clams and seaweed.

Cash flow is relatively limited and is used towards paying for daily livelihood needs. There are no banking services on the island, and employment opportunities are very limited. This lack of access to finance and markets is perhaps what drives the local population to migrate to Tarawa.

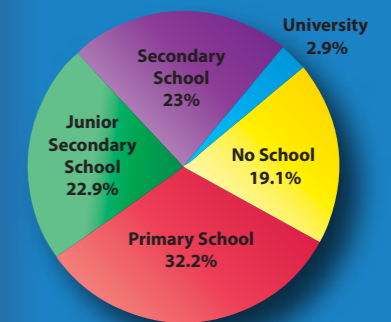
Enhanced financial resources in Abaiang must lead to improved prevention, preparedness and management of risks, 'microcredit' to develop business or diversify sources of income, and greater insurance and savings.

Human Capabilities

Population health, knowledge and skill levels influence people's capability to plan, implement and appraise new projects and processes. On Abaiang there are ten primary schools, one junior secondary school and two senior high schools with almost 2,000 students between them. But less than 1.4% of the local population have any higher education (e.g. diploma, bachelor, masters or vocational degree). During the assessment process, very few seemed confident to communicate in English, despite 81% answering that they can read and write English.



Level of education of Abaiang population

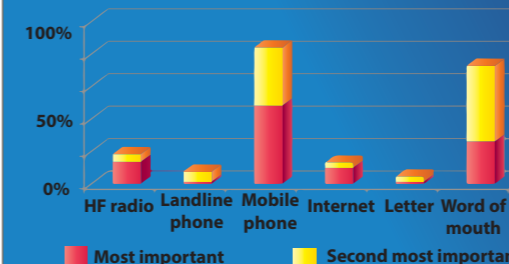


Sadly a wide range of health issues are also common. For example, reported cases of diarrhoea in Abaiang were the highest in all of Kiribati between 2012–2013. Whilst there are 9 small health clinics in Abaiang, there is no doctor or hospital, so time consuming travel is required to take patients to Tarawa.

Men and women on Abaiang have a broad range of traditional and contemporary skills related to handicrafts, medicine, seasons and marine resources. But regardless of how 'capable' the people of Abaiang are, if they are not healthy and cannot access a range of resources (natural, infrastructure and financial) their overall capability to adapt is severely reduced.



Method of communication on Abaiang



Infrastructure Capacity

All forms of infrastructure is extremely limited in Abaiang. Access to reliable energy can be a challenge as there is no grid. 52% of households depend on kerosene and 39% on solar energy as a source of lighting. Transport to and from Abaiang is via boat or plane from Tarawa. The three most common forms of on-island transport are motorcycles, bicycles and trucks. Roads are in mostly poor condition.

A new mobile phone tower has allowed easier communication with Tarawa, but not all villages are covered and 52% of households do not have access to a mobile phone. There are unreliable internet facilities at the Island Council and some schools. About a third of households have a radio and receive news via the national broadcaster.

Adaptation Planning

This section lists proposed adaptation options developed through analysis of the assessment results and planning with Government of Kiribati ministries, partners and representatives from Abaiang villages, schools, health centres, the Council and the Island Development Committee who came together at the Abaiang Participatory Planning Workshop.

Adaptation options were prioritised to assist with key local concerns including: access to drinking water, coastal erosion, increasing temperature, diminishing land and marine resources and a range of development issues.

Fisheries And Marine Resources

- Strengthen management of fisheries resources by developing island bylaws
- Establish marine protected areas
- Deploy fish aggregating devices (FADs)
- Encourage aquaculture development
- Develop value adding and other livelihood and income generating alternatives
- Control crown-of-thorns starfish
- Research the impacts of climate change on coastal fisheries resources



Coastal Ecosystems

- Ecosystem-based Adaptation (EbA) to reduce coastal erosion
- Plant mangroves, trees, bushes and vines in coastal areas
- Encourage communities to care for the coastal environment
- Plan development to support mangroves as they migrate
- Spatial analysis of coastal change



Water Resources

- Improve water quality monitoring
- Increase water storage capacity
- Protect wells and install 'Tamana' pumps
- Raise awareness regarding sanitation and hygiene
- Develop a drought management plan
- Improve waste management and support groundwater reserves to protect water lens
- Promote the use of improved dry sanitation systems

Land-based Food Resources

- Improve soil health and promote improved water and waste management and training for animal health, plant and livestock disease control
- Test and evaluate organic techniques and more resilient crop varieties and livestock breeds
- Promote more organic and locally grown food, especially vegetables and fruits
- Seek opportunities for processing and marketing locally grown produce for export



Institutions

- Commit resources (financial, human and technical) and training to strengthen existing institutions
- Support the Island Development Committee in implementing projects and programmes that address development priorities
- Involve women, youth and people living with disabilities in the decision-making processes, particularly when it concerns their livelihoods



Traditional Knowledge

- Preserve traditional knowledge, cultural values and practices
- Develop community traditional medicine and healing techniques



Transport and Communication

- Ribono and Nuotaea villages now have their own ferries
- Rehabilitate port at Tabontebike village
- Separate mobile towers could be installed at the northern and southern parts of Abaiang to cover villages without mobile phone access
- Support availability of spare parts for communication infrastructure

Education and Skills

- Support access to higher education, business and trade skills training for adults and youth
- Ensure adequate supply of education materials at schools and provide teacher training on climate change
- Improve water and sanitation facilities at schools
- Promote weather measurement training, gardening, composting and a healthier diet at schools
- Encourage teachers and students to monitor fish catch and food consumption at home



Housing and Energy

- Develop a land-use plan to regulate future land development based on spatial analysis of coastal change
- Continue to support installation and maintenance of solar systems for buildings, households and health clinics



Health

- Raise awareness on communicable diseases, fitness and the benefits of a local diet
- Seek assistance for the construction of household sanitation facilities
- Provide communication facilities, an isolation ward on the island, improved water supply and staff transport for health clinics on the island
- Research the use and practice of traditional medicines



Photo: Participatory Planning Workshop, Abaiang, November 2013

Abaiang Council Strategic Development Plan

Vision: "Abaiang Today for a Better Tomorrow"

The Integrated Vulnerability Assessment has assisted in the development of the 2014 - 2017 Abaiang Island Council Strategic Development Plan, which identifies the following objectives:

- 1 **To ensure healthy and secure communities**
- 2 **To improve food and water security**
- 3 **To strengthen good governance, socio-economic conditions and services**
- 4 **To improve livelihoods through the sustainable utilization of terrestrial and marine resources and the environment.**
- 5 **To preserve the traditional knowledge, cultural values and practices of our people and our island**
- 6 **To enhance formal and community education and to support youth, women and people living with disabilities and sports programmes**

At the Participatory Planning Workshop the vulnerability assessment results and proposed adaptation activities were presented for consideration by Council and community representatives for incorporation into the Development Plan. As a result the Development Plan now incorporates climate change adaptation measures that can be managed and monitored locally in Abaiang.

For this to be successful, additional resources, training and support must be provided for the Island Council and the Island Development Committee to take on steering the development, implementation and continual reviewing of their Development Plan.

Looking ahead

The Whole of Island approach in Abaiang has been a shift away from traditional vulnerability assessments where development projects often only work within one sector, such as agriculture, education, fisheries or water supply. The key principles of the Integrated Vulnerability Assessment in Abaiang included:

- Inter-connectedness of social and ecological systems
- Long-term and continuous lessons being learned and shared
- Emphasis on community participatory learning and building on traditional knowledge and experience
- Inclusive decision-making to create opportunities for engaging vulnerable groups


These principles aim to incorporate the value of local knowledge and gain the full engagement and ownership of project activities by communities in all stages of the development process.

The Integrated Vulnerability Assessment in Abaiang studied communities, governance, economics, education, employment, food, health, income, infrastructure, housing, knowledge, population, sanitation and water, to plan adaptation activities to assist across multiple sectors.

Following the completion of all assessment and planning phases, Whole of Island partners have now begun implementing activities on the ground in partnership with communities and institutions in Abaiang. To successfully adapt to climate change in Abaiang and other outer islands, lessons learnt from these activities must inform a continuous and dynamic process of decision-making over the long term.

With additional funding, the Whole of Island approach can also be replicated and further developed on other islands, with the long-term intention of initiating a similar development process and spreading the benefits to even more communities in Kiribati.





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Abaiang Island, Kiribati - A Whole-of-Island Integrated Vulnerability Assessment (SPC/GIZ/SPREP)