Integrated Vulnerability Assessment Framework for Atoll Islands

A collaborative Approach

Pacific Community
Communauté du Pacifique

SPREP
Secretariat of the Pacific Regional Environment Programme

german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Jointly prepared by the Pacific Community (SPC),
Secretariat of the Pacific Regional Environment Programme (SPREP) and
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ABBREVIATIONS

EU	European Union
GCCA	Global Climate Change Alliance
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoK	Government of the Republic of Kiribati
IDC	Island Development Committee
IPCC	Intergovernmental Panel on Climate Change
IVA	Integrated Vulnerability Assessment
KiLGA	Kiribati Local Government Association
KNEG	Kiribati National Expert Group
KJIP	Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management
KMS	Kiribati Meteorological Service
MELAD	Ministry of Environment, Lands and Agriculture Development
MFMRD	Ministry of Fisheries and Marine Resources Development
MISA	Ministry of Internal and Social Affairs
MoE	Ministry of Education
MHMS	Ministry of Health and Medical Services
MPWU	Ministry of Public Works and Utilities
OB	Office of Te Beretitenti (The President)
PLA	Participatory Learning and Action
SLF	Sustainable Livelihoods Framework
SOPAC	South Pacific Applied Geoscience Commission
SPC	Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
WoI	Whole of Island (approach)
WoI-IVA	Whole of Island – Integrated vulnerability assessment

1.0 INTRODUCTION

This resource material is designed as a generic guide for planning, implementing and reporting an integrated vulnerability assessment (IVA) that targets atoll communities in the Pacific Islands region. It is based on a sustainable livelihoods-based approach that combines the assessment of vulnerability to both climate change and disasters. An analysis of previous vulnerability assessment approaches in the Pacific Islands region suggests the importance of merging vulnerability and risk-based assessments as depicted in Figure 1 (Gero et al. 2011). The fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as the 'propensity or predisposition to be adversely affected', which includes 'sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC 2007). Similarly, vulnerability is defined by the United Nations International Strategy for Disaster Reduction (UNISDR 2011) as the 'characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard'. As shown in Table 1, other key concepts that determine vulnerability in the field of climate change and disasters are similar.

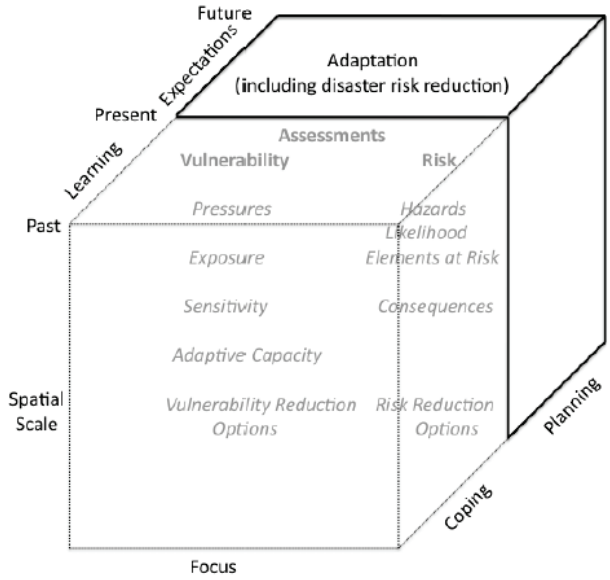

Figure 1: Visualisation of a proposed higher-level framework for vulnerability and adaptation assessments.

Table 1: Comparison of climate change adaptation and disaster risk reduction terminologies.

Term	Climate change adaptation (IPCC 2014)	Disaster risk reduction (UNISDR 2009)
Vulnerability	The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.	The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.
Exposure	The presence of people, livelihoods, species or ecosystems, environmental services and resources, infrastructure, or economic, social, or cultural assets in places that could be adversely affected.	People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.
Sensitivity	The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g. a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g. damages caused by an increase in the frequency of coastal flooding due to sea level rise).	
Capacity	Adaptive: The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.	Coping: The ability of people, organisations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.

Hence, integrating climate change adaptation and disaster risk reduction present strategic benefits in that: 1) disaster risk reduction activities may reduce climate related losses; 2) merging disaster risk reduction and climate change adaptation efforts will enhance resource use efficiency (when the cost of common objectives are streamlined); and 3) both initiatives enhance the likelihood of sustainability for each other's practice through mutual value adding (Shamsuddoha et al. 2013).

Climate change and disasters directly threaten the basic livelihood assets (particularly resources for food, water, shelter and income) of many local Pacific Island communities because they are geographically remote, largely semi-subsistent, have relatively limited infrastructural support and access to markets. The impacts of climate change and disasters will not be experienced separately from unsustainable development and demographic changes. Climate change effects will worsen the impact of current unsustainable practices and vice versa. Given that the ultimate aim of adaptation projects and programmes is to reduce vulnerability (usually via the enhancement of adaptive and coping capacities), this IVA toolkit has been framed to assess vulnerability in a way that supports integrated resilient development planning, implementation, monitoring, evaluation and appraisal in the immediate and long term.

Over the last decade, the Pacific Community (SPC), the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and other Pacific regional organisations that design and implement climate adaptation and disaster risk management projects, have developed their approaches to and methods of conducting vulnerability assessments that were tailored to specific interests. This has resulted in several Pacific designed IVA methodologies that vary in approach, scale, sector and tools (Hay 2011). This generically designed IVA toolkit incorporates the experience, scope and lessons from previous Pacific IVA approaches and methods as well as from lessons drawn from a pilot IVA assessment conducted in Abaiang, Kiribati. Based on a whole-of-island approach, lessons from the Abaiang IVA were incorporated into defining a set of key areas of focus to guide the identification of appropriate indicators, and in developing a step-wise, multi-agency approach to conducting an IVA that avoids duplicating vulnerability assessments and resilient development work in the region.

The IVA approach is a shift from the more sector-based vulnerability assessments. The term 'integrated' implies the integration between sectors, scales, disciplines and space. A continuous and dynamic process of decision-making linked at multi-levels and scales are implied to reflect the long-term iterative learning that is necessary to successfully adapt to climate change. The generic nature of this toolkit suggests that it could be modified or expanded to respond to various objective-driven vulnerability assessments for various thematic purposes (e.g. food security, urban water and sanitation, sustainable forestry) and contexts (e.g. village, 'whole-of-island', 'ridge to reef', national) while remaining committed to an integrated agenda.

The key principles of this IVA toolkit include the:

- interconnectedness of social and ecological systems;
- interconnectedness of sectors (e.g. water, forestry, agriculture, fisheries) and livelihood assets (natural, infrastructural, human, financial and institutional);
- long-term and continuous iterative learning and knowledge co-production between local communities and technical resilient development practitioners;
- an emphasis on participatory learning and action (PLA) tools that values, draws and builds on traditional and local knowledge experience so as to give local communities 'ownership' and empowerment;
- facilitation of inclusive decision-making that creates opportunities for engaging vulnerable groups; and
- the valuing of local and traditional knowledge and the full engagement and ownership of beneficiaries at various stages of the resilient development process.

This toolkit is a product of a comprehensive design, trial and reflection process on the part of the Kiribati National Expert Group (KNEG), SPC, SPREP and GIZ climate adaptation and disaster risk management practitioners. This process included the following key steps:

1) A desk review of climate change vulnerability and adaptation assessment approaches as well disaster risk assessments, frameworks, indicators and tools that have been developed and tested in the Pacific by regional agencies and globally sourced ones (conducted in April 2013).
2) A workshop of 16 SPC, SPREP and GIZ sector climate change adaptation and disaster risk management experts held on 20 and 21 May 2013. These experts discussed the outcomes of the desk review and identified various theme-based IVA indicators and tools, and consolidated the first draft of the IVA household questionnaire.
3) The development of the first draft of the IVA toolkit and IVA household questionnaire in September 2013 (via a consultative feedback process among SPC, SPREP and GIZ).
4) Consultation, review and approval of the IVA toolkit by KNEG.
5) The field test of the draft IVA toolkit based on a whole-of-island vulnerability assessment approach on Abaiang Atoll, Kiribati, in November 2013 by KNEG, SPC, SPREP and GIZ.
6) The incorporation of lessons learned from the Abaiang field assessment in the finalisation of the toolkit.

2.0 THE IVA FRAMEWORK

This section describes the six components that make up the IVA framework and how they guide the design and implementation of IVA field assessments and the analysis of field data. This IVA framework adaptively combines the principles and components of the other frameworks that have guided previous assessments in the Pacific (SOPAC 2004; Limalevu 2009; USP 2011; McNamara et al. 2012; Nakalevu 2006; Duncan 2001). Here, a generic GIZ climate change vulnerability framework (GIZ unknown date) and the Sustainable Livelihoods Framework (SLF) (DFID 1999) have been applied. The broad categories of vulnerability framework (Fig. 3) pertain mainly to climate-specific vulnerabilities in terms of exposure, sensitivities and adaptive capacity, while the SLF (Fig. 2) focuses on people's access to various resource types (natural, infrastructural, human, financial) to support their livelihood needs and the institutional structures and processes that influence people's access to and use of livelihood resources. Disaster risks are then considered in a vulnerability assessment as shown in Figure 4. Key elements of these three assessment approaches were combined to form the IVA framework shown in Figure 5.

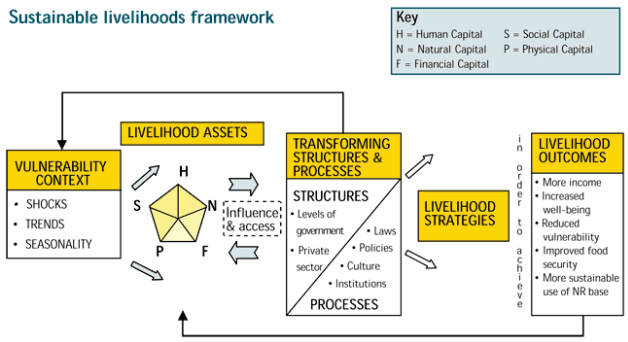

Figure 2: Sustainable livelihoods framework.

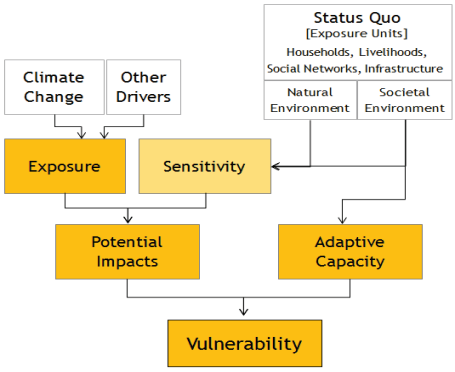

Figure 3: Generic vulnerability framework

Figure 4: Disaster risk framework.

The initial IVA fieldwork on Abaiang by KNEG, SPC, SPREP and GIZ practitioners in September 2013 was guided by the above three frameworks and lessons learned from previous regional IVAs. The IVA framework in Figure 5 — along with the identified key areas of focus, tools and step-by-step assessment process — was developed via lessons learned from the desk study, consultative workshops, and outcomes of the Abaiang IVA field assessment.

Overall, the IVA framework (Fig. 5) is an adaptation of the SLF (Fig. 2) that: 1) specifies climate-associated risks and sensitivities; 2) recognises social capital as an integral part of the transformative process within the functions of institutions; and 3) simplifies the analytical framework to suit smaller island communities by limiting the analytical components to six comprising: general context, natural capital, infrastructural capital, financial capital, human capabilities and institutions. It also builds on the generic vulnerability framework with a more detailed focus on adaptive and coping capacity that is contextualised to local Pacific Island communities that are vulnerable to climate change impacts and disasters.

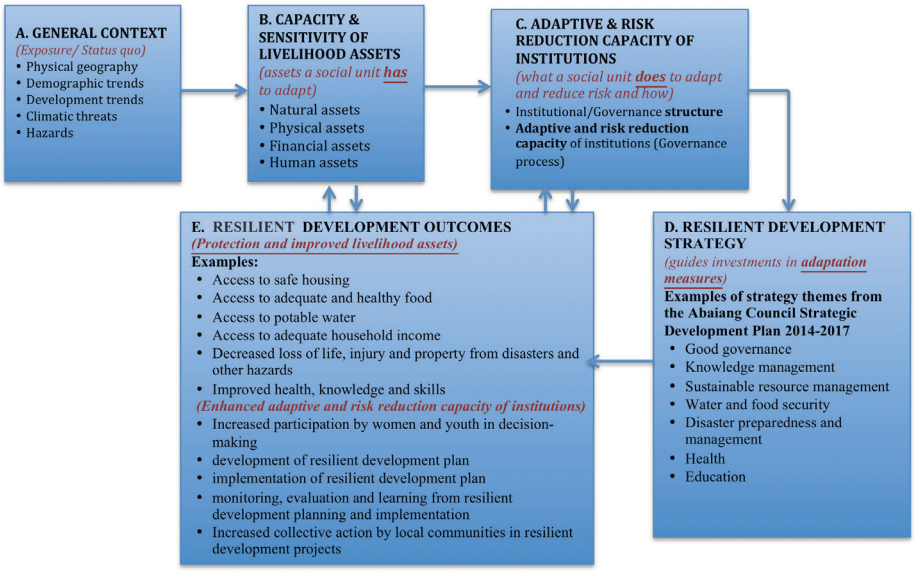

Figure 5: The integrated vulnerability assessment framework.

The above IVA framework divides adaptive and risk reducing capacity between resources (what a social system *has*) and institutions (what a social system *does*). Institutional adaptive capacity is defined as the informal mechanisms (values, norms, culture and customs) and formal rules (policies, laws and regulations) that shape the way people and groups channel livelihood resources (natural, infrastructural, financial and human) to respond to climate change and disaster risks and impacts. Institutions that are flexible, decentralised, democratic, participatory and based on sustainable development principles are regarded as more resilient. Good leadership and collective action, inclusive decision-making and the continuous incorporation of lessons learned into decision-making processes are key elements of institutional adaptive capacity. In this way, the term 'institution', as defined in the IVA framework, includes the concept of 'social assets' as defined in the SLF.

2.1 General context

The general context describes the understanding of experienced and anticipated climate effects and disasters, interacting with existing development and demographic trends influencing the availability and accessibility of community livelihood assets. Hence, the sensitivities of livelihood assets, particularly natural resources and physical infrastructure, to climate change and disaster effects (overlaying development and demographic effects) describe the vulnerability context of a socioecological system. External pressures on livelihood assets may be (broadly) in the form of shocks (e.g. tsunami, flooding), seasonality (e.g. droughts or dengue outbreak) and the gradual and incremental effects of climate change such as sea level rise and ocean acidification. For atoll communities such as those in Kiribati, the anticipated effects of climate change and hazards are likely to intensify the magnitude and impact of external pressures on livelihood assets. The vulnerability context of an IVA is usually more descriptive of key aspects of an island's socioecological system such as geographic, demographic and development features and trends, and the climatic and disaster risks associated with these. Suggested areas of focus, the rationale for guiding analysis, and the potential tool options for this component of the IVA are shown in Table 2.

Table 2: Area of focus, rationale and tool options for analysing the general context.

Suggested key focus areas	Rationale to guide analysis	Data acquisition tool options
Island geography overview • Location • Physical features • Current climate • Settlement history and culture	An overview of the island's geography contextualises the understanding of 'exposure' and 'sensitivity' of climatic and non-climatic pressures.	• Documentation review (past reports) • historical timeline(McNamara et al. 2012; Nakalevu 2006) • resource mapping(Nakalevu 2006) • multi-temporal image analysis
Demographic trends • Number of people (including men, women, children); households; villages; schools; hospitals • Age distribution • Population density at various locations/villages • Population growth rate (birth rate, immigration and emigration) • Population distribution according to religion, ethnicity/language (or place of origin) Pollution level estimates (solid and liquid waste)	A description of demographic trends generates a contextualised understanding of existing and potential population demands on the island's natural and physical livelihood assets, impacts of which will be further intensified by climate change.	• Documentation review (national census data; SPC (2013); health and education data; previous reports and publications)
Development and local natural resource use and management trends • Land-use and land-use change • Household income generation activities (agricultural, forestry and fisheries harvest demands) • Existing and planned economic activities on the island (industrial and infrastructural expansion on the island) • Other economic demands on livelihood assets • Waste management practices	A description of development trends generates a contextualised understanding of existing and potential pressures on island's natural and physical livelihood assets that stem from economic activities. Existing pressures on food production, housing, business, housing and infrastructure is expected to intensify with gradual climate change impacts.	• Desk study: documentation review (national census data, line ministry data and reports, other reports and publications) • IVA household survey questionnaire (Annex 1) • Multi-temporal image analysis
Observed and anticipated climate change effects (scientific observations and projections as well as community perception) • Temperature change • Rainfall change • Sea level rise • Ocean acidification • Climate extremes (e.g. cyclones, droughts, heavy rain, extreme heat) • Animal and plant indicators (e.g. changes in fruiting or spawning seasons and sizes of fruits and crops, or occurrence of pests and diseases) **Past and future disaster risks** Geological hazards (e.g Tsunami, earthquake, volcanic eruptions)	This section describes experienced and anticipated changes in climate patterns and hazards to overlay with existing population and development-related pressures and strengths on the island. Local experiences of past emergencies and disasters are useful indications of disaster risks. Local observations of environmental change are useful preliminary indications of the kinds of impacts that might be associated with climate change interactive with human and development	• Desk study: documentation review: Data and publications on observed and future climatic changes and past disaster events (e.g. post disaster needs assessments, damage and loss assessments, data from Meteorological Offices) • Climate modeling and analysis • Focus group discussions: Local hazard mapping based on past experience, seasonal calendar to discuss observed changes in climate patterns and plant and animal indicators (Annex 2) • IVA household survey questionnaire (Annex 1)

Suggested key focus areas	Rationale to guide analysis	Data acquisition tool options
• Hydro-meteorological hazards (e.g. inundations, flooding, drought, fire) • Biological hazards (e.g. epidemic, pests and diseases) • Men-made hazards (e.g. oil spills, fire)	activities. Climate change can intensify hydro-meteorological and biological hazards (including coastal erosion, wave-overtopping, salinisation and inundations)	
Climate and disaster risks on key areas *Natural resources and food security* • Coastal and marine ecosystems and fisheries • Land-based ecosystems, agriculture and forestry • Water resources *Physical infrastructure* • Water and sanitation infrastructure • Transport, telecommunications and energy • Housing and public buildings *Human health* • Water-borne disease trends • Vector-borne disease trends • Dietary trends • Access to health care during emergencies or disasters *Education and skills* • School enrollment • Safety of schools • Access to education facilities during emergencies or disasters • Traditional knowledge *Employment and income* • Income (cash and in-kind) from different sources	These areas are of particular importance to sustain island livelihoods and are particularly sensitive to climate change and disaster risks.	• Documentation review • Locally observed environmental change and experience with extreme situations: individual interviews; focus group discussions; impact frequency ranking; transect walk; water and soil testing; resource mapping; SWOT analysis (Annex 2), historical profile(McNamara et al. 2012; Nakalevu 2006)

2.2 Capacity and sensitivities of livelihood assets

Local communities need natural, infrastructural, human and financial resources to support their housing, food, water and income needs in normal times and in periods of stress, in the immediate and long term. Institutions (both formal and informal) influence the distribution and accessibility of livelihood assets to various social groupings within a community in a significant way. Diverging from the sustainable livelihoods framework (Fig. 2), the IVA framework incorporates social capital into institutional capacity, as it is closely inter-linked with the transformative structures and processes of socioecological systems (DFID 1999). The IVA framework defines institutions as the informal mechanisms (values, norms, customs and culture) and formal rules (policies, laws regulations and organisations) that all influence the way individuals and groups interact and act collectively. Social capital as understood in the context of the SLF is an integral part of these informal mechanisms and formal rules. This section describes the capacity and sensitivities of livelihood assets that local communities have access to. All livelihood assets will be either directly or indirectly affected by climate change and disasters such as sea level rise, changing rainfall patterns, ocean acidification, seawater inundations, droughts and tsunamis among others. The following sections describe the various livelihood assets and their respective functions in assessing adaptive and coping capacity.

2.2.1 Natural capital

Natural capital refers to the marine and land-based natural resource stocks, flows and services that support people's short and long-term livelihood needs in normal times and in periods of stress. Natural capital ranges from the more intangible public goods such as atmosphere and biodiversity to the more tangible dividable assets such as fishing grounds and land used directly for food, housing, water, handicrafts and income production. An assessment of the potential impact of climate change (e.g. based on the 2011 Pacific Climate Change Science Program climate models in the medium term, 2030, and long term, 2090; KMS, BoM and CSIRO 2011) on natural capital may be based on the co-production of knowledge sourced from the observations of technical field assessors and local community members.

Table 3: Focus areas, rationale and tool options for analysing the capacity of natural capital and sensitivities to climate change and disasters.

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
• Access to adequate freshwater resources to support a range of livelihood, and adaptation and risk reduction options in the immediate and long term ➢ Groundwater (quality and quantity) ➢ Surface water (quality and quantity) ➢ Rainfall catchment potential ➢ Management	Reflects the current baseline of availability, quality and access to fresh water and its source. Rising sea level, wave over-topping, changes in rainfall patterns and increasing evaporation are affecting the quality and quantity of water resources while population growth increases the demand for water.	• Documentation review (previous water assessment reports) • Freshwater vulnerability assessment (SOPAC 2004; Duncan 2011) • IVA household survey questionnaire (Annex 1) • Community-based water quality monitoring (SOPAC date unknown) • Observations, including water testing (physical and microbiological) • Focus group discussions (Annex 2)

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
• Access to sufficient and productive land to support a range of livelihood and adaptation options in the immediate and long term ➢ Elevation ➢ Distance of shoreline to nearest dwelling or building ➢ Mangrove health ➢ Coastal erodability ➢ Proportion of suitable land that is available for food production, income and housing (including farming and forestry) ➢ Condition of agricultural land, soil type and fertility ➢ Freshwater availability (quantity and quality) • Access to sufficient and productive marine areas to support a range of livelihood and adaptation options in the immediate and long term ➢ reef structure and health ➢ inshore water quality ➢ coral health ➢ seaweed health ➢ tidal flat health ➢ open ocean fish • Access to sufficient and productive local commodities for household food and income needs to support a range of livelihood and adaptation options in the immediate and long term ➢ coconut productivity (size and abundance) ➢ agricultural productivity and variety ➢ livestock productivity and variety ➢ fisheries catch per unit of effort (diversity, size, abundance)	Access to sufficient land and marine resources increases the range of options available to address livelihood needs when developing and implementing adaptation strategies to address climate and sea level changes, and to mitigate disaster risks. Climate change and disaster impacts on biodiversity as well as land and marine resources by degrading ecosystems, increasing pests and diseases, changes in soil conditions, decline of available land, increase of tidal flats and ultimately decreasing agricultural and coastal fisheries productivity. Extreme events can result in massive migration and extinction of endemic and native species as well as the invasion of introduced species.	• Coastal physical assessment (Limalevu 2009) • Multi-temporal image analysis • Soil tests • Invertebrates, marine habitats and fish assessments assessments (Awira et al. 2008; English et al. 1997 ; Pakoa et al. 2014) • Mangrove monitoring techniques via i) transect-based survey; ii) permanent plots; or iii) litter productivity and sedimentation monitoring (Ellison et al. 2012) • Sourcing local knowledge: IVA household survey questionnaire; key informant interviews; focus group discussions; community mapping; ranking matrix and impact frequency; seasonal calendar (Gero et al. 2011; UNISDR 2009) • Water and sanitation programme to provide other practical field tools (e.g. flow rate; salinity) • Hydrological assessment of yield and quality of ground and surface water (SPC no date)
• Establishment and maintenance of conservation areas	Acknowledgment of the fundamental dependence of human existence on the environment and the need to manage and protect it. Conservation areas can positively impact on the recovery rate of an area following disturbance (i.e. hazards related to extreme weather events and sea level change).	• Desk study: documentation review • Locally sourced knowledge: focus group discussion; individual interviews (McNamara et al. 2012; Nakalevu 2006) • Aquatic transects (SPC no date)

2.2.2 Physical (infrastructural) capital

Physical capital includes basic and enabling infrastructure necessary for supporting livelihoods in normal times and in periods of stress. Physical capital that supports adaptive and risk reduction capacity needs to be:

- sufficiently robust to cope with disaster and climate risks;
- movable (for relocation or retreat) when necessary;
- able to have alternative or 'back up' options;
- relevant to supporting livelihood needs; and
- open to wide ownership.

Infrastructure and technology may be categorised by systems that:

- support basic services such as housing, water and sanitation;
- deliver government health, education, justice and other essential services; and
- enable economic activities, including transport (roads, bridges, airports, ports and jetties), information, communication and technology, energy, agriculture, fisheries, forestry and tourism and other sector industries (Baker and Week 2011).

Table 4: Focus areas, rationale and tool options for analysing the capacity of infrastructural capital and sensitivities to climate change and disasters.

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Basic wellbeing • Access to adequate and climate- and disaster-proof housing and public buildings • Access to adequate potable water in normal times and times of stress • Access of adequate and climate- and disaster-proof solid and liquid waste management systems	Adequate housing, water systems and solid and liquid waste management systems that are sufficiently robust to cope with disaster and climate risks, movable (for relocation or retreat) and have 'back up' options reflect positively on adaptability and disaster mitigation.	• IVA household survey questionnaire (Annex 1) • Field observations and assessment (McNamara et al. 2012; Nakalevu 2006)
Delivery of government services • Access to adequate health services (hospitals, doctors and nurses) • Access to formal and informal education (schools and training centres) • Access to justice services (e.g. police, village wardens, by laws, courts, fire arms) • **Access to extension services that enhance the availability of food, water and income options**	Access to adequate health, education, justice and industry extension services in normal times as well as periods of stress reflects positively on adaptability as well as disaster mitigation, preparedness, response and rehabilitation.	• Locally sourced knowledge: individual interview with identified internal and external key informants; focus group discussion (McNamara et al. 2012; Nakalevu 2006) • Field observations • Community mapping (Nakalevu 2006; Govan et al. 2008) • IVA household questionnaire (Annex 1)
Enabling economic activity • Access to adequate and enabling transport (roads, bridges, airports, ports) services that enable mobility of people and goods for household income • Access to ICT services that improve access to markets and income • Access to adequate energy to support health, education and local industries • Access to industry-specific support local commodities (e.g. tourism, availability of climate resilient crop varieties)	Access to adequate transport, communications, energy and industry infrastructure capable of buffering climate change and disaster impacts reflects on access to markets, services and information on adaptation and risk reduction options and, hence, adaptability and resilience.	• Locally sourced knowledge: individual interview with identified internal and external key informants; focus group discussion (McNamara et al. 2012; Nakalevu 2006) • Field observations (McNamara et al. 2012) • Resource mapping (Nakalevu 2006; SPC no date) • IVA household questionnaire (Annex 1)

2.2.3 Financial capital

Financial capital refers to money that can be accessed via available stocks (such as cash and bank savings, liquid assets such as livestock and jewelry, insurance and credit availability), regular inflows such as income earnings, pension, state transfers and remittance and income in-kind. Financial resources that support adaptive and risk reduction capacity have the following combined features: improved prevention, preparedness and management of risks, microcredit ('smart' risk taking; for example, to develop business or diversify sources of income), risk transfer (insurance), and risk reserves (savings). Notably, savings may be enhanced when people have adequate access to natural resources for food and other basic needs.

Table 5: Focus areas, rationale and tool options for analysing the capacity of financial capital and sensitivities to climate change and disasters.

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Access to and diversity of cash income from • Remittances flow • Employment • Private business (including sale of surplus agriculture, livestock, forestry and fisheries produce and service sector) • Pensions • Land rent • Building or house rent	Regular access to a cash income or remittances will smooth out fluctuations in income and provide financial security with which to consider adaptation and risk reduction options.	• Documentation review (e.g. national census data, household income and expenditure data) • National level key informant interviews (e.g. banks, Ministry of Migration and Labour, land registries) • IVA household survey questionnaire (Annex 1)
Access to credit schemes • Trust funds • National or bank credit schemes • Traditional credit schemes (in cash or in-kind)	Increased access to credit and money more readily facilitates transitions to new livelihood options and generally provides a buffer to climate and disaster impacts.	• Documentation review (e.g. national census data) • National level key informant interviews (e.g. banks, Ministry of Migration and Labour) • Locally sourced information: individual interviews with identified internal and external key informants; focus group discussions (McNamara et al. 2012; Nakalevu 2006)
Access to and diversity of income in-kind from • Agriculture • Livestock • Fish • Wildlife • Forests • Handicrafts • Medicinal plants • Minerals • Building & construction of tools, houses, boats etc.	Regular access to income in kind in the form of self-produced or exchanged food, building, handicrafts, tools and medicinal produce is of significant financial importance to reduce household's cash requirements and ensure to support livelihoods in many ways (food security, social status, health, housing). A greater diversity of produce increases adaptive capacity and resilience. Climate change and disasters impact on the availability and quality of natural resources mostly negatively (e.g. decreased productivity caused by loss of species, pests and diseases or damages during extreme events).	• Documentation review (e.g. national census data, household income and expenditure surveys, data from line ministries) • Locally sourced information: individual interviews with identified internal and external key informants; focus group discussions (UNISDR 2009; McNamara et al. 2012) • IVA household survey (Annex 1)

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Access to overseas development aid (including agreements for these)	Access to overseas aid increases the amount of resources that can be accessed during times of stress. Sustainable development outcomes usually strengthen adaptive capacity and resilience.	• Documentation of development programmes implemented at the site (e.g. through the ministries in charge of climate change, disaster risk management, finance and internal and/or external affairs) • Locally sourced information: individual interviews with identified internal and external key informants (McNamara et al. 2012; Nakalevu 2006)
Debt/equity at local to national scales; balance of trade; currency value	High debt and inequity of wealth during periods of disturbance increases stress on limited resources and constrains the development of alternative adaptation and risk reduction options.	• Documentation of publication and reviews (e.g. Ministry of Finance, International Monetary Fund, World Bank) • Locally sourced information: individual interviews with identified internal and external key (McNamara et al. 2012; Nakalevu 2006)

2.2.4 Human capabilities

Human capital refers to the individual and collective skills, knowledge, and physical and mental ability (health) of a given population that enables them to utilise existing resources to meet daily livelihood needs as well as to plan, implement and monitor development actions and processes including climate change adaptation and disaster risk management. However, the number of 'capable' people relative to accessible resources within a social unit also determines adaptive and risk reduction capacity and so demography and mobility are critical factors. Further, human capital is often assessed according to education and skills level, leadership potential and health status. The lack of education and poor health is often regarded as a vulnerability driver.

Table 6: Focus areas, rationale and tool options for analysing human capabilities and sensitivities to climate change and disasters.

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Availability of productive population relative to dependent population • age structure (less than 15; 15–30; 30–45; 45–60; 60 and older) • density • mobility (seasonal or permanent)	Demographic structures and trends of a social unit influence their adaptability, preparedness and response. A higher proportion of children, disabled and elderly (possibly due to seasonal migration for employment) may suggest higher vulnerability, particularly in times of natural disasters. Similarly, too many people relative to available resources and declining or too few people as a result of migration may also lower the capacity of a community to adapt to climate change and respond to risks.	• Documentation review: national census data; SPC 2013) • IVA household survey questionnaire (Annex 1)

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Human health • Infant mortality (rates and causes) • Infant morbidity (rates and causes) • Life expectancy • Prevalence of communicable disease • Prevalence of non-communicable diseases • Prevalence of conjunctivitis and night blindness (linked to vitamin A deficiency) • Prevalence of vector-borne disease • Prevalence of domestic violence • Disabled population	The physical and mental health of a population is a critical factor in determining adaptation capabilities. Sick people are less capable and have less time to commit to addressing livelihood needs and adaptation or risk reduction initiatives. Changes in temperature, rainfall and impact on the frequency and intensity, especially of vector-, food- and water-borne, diseases. Disasters can leave people with injuries, cause loss of life and, if not managed well, can lead to outbreaks of epidemics.	• Documentation review: national census data; SPC 2013; Data from Ministries of health • Locally sourced knowledge: interviews with identified internal and external key informant, especially local medical staff (McNamara et al. 2012; Nakalevu 2006)
Knowledge and skills • Proportion of population with no formal education experience • Proportion of population with primary level education; Form 3 school certificate; Senior Secondary Certificate • Net school enrolment ratio • Proportion of population that is computer literate • Proportion of population able to read and write in the local language • Proportion of population that is able to read and write in English • Proportion of population with tertiary education (including academic and technical and vocational education and training) • Proportion of population practicing traditional methods of handicrafts, canoe-building, costume design, house construction, fishing, agricultural production and medical healing • Knowledge of and access to climate change and disaster risk management information **Leadership skills** • Number of people in a community who motivate others to achieve a certain goal and take responsibility to identify resources and to implement actions in the common interest	People's knowledge, experience and skills determine how they respond to risk, and given the uncertainties around climate change, hazards and their impacts, adaptation and risk reduction option assessments and decision-making will be influenced through learning by doing and sharing lessons learned. The ability to co-produce knowledge (e.g. from science, traditional knowledge, experience of vulnerable groups) is a positive indication of adaptive and resilient capacity. Changes in the environment caused by climate change or shocks caused by disasters can potentially make traditional knowledge obsolete (e.g. if certain species disappear these cannot be used anymore for medical purposes).	• Desk study: National census data; SPC 2013; Data from the Ministry of Education and/or Labour Locally sourced knowledge: interviews with identified internal and external key informants; focus group discussions; Field observations (McNamara et al. 2012; Nakalevu 2006) • IVA household survey questionnaire (Annex 1)

2.2.5 Institutional structures and processes

Institutions refer to informal mechanisms (values, norms, customs and culture) and formal rules (policies, laws and regulations) that influence the way individuals and groups interact and act collectively (via informal and formal organisations) (Dovers 2001; Gupta et al. 2010). Hence, institutions shape the way people and groups respond to climate change vulnerability, disaster risks and impacts, as well as channel the flow of resources and power required to adapt to climate change and reduce risks. Adaptation and risk reduction are essentially institutional processes and flexible, decentralised, democratic, and participatory institutional designs are a positive indication of adaptive capacity and resilience. The assessment of institutions requires two parts: the institutional structure and the adaptive and coping capacity of institutions. Key areas of focus to guide the IVA assessment are shown in Table 7.

Table 7: Focus areas, rationale and tool options for analysing the adaptive capacity of institutions to climate change and disasters.

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Institutional context • Governance structure (both modern and traditional) • Social structure and grouping profile (e.g. age, sex, religion, kin, place of origin) • Networks with external agents • Historical profile and recent influential events	This section outlines the social structures and power relations (between individuals and groups within a community and between a community and external agencies) that shape decision-making processes that are necessary to initiate, resource, implement and monitor adaptation and risk reduction measures.	• Desk review: documentation review • Locally sourced knowledge: interviews with identified internal and external key informants; sex segregated focus group discussions; institutional and/or network mapping; historical profile; community power structure and hierarchies; gender and generational roles; daily time chart (USP 2011; McNamara et al. 2012; Nakalevu 2006; SPC no date) • Adaptive capacity wheel policy analysis method (Klostermann et al. 2010) • Institutional adaptive capacity assessment (SPC 2013) • National adaptive capacity assessment (WRI 2009)
Adaptive and coping capacity of leadership within institutions • Ability to act collectively towards adaptation and risk reduction goals ▪ Existence of either a climate change adaptation (mitigation) and disaster risk management goal and action plan or a local development plan incorporating risk reduction strategies ▪ Capacity of community leaders to mobilise community and external partners towards development goals inclusive of adaptation (and mitigation) and risk reduction ▪ Community climate and disaster risk awareness ▪ Community confidence and trust in local leaders' ability to work together to drive resilient development • Ability to facilitate inclusive decision-making by: ▪ Sourcing knowledge and skills from various groupings within the community inclusive of elderly, women and youth groups ▪ Sourcing knowledge from various reliable technical experts from outside the community • Ability to continuously 'learn by doing' and improving on previously trialed adaptation measures: ▪ Community-based monitoring of hazards, disasters, climate impacts and effectiveness of adaptation and disaster risk management ▪ Continuous process of incorporating observations of adaptation measure and process effectiveness into decision-making around adaptation planning and implementation	Institutions that are able to empower individuals and groups to reduce disaster risks and to respond to short and long-term impacts of climate change either though planned or creative measures are a positive indication of adaptive and coping capacity.	• Locally sourced knowledge: interviews with identified internal and external key informants; sex segregated focus group discussion (Nakalevu 2006; SPC no date) • Participant observation • IVA household questionnaire survey (Annex 1)

Suggested key focus areas	Rationale to guide analysis	Tool options for gathering data
Beliefs, norms and taboos Population indicating that: ▪ they have control over their future ▪ taking actions now will prevent problems in future ▪ new ways of solving problems are always accepted by the community ▪ the community often plans for the future ▪ their household adheres to community traditional values of collective action (*katein te aba*) ▪ their community values traditional practices of collective action and cooperation ▪ women and young people participate actively in decision-making processes ▪ conflicts within the community are usually resolved adequately ▪ the community (e.g. clans or church-based local groups) can raise funds to support livelihood needs ▪ local leaders can work well with other external agencies in dealing with climate change and disaster impacts	Norms, beliefs and taboos can explain different community behaviour ranging from positive and pro-active adaptive and risk reducing actions, to stalling any response and development processes, leading to a stagnant situation or even worsening it.	• Documentation review • Key informant interviews at national level (e.g. faith-based organisations, ethnologists, culture experts) (McNamara et al. 2012) • Locally sourced knowledge: interviews with identified internal and external key informants (including elderlies, traditional healers, faith representatives, women, youth); sex segregated focus group discussion (McNamara et al. 2012; Nakalevu 2006; SPC no date) • IVA household questionnaire survey (Annex 1)

3.0 RESILIENT DEVELOPMENT STRATEGIES AND OUTCOMES

Resilient development strategies and outcomes refer to plans of action or policy designed to achieve resilient development goals and objectives. Resilient development outcomes are the likely short- to medium-term achievements linked to a resilient development strategy activity outputs. Resilient development outcomes are generally expressed in terms of capacities and other benefits to the target groups and may be thematically categorised to support access to livelihood resources and improved and/or resilient institutional processes as shown in Figure 3. Theoretically, the development of a resilient development strategy follows the vulnerability assessment process and may be approached in several ways depending on evolving institutional contexts and needs. The outcomes of the vulnerability assessment may inform the development of a new resilient development strategy (if a similar policy is not in place) or add on amendments to an existing policy by building in resilience principles and strategies. The Kiribati Joint Implementation Plan (KJIP) and Abaiang Island Development Plan (Table 8) are examples of resilient development strategies that guide resilient development activities and investments at the national level and Abaiang island (local) level.

Table 8: Summary of Kiribati Joint Implementation Plan (KJIP) and the Abaiang Island Development Plan.

KJIP strategies	Abaiang Island Development Action Plan
Strategy 1: Strengthening **good governance**, policies, strategies and legislations *Strategy 2:* Improving **knowledge and information** generation, management and sharing *Strategy 3:* Strengthening and **greening the private sector,** including small-scale businesses *Strategy 4:* Increasing water and food security with integrated and sector-specific approaches and promoting **healthy and resilient ecosystems** *Strategy 5:* Strengthening **health-services** delivery to address climate change impacts *Strategy 6:* Promoting sound and reliable **infrastructure development** and land management *Strategy 7:* Delivering appropriate **education**, training and awareness programmes *Strategy 8:* Increasing effectiveness and efficiency of **early warnings** and disaster and emergency management *Strategy 9:* Promoting the use of sustainable renewable sources of **energy and energy efficiency**	**Objective 1 - To ensure healthy and secure communities.** *Strategy 1.1 HEALTH:* The people of Abaiang have a better understanding of health issues and access to health services, safe drinking water and appropriate sanitation systems. *Strategy 1.2 SANITATION:* Communities and schools have access to safe sanitary facilities to minimise health risks and the contamination of the water lens and the ocean. *Strategy 1.3 DISASTER RISK MANAGEMENT AND SECURITY SERVICES:* The communities on Abaiang are more safe and secure through enhanced coordination, awareness and management of risks and the ocean. **Objective 2 - To improve food and water security on the island.** *Strategy 2.1 WATER:* Potable water is ensured for all communities through better management, increased storage capacity and access, monitoring of quality and quantity, community awareness and applied research on impacts of climate change and land use on water. *Strategy 2.2 AGRICULTURE AND LIVESTOCK*: Agricultural productivity is increased through improved soil health condition, appropriate water management practices, research and evaluation for adaptable crop varieties, livestock breeds and sustainable farming methods that are suitable to atoll conditions and climatic extremes. *Strategy 2.3 FISHERIES*: Fisheries resources are managed appropriately by communities at a sustainable level supported through scientific research, and has enhanced income and improved livelihoods. **Objective 3: To strengthen good governance, socioeconomic conditions and services on the island.** *Strategy 3.1 GOOD GOVERNANCE:* Good governance applied through an Island Council and Island Development Committee effective in coordination, communication, finance management, monitoring and enforcement of appropriate legislations and through inclusive community-based planning and lobbying mechanisms for different groups. *Strategy 3.2 ECONOMIC DEVELOPMENT:* Small-scale and community-based private businesses drive economic growth with a focus on organic coconut and fish products, handicrafts, transport and ecotourism through business-friendly mechanisms to start and develop private businesses and training.

Strategy 10: Strengthening capacity to access **financing** and monitor expenditures and maintain strong partnerships

Strategy 11: Maintaining Kiribati Existing **Sovereignty** and Unique Identity

Strategy 12: Enhancing the participation and resilience of **vulnerable groups**

Strategy 3.3 INFRASTRUCTURE: Communities, schools, health centres and dispensaries, the police and the Island Council have access to energy for lighting, cooking, refrigeration, water systems and communication with an increased renewable energy share, and access to better roads, reliable air and sea transport and to radio, internet and mobile networks.

Objective 4:To improve livelihoods through the sustainable utilisation of natural, marine resources and the environment.

Strategy 4.1 ECOSYSTEMS: Marine and terrestrial resources are sustainably utilised and have improved community livelihoods and maintained biodiversity through natural solutions, appropriately selected protected areas and species, research and community engagement.

Strategy 4.2 LANDS: Management of marine and terrestrial resources enhanced through consultation, formulation and enforcement of by bylaws, policies, plans, guidelines and acts on land uses, access to natural resources, relocation and lease rates.

Objective 5: To preserve the traditional knowledge, cultural values and practices of our people and our island.

Strategy 5.1 TRADITIONAL KNOWLEDGE: A preserved local culture thriving with traditional knowledge, respect for the *umimwane*, local authority and values, community cohesiveness and capacity to take on new ideas through documenting and sharing traditional knowledge and skills and having the ability to adapt to and live in a globalised world.

Objective 6: To enhance formal and community education and to support youth, women and people living with disabilities and sports programmes.

Strategy 6.1 EDUCATION, TRAINING AND AWARENESS: Teachers, students and community members have increased capacities to actively engage in the work force and to generate income on Abaiang and abroad and are active members of the community by expressing their views and responding to challenges (including climate change or any other shocks and trends).

Strategy 6.2 YOUTHS AND CHILDREN, WOMEN & PEOPLE LIVING WITH DISABILITIES: Youth, women and people living with disabilities take part in decision making and enhance their livelihoods (with increased incomes).

Strategy 6.3 SPORTS: Women, men, children, youth, elderlies and people living with disabilities are physically fit and trained and some of them can take part in national championships.

4.0 A STEP-BY-STEP GUIDE TO CONDUCTING AN INTEGRATED VULNERABILITY ASSESSMENT

This section describes a general step-by-step guide to planning and carrying out a whole-of-island (WoI) IVA. The arrangement of the section has been influenced by the experiences and lessons drawn from the multi-agency IVA conducted on Abaiang Island, Kiribati between September and November 2013.

IVA Steps

- Step 1: Establish a national coordination mechanism — or work through existing ones — and identify island-specific IVA partnering agencies
- Step 2: Collectively agree to the IVA aim and objectives and consolidating partnership
- Step 3: Review existing information about the island and draft the IVA plan
- Step 4: Finalise the IVA design, plan, budget, database and report outline
- Step 5: Endorsement and briefing of the IVA design and plan through the relevant national coordinating mechanism
- Step 6: Formation of the fieldwork assessment team
- Step 7: Pre-fieldwork orientation and preparations
- Step 8: Carry out the fieldwork
- Step 9: Debrief and presentation of preliminary findings to the national coordination body
- Step 10: IVA data entry, analysis and report writing
- Step 11: National and island verification of the IVA report and adaptation planning

The section begins with the formation of the stakeholder group with an interest in conducting an IVA (on a particular island) and ends with the planning of resilient development strategies inclusive of climate change adaptation and disaster risk management. As such, this guide is based on several preconditions as follows:

- The island to be assessed has been determined by the relevant national authorities and with support from partner agencies.
- The national policy framework that the IVA will support has been defined.
- The national coordination mechanism for the IVA process has been determined (e.g. Kiribati National Expert Group, KNEG).
- The relevant island or local government authority (e.g. Island Council, Provincial Council) has agreed to support the IVA.
- Interested agencies have an interest in supporting Pacific Island countries and territories in achieving resilient development goals through sustainable multi-partnerships.

Step 1: Establish a national coordination mechanism — or work through existing ones — and identify island-specific IVA partnering agencies

The first step to carrying out an IVA is to identify a national coordinating mechanism to oversee and provide the necessary institutional links with the various national government agencies, their development priorities, experts and monitoring systems. An existing national subcommittee may take on this role and a full-time person may be required to facilitate the various activities required to undertake the IVA. Such a national coordination mechanism may then be responsible for scoping and inviting various agencies that may have an interest in the IVA process on the island. The stakeholders with potential interests in engaging in the IVA may vary according to sectors (e.g. agriculture, fisheries, water, women) and governance levels (village, island and national). Organisations and agents with previous, current or planned activities and investments on the island are more likely to be interested in engaging in the IVA and may be identified via the respective national departments and island-based governments as well as through regional and international agencies. While engaging a wide cross-section of stakeholders may slow decision-making and implementation processes, such an approach is critical for resourcing the development, implementation, management and monitoring of resilient development plans efficiently in the immediate and long term.

An IVA can be a 'one-off' event designed to assess the vulnerability of a particular community, island or province in an integrated way as well as provide the information required to make immediate and long-term resilient development decisions and monitor and evaluate their relevance, effectiveness, impact, efficiency and sustainability. In this way, the IVA is similar to conducting a needs assessment and determining baseline data from which future resilient development measures may be prioritised. Communicated in this way, various agencies may see the value of an IVA to their own project or programme objectives and, hence, decide to be part of the process. Nevertheless, to ensure that the IVA actually does address the interests of a diverse range partnering agents, a brief stakeholder analysis should be carried out. Such a process will require that all agencies declare their interests and expectations from the IVA process from the outset so as to inform the IVA design and planning process. Such a stakeholder analysis could be a very quick and simple one that could be compiled and presented in a tabulated format as shown in Table 9.

Table 9: Format for conducting a stakeholder analysis of IVA partnering agencies.

Agency name	Interest(s) in an IVA	Expectation from the IVA	Resources willing to commit to IVA	Potential engagement post-IVA (resilient development investment, scope and timeframe)

The outcomes of such a stakeholder analysis may then be distributed to all of the identified partnering agencies to generate thoughts on how the IVA might be designed to suit the needs of all interested parties.

Step 2: Collectively agree to the IVA aim and objectives and consolidating partnership

A collective agreement regarding the scope, aims and objectives of the IVA may follow the stakeholder analysis (Step 1). Whoever facilitates the brief stakeholder analysis may propose an IVA aim and objectives for the identified island or region, and this could be further discussed and finalised at a meeting between all IVA partnering agencies. The formulation of objectives should strategically weave together the varying interests and expectations of the various agencies. Part of this is ensuring that the 'integrated' nature of IVA is commonly understood, implying that not all sector issues will be prioritised and other unexpected priorities that may arise out of the IVA field assessment. Unrealistic expectations from the IVA should be avoided by emphasising the 'rapid assessment' approach that the IVA generally follows, and that supplementary effort may be required by those agencies intending to acquire further in-depth technical information. Hence, a flexible and responsive approach to the IVA will be critical.

Once a group of agencies has agreed in principle to work together, a formal partnership agreement is key (does not have to be legally binding) to ensuring that partnerships are genuine, accountable and sustainable. Genuine partnerships involve commitment, constructive discussion, regular exchange of information and action within the

group to work together towards a common goal, and such partnerships require time, resources (human capacity), effort and patience. The facilitator, ideally operating on behalf of the national coordinating mechanism (but possibly also on behalf of the regional coordination mechanism), may be required to generate and manage communications and information exchange between all partners, from the community level to national and partner agency levels as well as across sectors. The sharing of the vulnerability assessment approach, tools and expectations is critical from the beginning and all partners will need to be upfront about the resources in terms of financial and technical investments they are willing to commit to the IVA process. It is also important to note that some stakeholders or partnering agents may not be interested in engaging in the earlier stages of the IVA process but may have a vested interest in the resilient development planning, implementation, monitoring and evaluation due to their own specific project objectives and frameworks.

Finally, to be effective, the IVA and the resilient development planning process that follows must be reflected in the work plans and budgets of the partnering agencies in a way that is mutually beneficial. For example, it would be preferable that IVA activities and processes are reflected in the lead ministerial work plans as well as those of development partners in order to manage limited resources. Additionally, a collective work plan and log frames between partnering agencies may be developed, from which, decisions regarding respective roles and responsibilities of the various agencies are specified and incorporated into a non-legally binding partnership agreement.

Step 3: Review existing information about the island and draft the IVA plan

A review of existing information about the island being assessed is the next key step, and the main purpose of such an exercise is to ensure that the IVA responds to local realities, needs and aspirations while avoiding duplication of efforts and inefficient use of limited resources. Such a review may be done iteratively with Step 2 as information gathered in this way is likely to affect the development of the IVA goals and objectives. Done well, the review will generate greater awareness (among partnering agents) about context-specific factors influencing the vulnerabilities and development challenges faced on the island to be assessed. The other purpose of the informational review is to design the IVA plan, database, report structure and budget.

Understanding the context of the island

Understanding the local resilient development context is a critical part of any vulnerability assessment and so the acquisition of information relating to the study site should commence once the target island has been decided upon. This step includes gathering the data required to:

- start populating the general context section of the IVA report according to the key categorised factors specified in Section 2 of this toolkit (geography, demography, current climate; see context section) based on, for example, census and household income and expenditure data;
- review past climate change and disaster risk vulnerability as well as sector-based assessment reports covering the island or province or the respective geographical region;
- identify various development agents that were previously or are currently engaged with the island or province as well as those that intend to make future investments though the various sectors (e.g. infrastructural or capacity development in the areas of health, education, resource management, telecommunications, transport);
- national and local capacity available to effectively engage in the IVA and subsequent resilient development planning; and
- previous climate change and disaster risk management awareness raising workshops, media campaigns and resilient development projects implemented in the area.

A sound review of the above information will be critical to preparing a fieldwork methodology that is contextually grounded. Additionally, once the general structure of the IVA report has been agreed to, the information gathered via the review could be used to start populating the report.

Consolidating the guiding IVA design and plan

A more detailed IVA plan may also be developed out of the review guided by the IVA aims and objectives consultatively defined in Step 2. The vulnerability factors and indicators provided in this toolkit are livelihood-based and generic in nature, and the process of consolidating a multi-sector IVA process may include sector-specific indicators that respond to their respective government and partner agency analysis and reporting requirements. Also,

the multi-sector team engaged in the IVA may deem certain indicators in the toolkit unnecessary for the purpose of their assessment and so may choose to exclude these.

Deciding on the methods and tools for gathering the IVA data

Section 2 of this toolkit also provides potential methods and tools (such as household census, questionnaire, key informant interviews, problem root-cause analysis, historical profiling, seasonal calendar, participatory rural appraisal tools) that could be used to gather the required data. A helpful and systematic way of determining the tools and methods could be to:

- Collectively consolidate the IVA factors and indicators to be assessed according to the six IVA key components as shown in Table 10.
- Based on the review information, identify those factors and indicators where data exists and the gaps that the IVA field assessment needs to address. Systematically arranging indicators and tools in a tabulated formal (as per Table 10) may be particularly beneficial to tailoring the IVA household questionnaire in a strategic way (Abaiang feedback suggests that the current IVA household questionnaire is too long); and improving the overall fieldwork strategy so as to avoid repetition and lengthy assessments without compromising on data needs.
- Develop field assessment schedule, facilitation plan and a list of resource and equipment needs
- Develop an IVA database from which field data may be entered and analysed in a systematic and consistent way.
- Develop a report writing plan (structure, process, schedule, responsibilities).

Table 10: Integrated vulnerability assessment fieldwork and reporting framework.

INDICATORS (list of final indicators selected by partners)	Existing data available (e.g. census, national minimum development indicators database, previous research)	Gaps in existing data	Tools (method of data collection)	Resources required to obtain needed data
A. CONTEXT				

B. NATURAL CAPITAL
• Access to adequate freshwater resources to support a range of livelihood and adaptation options in the immediate and long term
  ○ Groundwater (quality and quantity)
  ○ Surface water
  ○ Rainfall catchment potential
• etc.				

C. PHYSICAL CAPITAL				
D. FINANCIAL CAPITAL				
E. HUMAN CAPITAL				
F. INSTITUTIONAL CONTEXT AND PROCESS				

While this toolkit suggests specific tools for each factor and indicator to be assessed, the multi-stakeholder IVA team need not limit itself to these recommendations. Also, local members of the IVA team should determine the cultural appropriateness and translation requirements of the IVA framework and respective tools, such as the household questionnaire or participatory rural appraisals (PRAs).

Step 4: Finalise the IVA design, plan, budget, database and report outline

It is important for partnering agencies to have a sense of ownership over the entire IVA process, and finalising the plan is key to generating such ownership. Once drafted, the IVA plan (from Step 3) should be distributed to all stakeholders for discussion and comments, and all parties may gather at a meeting to finalise the plan, agree to terminologies and report writing structure and schedule, as well as to discuss and agree to logistical and budgetary requirements to carry out the IVA. Given that an IVA brings together stakeholders from various sectors, fields and levels of governance, approaches to assessing vulnerability may vary in meaning and emphasis. As such, open and constructive debates and discussions about the way the IVA will be undertaken, reported and used needs to be encouraged and the role of the facilitator is key to enabling wide agreement regarding the IVA plan, budgetary contributions, database establishment and final report structure. The database establishment involves a considerable amount of time and expertise as well as decisions around ownership and data sharing protocols between local, national and regional partners. A widely consultative and engaging IVA plan finalisation process is more likely to bring about more effective outcomes and enduring partnerships in the resilient development process.

Step 5: Endorsement and briefing of the IVA design and plan through the relevant national coordinating mechanism

A well-informed and supportive national coordinating mechanism can significantly influence the process and outcomes of the IVA. The IVA facilitator may need to keep senior members of the national coordinating mechanism regularly informed at each progressive stage of the IVA planning process so as to enable the engagement of various government ministries and departments at the national and island levels. In this way, coordination skills are a necessary requirement of national or regional facilitator that the IVA partner agencies work with.

Step 6: Formation of the fieldwork assessment team

The fieldwork assessment team comprises national and regional multi-sector experts and several support fieldworkers who travel to the island or province to gather required data as specified in the endorsed IVA plan. If the mission team comprises both regional and national sector experts, then the leadership of the field assessment may be shared between an appointed representative from both groups. Additional locally based field support will be required to administer the household questionnaires as well as assist with the PRA process in sampled communities. In some case, the field support team may comprise local enumerators who have been trained by the National Bureau of Statistics.

Due to the integrated nature of the assessment, all members of the field mission must be comfortable with using the selected IVA tools in gathering data relating to various sectors, especially given that sector experts will not be able to administer all of the household surveys. This means that the survey questionnaire should be designed and administered in a way that allows the best possible acquisition of data from a local community member such as a local enumerator trained on census data – implying that if questions are too technical then inaccurate or unusable responses (and, thus, data) may result. Additionally, the technical sector expert may need to be sensitive to the type of data that are best drawn from the household survey, based on the capacity and knowledge of the local enumerator and household members and, where needed, provide training, clear instructions and daily briefing and de-briefing with enumerators regarding their respective sector-specific questions.

Based on lessons drawn from the Abaiang IVA field experience, a number of identified key roles of the various IVA field mission team members are shown in Table 11 (which may be adapted to suit various situations).

Table 11: Examples of compositions and roles of the inundation vulnerability assessment (IVA) field mission team.

Teams	Members	Roles
IVA field team	Mission leaders (may include both a national and regional expert leader)	▪ Liaise with regional partner agencies ▪ Liaise with national partner agencies ▪ Liaise with the respective island governing institution (e.g. Mayor, Clark, Island Council or Provincial Council) ▪ Represent the IVA mission team and the overarching resilient development planning to the island and village governing institutions ▪ Supervise the fieldwork on a daily basis: • Facilitate logistical arrangements related to the field mission • Facilitate daily briefing and de-briefing of all field mission staff to jointly identify issues and develop solutions • Ensure IVA tools and methods are communicated and utilised appropriately during field work • Gather and store raw data systematically • Ensure that all field mission team members adhere to an agreed code of conduct (to ensure professional behavior and good relations between the field team and local communities and to deal with potential internal team issues) ▪ Check on the progress of household surveys against IVA assessment plan ▪ Engage in the technical and participatory assessments where necessary, for example to fill gaps such as key informant interviews
	Sector experts (may include both national and regional experts including extension officers and statistics officers)	▪ Carry out respective technical assessments and facilitate community participatory assessments ▪ Train enumerators on the household survey ▪ Solicit feedback from household survey enumerators on the progress and type of feedback gathered according to their respective sectors on a daily basis ▪ Provide feedback to field mission leaders on the data gathering activities on a daily basis ▪ Supports team leaders when requested ▪ Statistic officer (with the support of the generalist mission leader) to ensure household data gathered is effectively captured and useful during data analysis ▪ Brief and de-brief the Island Council and Island Development Committee or other respective Province or Island level governance mechanisms on the IVA assessment approach and the preliminary results
Field support team	Enumerators and national statistics officials	▪ Carry out household survey ▪ Provide feedback to field mission leaders and relevant sector experts on progress of household survey

Other important lessons when forming the field mission team are as follows:

- National government sector experts should be encouraged to lead the IVA process.
- Where available, use local enumerators identified by the National Bureau of Statistics to carry out household surveys and ensure they are trained in administering and content of the questionnaires.
- Assess the experience levels of enumerators and potential field support recruits to determine the level of sector-specific training and briefing required to administer the IVA questionnaire.
- Translate the questionnaire, but leave the original English version to ensure a correct understanding. (On Abaiang, the translated version was, at times, overly complicated compared to the original English version.)
- Identify and recruit local fieldwork support via the relevant national government and non-governmental agents who may be members of the IVA field mission team.

Step 7: Pre-fieldwork orientation and preparations

A briefing workshop among the field mission team members should be conducted once they have been identified. Pre-fieldwork preparations take up to at least two days, depending on the design of the IVA and the briefing needs of the field assessment team. Several objectives should guide this briefing meeting, including:

- Familiarisation of the goals, objectives, design and assessment tools of the IVA.
- Familiarisation of the island that will be assessed (geography, demography, culture, governance, services, infrastructure).
- Piloting the IVA household questionnaire and other participatory assessment tools, and improving these tools based on piloting feedback.
- Where necessary, translate resource materials, questionnaire and interview questions so as to develop a common meaning of key concepts in the local vernacular. (In some cases, where the enumerators are fluent in both English and the local vernacular, a written translation of the questionnaire may not be necessary.)
- Train enumerators to administer the questionnaire with sector experts, briefing enumerators on the purpose of the sector-specific sections and the kind of information required.
- Familiarise field mission team with the IVA database with the aim of ensuring data gathered is consistent with entry requirements
- Brief the team on IVA logistical arrangements, schedules, task allocations and responsibilities of various team members.
- Discuss and agree to a code of conduct and set of protocols to be followed by all assessors for the full duration of the fieldwork mission. A representative from the island should be invited to brief the research on cultural protocols of the island and ways of socialising in a way that will be beneficial to both the community and the IVA.

Step 8: Carry out the fieldwork

The IVA fieldwork is the more laborious step of the process because mission leaders and team members spend most of the day (and night) gathering the required data. The estimated time and resources required to conduct the IVA field mission will vary depending on the geographic and demographic features of the island or province being assessed and the types and levels of data sought as per the IVA design and plan. Based on lessons from Abaiang, the key IVA methods used included:

- PRAs conducted in several select villages
- Household surveys (combining household census and sector-specific questionnaires)
- Interviews with key informants
- Sector-specific physical assessments.

It is advisable that field mission leaders hold briefing meetings on a daily basis either at the beginning or end of the day to discuss progress, interesting observations and setbacks experienced by the team so as to capture critical feedback and respond appropriately. The daily field briefing session is also an opportune time to discuss the application of participatory tools in the local context, and the most effective ways of obtaining as much genuine information as possible from the various social groupings. Raw field data such as filled questionnaires, charts and notes should be handed to the mission leaders or other appointed team members for recording and storage. The raw data gathered and daily briefing discussions will be particularly valuable in forming general preliminary findings to be presented to the local government and governance committee, the national coordinating mechanism and senior government officials (Step 9) soon after the field assessment. Given the intensity of the IVA field mission, all IVA field team members should expect to shoulder some of the responsibilities of the mission leader(s) when requested.

Step 9: Debrief and presentation of preliminary findings to the national coordination body

A debriefing session and presentation of preliminary findings to the local government and governance committee, the national coordinating mechanism and invited senior officials should be held immediately after the field assessment. In Kiribati, it is advisable to invite the mayor and the Island's members of Parliament to the debriefing. The objective of this meeting is to report back on the assessment process, the data that was gathered, interesting observations made, and to highlight some general and sector-specific preliminary findings that may be incorporated into the island's development planning and policy processes. The presence of the national coordinating body and senior government

officials such as the island mayor and other local members of parliament is key to generating discussions on how the findings might be used in the island's development planning process as well as in guiding investments on the island. Such a briefing meeting is recommended so that the national coordination body and island leaders can start responding to key IVA findings without having to wait for the completion of the IVA report. Furthermore, they are fully aware of the progress and can brief their superiors and respond to Parliament or media requests.

Step 10: IVA data entry, analysis and report writing

All data gathered during the field assessment should be stored in an ordered way and be accessible to all IVA partners. For example, questionnaires should be numbered and identifiably linked to an enumerator. It may be beneficial to have a dedicated person to coordinate the collection and sorting of all the returned questionnaires and other raw data, conduct quality control checks, and organise the entry into the IVA database. Ideally, this role may be taken up by the National Bureau of Statistics so as to foster national ownership of the IVA data and, based on an agreement, that the data is also accessible by other partnering agencies. However, the National Bureau of Statistics may require additional resources and partner support; for example, a short-term expert to assist with the task. PRA and questionnaire data might have to be translated into English to ensure access for all IVA partners.

Guided by the IVA report structure developed in Steps 3 and 4, the partnering agencies may task certain sections or parts of the report to the appropriate partnering members (e.g. a water technician to analyse the water-related PRA, household questionnaire, field testing data and a laboratory to test collected samples). From the outset, a clear and commonly understood meaning of key concepts such as vulnerability, the IVA framework and adaptive and coping capacity should also have been developed earlier to facilitate the clarity in the writing of the IVA report.

Given that the IVA report serves to inform the resilient development planning process, it would be helpful if there were a specific section (perhaps towards the end of the report) that listed the recommendations for adaptation options, from a technical view point, in a way that costs and benefits of each option are outlined. Such a section should be designed to inform the island or provincial level resilient development planning process so that decisions made are based on meaningful interactions and co-learning between technical experts and the knowledge of local people. One dedicated IVA team member, or a dedicated short-term expert who was involved in the assessment, should be nominated to coordinate and supervise the IVA report writing (perhaps one national and one partner representative who liaise closely with each other) and the amount of time and resources needed for this overall coordination and editing should not be underestimated. To avoid long lapses between the assessment and the planning of resilient development it is recommended to produce a draft analysis of the IVA framework to inform planning; this would then be followed by a detailed assessment report.

Step 11: National and island verification of the IVA report and adaptation planning

Once the partnering agencies and field mission team members have collectively commented on and endorsed the IVA report or draft analysis report, a verification process at the island level may follow. The verification process allows island community members to respond and provide further input into the IVA results to ensure local realities and needs are accurately reflected. Various modes of presenting the IVA report findings may be used to generate local interest and contribution to the report. Such communication mediums (e.g. visual, audio and audiovisual materials) would also benefit the resilient development planning process at the island, provincial and village governance levels as local stakeholders become more aware of the factors that influence their vulnerabilities. Moreover, the IVA report verification process may also provide a forum for planning resilient development intervention recommendations within the island's development framework and policies (if they already exist). In this way, the co-learning process of conducting an IVA is concluded and a co-planning process of resilient development commences.

Annex 1: Integrated vulnerability and adaptation household survey questionnaire

Integrated Vulnerability and Adaptation Household Survey
Abaiang, Kiribati

Section1: Background information

Surveyed by:_____ Date:_____ Time:_____

Village:_____

Respondent's name: _____ (only for data verification purposes. All personal information will be confidential)

No. of household members:_____

Section 2: Household profile, skills and movements

2.1 Household composition and skills

a. HH person no	***b. Sex (f / m)***	***c. Age or yr of birth***	***d. Relationship to household:*** 1=Head of HH 2=Spouse; 3 = Mother of 1 4 = Father of 1 5=Child of 1; 6=Grandchild of 1 7=other relations; 8=not related	***f. Religion (denomination)***	***g. Education level*** 1=No education at all; 2=Primary (specify level); 3=Completed primary; 4=Secondary (specify level); 5=Completed secondary; 6=Vocational 7 = Tertiary	***h. Language and literacy (read and write)***		***i. Computer literate*** 1=No; 2= basic level (at least writing); 3= advanced level (at least internet)	***j. Residency in comm.*** 1=since birth; 2=since marriage (specify year); 3=other (specify reason for moving to community)
						English			
						Speak	***R&W***		
Temporary absent HH members for education, seasonal employment						***Absence (months/yr)***			

2.2 People who have moved out of the community or village in the past 5 years.

No.	**Sex**	**Age**	**Reason for leaving**	**Where have they gone?**	**Do they send money back to help with household expenses?**	**Are they expected to return?**

2.3 How long has the household resided in the community? (Circle the correct numbered answer.)

1 = time immemorial	2 = over 20 years	3 = over 10 years
4 = over 5 years	5 = over 1 years	6 = within the last 12 months

Section 3: General climate change and vulnerability awareness

3.1 What do you think are the most significant problems or challenges faced by your community? (Please rank after respondent answers, 1=most significant, 2=significant, 3= least significant. Does not have to be climate change related.)

Problem	**Rank**

3.2 Have you heard or come across information about climate change?

1 = yes	2 = no

3.3 What do you think may be causing the changes in the climate? (Ask this as an open question and then tick. Do not read out answers. Tick the box(es) that best matches answer. If 'others', describe them.)

Deforestation	God's will
Increase in gases from factories and cars (emissions)	I don't know (voluntary)
Other:	

3.4 What do you think will be the three most significant effects of climate change in your community? (Please rank after respondent answers, 1=most significant)

Significant effects	**Rank**

Section 4: Security of place

4.1 Please indicate the level at which your dwelling is at risk from the following events.
(Tick the relevant box; this should also be done by a transect walk or by own observation.)

Event	**Risk factor**			
	Nil	**Low**	**Medium**	**High**
Coastal erosion				
Sea water inundation caused by severe storm				
Sea water inundation caused by king tide				
Strong winds - damage of houses, bridges and other infrastructure				
Fire				
Tsunami				
Other:				

4.2 What can you do to reduce and respond to the risk?

Risks associated with dwelling	**Possible response actions to protect dwelling**	**What have you already done to protect your dwelling?**
coastal erosion		
Flooding from severe storm and/or king tide		
Damage to house from severe storm		
Fire		
Tsunami		
Other:		

Section 5: Water security

5.1 Please tick the following boxes. (Walk around the property to identify water sources, ask selected questions 5.1.1 to 5.1.3, and tick where appropriate.)

5.1.1 Source	**5.1.2 Outlet**	**5.1.3 Storage**	**5.1.4 Use**
<u>Well</u> ☐ 1 = Covered well ☐ 2 = Partially covered well ☐ 3 = Uncovered well Is there a <u>pump?</u> 4 =☐ Yes 5= ☐ No If yes: 6 =☐ Electric pump 7 =☐ Tamana pump 8 =☐ Modified tamana pump	<u>Bucket</u> ☐ 1 = Hand bucket from well Distance from house: .....meters <u>Tap</u> ☐ 2 = Inside house ☐ 3 = Private tap located outside ☐ 4 = Communal tap Distance from house: .....meters	☐ 1=Household tank ☐ 2=Shared tank with several other houses. ☐ 3=Whole of village tank/s Total volume: .....liters ☐ 4=Containers/bottles Total volume:.....liters Do they have lids? ☐ 5=Yes ☐ 6= No	☐ 1 =Drinking ☐ 2 = Cooking ☐ 3 = Cleaning and/or washing ☐ 4 = Bathing ☐ 5 = Watering crops ☐ 6 = Livestock drinking
<u>Rainfall</u> ☐ 8 = Sealed rainwater tank ☐ 9 = Tank with screen ☐ 10 = Open rainwater tank Is there a gutter? 11 =☐ Yes 12 = ☐ No Gutter on all 4 sides on roof? 13 =☐ Yes 14 = ☐ No Does gutter or roof appear dirty? 15 = ☐ Yes 16 = ☐ No Roof material: 15 = ☐ Iron 16 = ☐ Thatch	<u>Bucket</u> ☐ 1 = Hand bucket from rainwater tank Distance from house: .....meters <u>Tap</u> ☐ 5 = Inside house ☐ 6 = Private tap located outside ☐ 7 = Communal tap Distance from house: .....meters	☐ 7=Household tank ☐ 8=Shared tank with several other houses. ☐ 9=Whole of village tank/s Total volume: _____liters ☐10=Container/bottles Do they have lids? ☐ 11=Yes ☐ 12= No Total volume: _____liters	☐ 1 =Drinking ☐ 2 = Cooking ☐ 3 = Cleaning / Washing ☐ 4 = Bathing ☐ 5 = Watering crops ☐ 6 = Livestock drinking
<u>Source other than well or rainfall</u>	<u>Details:</u>		

5.2 Is the **water supply sufficient** to meet your household needs **(quantity)?**

	1 = almost of the time (every day)	2 = Sometimes (once every two weeks	3 = Rarely (once a month	4 = Never
Drinking water	☐	☐	☐	☐
Non-drinking water	☐	☐	☐	☐

5.3 Do you think your drinking or potable **water supply is safe** for consumption and cooking **(quality)?**

☐ 1 = almost of the time	☐ 2 = Sometimes	☐ 3 = Rarely	☐ 4 = Never	☐ 5 = I do not know

5.4 Do you **boil drinking water** to make it safer? ☐ 1 = Yes ☐ 2 = No ☐ 3 = Sometimes

5.5 Do you have any **water filtration systems?** ☐ 1 = Filter ☐ 2 = Biodisc ☐ 3 = Other_____

5.6 Which **events can create problems** for accessing household drinking water?

Event	**Challenges to accessing drinking water**			**How does your household deal with these drinking water shortages?**
	High	**Medium**	**Low**	
Drought	☐	☐	☐	
Heavy rainfall periods	☐	☐	☐	
Storm surge	☐	☐	☐	
High tides	☐	☐	☐	
Other:_____	☐	☐	☐	

5.7 Even when there is no shortage, is there anything you do to save water?

_____

_____

_____

5.8 During periods of drought or water shortage, who do you rely on for water?

☐ 1 = Government	☐ 2 = Church	☐ 3 = Neighbor	☐ 4 = Village	☐ 5 = I do not know	Other:_____

5.9 Does your household ever **buy water or pay for water**?

☐ 1 = Never	☐ 2 = Once a month	☐ 3 = Once a week	☐ 4 = Everyday	☐ 5= I do not know

5.10 How **much would you be willing to pay** for water per week?

☐ 1 = Less than $1	☐ 2 = $1	☐ 3 = $2	☐ 4 = $2 or more	☐ 5 = I do not know	Other:_____

5.11 Please indicate **where you toilet** (tick more than one box if needed):

☐ 1 = Bush	☐ 2 = Beach	☐ 3 = Flush toilet ☐ communal ☐ private ☐ pour flush ☐ push flush ☐ to septic tank ☐ to drum	4= Compost ☐ communal ☐ private	5 = Pit latrine ☐ communal ☐ private	Other_____

5.12 Do household members wash their hands after using the toilet and before eating?

☐ 1 = Never	☐ 3 = Sometimes	☐ 4 = All the time

5.13 Do household members use soap to wash their hands?

☐ 1 = Never	☐ 3 = Sometimes	☐ 4 = All the time

5.14 Where do you dispose of 'greywater' (i.e. the water left after cooking food, washing plates and clothes, showering)?

☐ 1= Crops	☐ 2= On ground	☐ 3=Near the well	☐ 4= Into the bush	☐ 5= Into the lagoon or sea	Other:_____

Section 6: Food security

6.1 Does your household have access to land to grow food for the household?

1 = yes	2 = no

6.2 How much land do you have access to _____m (length) x _____m (width)

6.3 If no, how much do you pay a year for the land? _____

6.4 Does your household grow fruits, vegetables and crops? (please tick)

	1 = Yes, private	**2 = Yes, shared**	**3 = No**
Fruits			
Vegetables			
Crops			

6.5 If yes, how fertile is the soil to grow crops and vegetables?

	1 = Poor	**2 = Average**	**3 = High**
Fruits			
Vegetables			
Crops			

6.6 In a typical **week,** how much **crops** does your household consume, give away, sell, receive as gifts and purchase?

Crop	**Total produced by the household Weight (lbs)**				**Received as gift** (kg)
	Total (kg)	Household consumption (kg)	Preserved (kg)	Given away (kg)	
Taro (*Colocasia*)					
Banana					
Babai					
Coconut					
Sweet potato					
Breadfruit					
Other					
Total					

6.7 Does your household raise livestock?

1 = Yes	2 = No

6.8 In a typical **week,** how much **livestock** does your household consume, give away, sell, receive as gifts and purchase?

Livestock	**Total produced by the household weight (kg)**				**Received as gift** (kg)
	Total (kg)	Household consumption (kg)	Preserved (kg)	Given away (kg)	
Pig					
Chicken					
Other					
Total					

6.9 In a typical **week,** how much **wild harvested** food does your household consume, give away, and receive as gifts?

Wild harvest (e.g. *te bero*, coconut crabs, *noddi*)	**Total produced by the household weight (lbs)**				**Received as gift** (kg)
	Total (kg)	Household consumption (kg)	Preserved (kg)	Given away (kg)	
Total					

6.10 In a typical **week,** how much seafood produce does your household consume, give away, sell, receive as gifts and purchase – check species and names (see fish poster). Enumerator: If it is difficult to say how how many kg, then describe quantity for, say, fish as: a hand's length, an elbow's length, an arm's length, two arms length.

Seafood		**Total produced by the household weight (lbs/kg)**					**Received as gift** (kg)	**Purchased from another household or store**		**Post-harvest method (e.g. sun-drying, salting)**	**Availability over past 5 years** (1 = Declining; 2 = No change; 3 = Healthy and/or Increasing)
		Total (kg)	Household consumption (kg)	Preserved (kg)	Given away (kg)	Total kg		Amount	$ Value		
Tuna and all ocean fish	Tuna (skipjack, *ati*)										
	Tuna (yellowfin, *Ilgimaea*)										
	Tuna (bigeye, *kaukanoanimata*)										
	Rainbow runner (*kamaa*)										
	Mahimahi										
	Flyingfish										
	Wahoo										
	Billfish										
	Shark										
	Other										
Deep bottom fishes	Oilfish (*ika nenea*)										
	Bottom shark/ 6 gills shark (*tembauia*)										
	Snappers (*aratabwa*, *bukitakeiau*)										
	Other deep bottom fish										
Reef fishes	Humback red snapper										
	Bluefin trevally										
	Grouper (*bakati*)										
	Spangled emperor (*te morikoi*)										
	Bluespot mallet (*aua*)										
	Bonefish (*ikari*)										
	Other reef fish										

Seafood		Total produced by the household weight (lbs/kg)					Received as gift (kg)	Purchased from another household or store		Post-harvest method (e.g. sun-drying, salting)	Availability over past 5 years (1 = Declining; 2 = No change; 3 = Healthy and/or Increasing)
		Total (kg)	Household consumption (kg)	Preserved (kg)	Given away (kg)	Total kg		Amount	$ Value		
Invertebrates	Lobsters (*neewe*)										
	Manta shrimps (*waru*)										
	Octopus (*kiika*)										
	Clams (*were*)										
	Sea cucumbers (*kereboki*)										
	Ark shell (*te bun*)										
	Sea worm (*Ibo*)										
	Other invertebrates										
Aqua-culture	Milkfish (*baneawa*)										
	Tilapia (*tirabia*)										
Others	Turtles (*on*)										
	Other										
	Total										

6.11 Apart from food what are the most important uses of the following other resources:

Resource (local timber, coral stone, shells, leaves)	**Use of resource (firewood, local housing material, traditional medicine, handicrafts, income, shelter, feed for livestock, seasoning, others)**	**Ranking Rank from 1–3, with 1 being the most important**
Example: pandanus leaves	**Examples**: thatched roofs, mats, handicrafts	

6.12 Current activity of household members (aged 5 and above)

In an **average week** spent on the island, how much time do you usually spend undertaking the following activities? (Enumerator to discuss with family and translate into hours.)

	Activities												
Household member (no as in 2.1)	**Farming staple food crops (e.g. swamp taro)**	**Tending backyard gardens (e.g. vegetables)**	**Collecting wild forest produce**	**Fishing (coastal and deep sea and aquacuture ponds)**	**Selling crops, fruit, seafood, wild harvest, handicraft**	**Work for income**	**Household chores (e.g. washing, cooking)**	**Handicraft**	**Community activities**	**Church activities**	**School activities**	**Total hours**	**Leisure– total hours (7 days x 24 hours)**

6.13 Please rate the health status of each ecosystem as indicated in the Table below.

Ecosystem	**Health** **1 = Not healthy** **2 = Healthy** **3 = Very healthy**	**Change over past 30 years** **1 = Worse** **2 = No change** **3 = Improving**	**Are natural resources your household uses being managed? (1–5 where 1 = No management and 5 = Well managed)**
Coconut plantation			
Home garden areas			
Bushes and shrubs			
Coastal zones			
Mangroves			
Seagrass beds			
Reefs			
Ocean			

6.14 Is there a protected area on the land, at the coast, in the lagoon or in the ocean? If yes, where?
_____

If yes, how big is it?
_____
_____

If yes, when was it established and why?
_____
_____

6.15 Please indicate how much of the following shop-sourced food is purchased or received as gifts by your household:

Shop food	**Purchased**		**Gift/Remittance**	
	Volume purchased daily/ weekly/ monthly/	AUD value	Volume purchased daily/ weekly/ monthly	AUD value
Sugar				
Salt				
Tea				
Coffee				
Flour				
Rice				
Canned tuna				
Canned beef				
Frozen vegetables				
Noodles				
Sweets and candy				
Soft drinks (cola)				

6.16 Compared with 10 years ago, do you need to buy more food from the shop today?

1 = doubled expenses on food bought from shop	2 = more or less the same	3 = half of prior expenses on food from the shop

6.17 If there has been a change (whether an increase or decrease), please explain why:

_____

_____

6.18 Please indicate how reliable the various food sources are after droughts or other extreme events? (Tick the box that best matches your answer.)

Food source post disaster	Most are reliable	Some are reliable	Very few are reliable	None are reliable at all
Food garden				
Livestock				
Wild flora				
Wild fauna				
Coastal fisheries				
Ocean fisheries				
Aquaculture (ponds)				
Intracommunity trade				
Shop sourced food				
Food aid from outside				
Preserved food				

Section 7: Household income security

7.1 What are the main sources of cash income for your household? (Tick the box that best matches answers. If 'others', describe them and rank main 3 sources of income.)

	Income source (detail of income from the sources)		What are the 3 main income sources (1 = most important; 2 = second most important; 3 = third most important)
	In kind	In cash	
Copra			
Handicraft			
Farming			
Sea cucumber			
Other fishing activities Specify:			
Wages/Salaries			
Small business (community store, kava retail, cigarette retail)			
Council contracts			
Remittances			
Other (specify)			

7.2 What is your average monthly cash income (including remittances)? (Read out the scales rather than asking them for an exact amount.)

		All men monthly	**All women monthly**
1	$1–99		
2	$100–199		
3	$200–299		
4	$300–399		
5	More than $400		

7.3 Please indicate and rank the top 4 obligations or expenses of the household, with 1 being the 'highest impact'.

	Indicate	Rank from 1 to 3, with 1 being the highest impact)
Traditional obligations		
Church obligations		
Food (meals, preserved food)		
School fees		
Health care		
Water and sanitation services		
Shelter, clothing		
Other:		

7.4 In the case of an emergency, what are your priorities in terms of cash expenditure?

	Indicate	Rank top 3
Additional water		
Additional food		
Lighting needs		
House security and repair		
Health expenses		
Educational expenses		
Community obligations		
Transportation		
Other:		

7.5 Are younger members of the community (ages 15–29) being encouraged to utilise local resources to produce income?

1 = Yes	2 = No	3 = Other:

7.6 If so, in what way?

_____

_____

Section 8: Transport and telecommunications

8.1 How often do you need to travel (tick appropriate box)?

	Group	**Daily**	**Weekly**	**Monthly**	**Yearly**
Within Island	Men				
	Women				
	Children				
Inter-Island	Men				
	Women				
	Children				

8.2 What are your two main reasons for travelling (1 being the most important)?

Group	1. Most important reason	2. Second most important
Men		
Women		
Children		

8.3 What are the two main forms of transport that you use (1 being most important)?

	Most important transport means	Second most important transport means
Within the island		
Interisland		

8.4 Do family members have access to transport when they need it most? (Tick appropriate box.)

	Always	Sometimes	Never
Within the island			
Interisland			

8.5 How often do you need to communicate with people outside your village?

	Daily	Weekly	Monthly	Yearly
Within the island				
Interisland				

8.6 What are the two main forms of communication that you use (1 being most important)?

		First most important communication form	Second most important communication form
Within the island	Wireless radio		
	Landline		
	Radio telephone		
	Internet		
	Mobile phone		
	Letter/mail		
	Word of mouth		
Inter-island	Wireless radio		
	Landline		
	Radio telephone		
	Internet		
	Mobile phone		
	Letter/mail		
	Word of mouth		

Section 9: Household health

(Rather than go to the Health Centre, if open questions remain, ask household members)

9.1 How often have there been incidences or cases of diarrhoea (running stomach) in your household during the last 3 years?

☐ 1 = Never	☐ 2 = Once a year	☐ 3 = Once a month	☐ 4 = Every week	☐ 5 = Every day	Other:_____

9. 2 What do you think causes diarrhoea (running stomach) of the household member suffering from it?

_____

_____

9.3 Please indicate if there are members in your household with the following risk factors for non-communicable diseases (NCD):

Risk factor	How many household members?	Age of people with NCD	Sex
Overweight or obese*			
Smoking tobacco on a daily basis			
Alcohol consumption on most days of the week			
Kava consumption on most days of the week			
High blood pressure diagnosed by health worker in past 12 months			
Diet low in fruit and vegetables (<5 servings per day)^			
Other, please specify…….			

*Indicate if this was diagnosed by health worker or not.
^One piece of fruit is one serving of fruit; one cup of leafy greens is one serving of vegetables; half a cup of other vegetables is one serving of vegetables.

9.4 Please indicate if there are members in your household who have had any of the following communicable diseases (CD) in the past 30 days:

Communicable disease	How many?	Age of people with CD	Sex
Lung infection			
Tuberculosis			
Anaemia			
Intestinal worms			
Other, please specify…….			

9.5 Are you confident that your local leaders can work well with other agencies to help your community deal with promoting a healthy lifestyle?

1 = no confidence at all	2 = low confidence	3 = moderate confidence	4 = high confidence

Section 10: Community norms, values, beliefs and 'inclusiveness' in decision-making

Please tick the box that indicates your views on the following statements:

	Interviewer: 'I will read a list of statements about belief systems and world views in the community. Can you indicate whether you agree or disagree with each statement?' (Tick one option for each statement.)	Agree	Disagree	Neutral
10.1	We have no control over our future.			
10.2	Taking action now will prevent problems in the future.			
10.3	New ways of solving problems are always accepted by the community.			
10.4	The community often plans for the future.			
10.5	My household adheres to community traditional values of collective action (*katein te aba*).			
10.6	My community values traditional practices of collective action and cooperation.			
10.7	We can shape decision-making in our community within the traditional structure.			
10.8	Women and young people participate actively in decision-making processes.			
10.9	Conflicts within the community are usually resolved adequately.			
10.10	The church community can support our livelihood needs, including for example raising funds for us to protect coasts or using church roofs for rainwater harvesting. Church values increasingly become part of our traditional values.			

10.2 Are you confident that local leaders can work well with other agencies to help your community deal with the effects of climate change and natural disasters (insert comments where appropriate)?

Leaders	**1 = No confidence at all**	**2 = Low confidence**	**3 = Moderate confidence**	**4 = High confidence**
Council				
Other:				

Please explain: _____

_____

Annex 2: Participatory rural appraisal tools used by the Abaiang field team.

Seasonal calendar template
(A rating of 1 being the lowest and 5 being highest)

Parameter	Time	Period	Perceived changes	Scale
Hot temperatures	Before (5–30 years back)	January–August	Nil	3
	Now	January–December		4
Cool temperatures	Before	September–December	Nil	2
	Now	Nil		4
Rainy season	Before	January–June	Nil	3
	Now	August–December		2
Seawater inundation	Before	November–December	Nil	2
	Now	January–December		4
Drought	Before	May–July	Nil	2
	Now	January–December		4

Seasonal plant and animal behaviour template

(A rating of 1 being the lowest and 5 being highest)

Parameter	Time	Period	Perceived changes	Scale
Flowering and fruiting (Plant 1) – breadfruit	Before	January–March June–August October–December	Nil	2
	Now	Same as above		2
Flowering and Fruiting (Plant 2) – Coconut tree	Before	January, April–June, December	Less fruit produced and they are very small and oval-shaped (deformed shape).	2
	Now	Same as above		2
Animal behaviour (Animal 1) – Pig	Before	January–March June–August October–December	In the old days, pigs were very healthy because they had a variety of food available. Now, most of the plants they used to eat have been lost due to long periods of drought.	3
	Now	January–December		1
Animal behaviour (Animal 2) – Chicken	Before	January–March July–August October–December	Same comments as for pigs. But chickens today breed earlier than chickens from the olden days.	3
	Now	January–December		1
Spawning (fish) – Reef fish (*maniku*, *maebo*, bonefish)	Before	October–December		2
	Now	January–December		4

Sensitivity template

(A rating of 1 being the lowest and 5 being highest)

Parameter	Hazard	Indicator	Perceived changes	Scale
Agriculture and food security	Land used for agricultural purposes	60%	Water becoming increasingly brackish for agricultural purposes.	3
Forest and biodiversity	Plant lives	60%	Food productivity from sea and land is decreasing.	3
Infrastructure	Many structures built (local and westernised), including houses, clinics, roads and tanks	10%	People tend to move inland due to coastal erosion, seawater inundation, brackishness of water and strong winds.	1
Water resources	Water quality is declining	80%	Fresh water becoming increasingly brackish and unsafe for consumption.	4
Human health	People's health	10%	Increase in diarrhoea rate, especially among young children.	1
Fisheries and food security	Type of fish found and their habitat	40–50%	Coral bleaching is occurring, which affects food production from the sea.	3

Adaptive capacity template (SWOT+HH)

(A rating of 1 being the lowest and 5 being highest)

Parameters	Strength	Ranking	Weakness	Ranking	Opportunity	Threat
Human assets	Our traditional knowledge of fishing	4	Not wanting to share traditional knowledge with the public	3	Subsistence cash income for people buying the service.	Traditional knowledge will be lost (knowledge of how to fish and cultivate plants)
	Our traditional knowledge of cultivating plants	4				
Natural assets	Bonefish	2	Overfishing of bonefish	4		If they are not regulated, conserved and managed properly, bonefish will rapidly decrease in number.
	Morikoi	1	Overfishing of *morikoi*	4	Subsistence cash income for people buying fish for food, for the exchange of goods, and for special occasions.	If they are not regulated, conserved and managed properly, they will rapidly decrease in number
Financial assets	Cultivating coconut trees and harvesting coconut fruit to make money from selling copra	2	Decrease in coconut fruit productivity.	3	Subsistence cash income for the family, groups and villages.	Tree crops dying due to increasing and prolonged periods of drought and because people are not replanting tree crops.
Social assets	Elders decision making	4	No cooperation to carry out what is planned by the elders	1	Knowledge of cultivation to be maintained in the family.	Traditional knowledge of how to cultivate *bwabwai* and other tree crops will be lost if not maintained as a daily activity by the family.
Physical assets	Water tanks	1	High demand for water tanks but they are not well maintained	3	Used for storing water	Expensive
	Public roads	2	Roads are not used all the time by the people	2	Used for communication	Not properly maintained, they are easily damaged.

Network template

Village	Government line ministries	Women, youth and church groups (and others)	Donors	Remarks/ Comments
Koinawa	Ministry of Environment, Lands and Agricultural Development (MELAD) through Agricultural Assistant	Kiribati Protestant Church (KPC) Village elders Kiribati Family Health Association Village leaders Roman Catholic church Men's groups Village youth groups Reitan Ainen Kamatu – KPC women's association Itoi Ni Gaina (Morning Star) – RC Women's Association		
	Ministry of Internal and Social Affairs through the Social Worker Officer			
	Ministry of Internal and Social Affairs through the Island Council			
	Ministry of Health and Medical Services through village clinics			
	Ministry of Education through village schools			

Annex 3: List of indicator options.

(Please note these are only 'proposed' categories that may be used to guide and to be adapted to suit various purposes.)
*coded indicators relate to the SPC National Minimum Development Indicators (NMDI) or the Millennium Development Goals (MDG)

	Ecosystem service	Infrastructure	Human resources	Institutional
Generic	**Ecosystem health** ▪ water quality ▪ phytoplankton conditions ▪ sea grass conditions ▪ coral conditions and reef health ▪ mangrove health ▪ coastal vegetation changes in freshwater flow **National Minimum Development Indicators and Millennium Development Goals (MDGs)** *Population (pressures)* ▪ Population size (PD-POP-1.1) ▪ Population growth (PD-POP-1.2) ▪ Rate of natural increase (PD-POP-1.3) ▪ Urbanisation (PD-POP-1.4) ▪ Total fertility rate (PH-MH-1.7) ▪ Annual number of tourists (PD-ECD-1.6) *Agriculture and forestry* ▪ Proportion of national gross domestic product (GDP) from agriculture and forestry (current prices) (AF-HH-1.2) ▪ Agriculture and forestry export value as a proportion of total export value (AF-NE-2.1) ▪ Agriculture and forestry import value as a proportion of total import value (AF-NE-2.2) *Fisheries (pressures)* ▪ Annual coastal commercial fish catch	**National Minimum Development Indicators and MDG Indicators** *Health* ▪ Proportion of children under age 5 sleeping under insecticide-treated bed nets (WHO) (PH-VBD-1.4; MDG 6.7) ▪ Proportion of children under 5 with fever treated with anti-malarial drugs (PH-VBD-1.5; MDG 6.8) ▪ Pregnant women sleeping under treated bed nets (WHO) (PH-VBD-1.6) ▪ Tuberculosis (TB) treatment success rate (MDG6.10.2; PH-CD-1.5) ▪ Proportion of births attended to by skilled health personnel (MDG 5.2; PH-MH-1.6) ▪ Antenatal care coverage (% of women who had at least one antenatal session with a skilled provider) (MDG 5.5; PH-MH-1.3) ▪ Antenatal care coverage (% of women who had at least one antenatal session with a skilled provider) (MDG 5.5; PH-MH-1.6) ▪ Unmet need for family planning (MDG 5.6; PH-MH-1.8) ▪ Proportion of population with HIV infection with access to	**Health** **National Minimum Development Indicators and MDGs** ▪ Prevalence of violence against women (HD-GEN-1.12) ▪ Under 5 mortality rate (MDG 4.1; PH-VS-1.1) ▪ Infant mortality rate (MDG 4.2; PH-VS-1.2) ▪ Neonatal mortality rate (PH-VS-1.3) ▪ Life expectancy at birth (PH-VS-1.4) ▪ Life expectancy at age 40 (e/40) (PH-VS-1.5) ▪ Adult mortality rate, (45q15) (PH-VS-1.6) ▪ Incidence of dengue per 1000 population (PH-VBD-1.1) ▪ Incidence of malaria per 100,000 population (MDG 6.6.1; PH-VBD-1.2) ▪ Death rates associated with malaria per 100,000 population (MDG 6.6.2; PH-VBD-1.3) ▪ TB prevalence (est. TB cases per 100,000 population) (MDG 6.9.1; PH-CD-1.1) ▪ TB Incidence rate (new cases each year per 100,000 population) (MDG 6.9.3; PH-	**Norms and beliefs** **Proposed IVA indicators:** Proportion of community that: ▪ adhere to a traditional values driving collective action (*mana, vanua, fenua, whenau)* in a modern (Christian and capitalist) context ▪ are willing to accept change or trial new ideas ▪ believe in self-agency (or that "God helps those who help themselves") ▪ believe in their ability to adapt to climate change ▪ believe their community, village or settlement will be able to adapt to climate change. **Formal and informal rules** **National Minimum Development Indicators and MDGs** ▪ Consumer price index - Annual change in quarterly CPI (PD-ECD-1.3) ▪ Total trade/GDP ratio (total imports + total exports / GDP in current prices (all at the same year) (PD-ECD-1.4) ▪ Trade balance/GDP ratio (trade balance/GDP in current prices

	Ecosystem service	Infrastructure	Human resources	Institutional
	by volume (t) (F-ECM-2.1.1) ▪ Annual coastal commercial fish catch by value (F-ECM-2.1.2) ▪ Annual coastal subsistence fish catch by volume (t) (F-ECM-2.1.3) ▪ Annual coastal subsistence fish catch by value ($USâ€™000) (F-ECM-2.1.4) ▪ Annual aquaculture production by volume (t) (F-ECM-2.1.5) ▪ Annual aquaculture production by value ($USâ€™000) (F-ECM-2.1.6) ▪ Annual offshore locally based catch by volume (t) (F-ECM-2.1.7) ▪ Annual offshore locally based catch by value ($US000) (F-ECM-2.1.8) ▪ Annual offshore foreign-based catch by volume (t) (F-ECM-2.1.9) ▪ Annual offshore foreign-based catch by value ($US000) (F-ECM-2.1.10) ▪ Contribution of fisheries and aquaculture to GDP (%) (F-ECM-2.2) ▪ Fisheries and aquaculture export value as proportion of total annual export value (%) (F-ECM-2.3)	antiretroviral (ARV) drugs (MDG 6.5; PH-SXH-1).6) ▪ Sustainability of national health systems (prop of annual health expenditure from international aid) (PH-HS-1.4) ▪ Equity in national health services coverage (PH-HS-1.5) ▪ Health professionals - Number of physicians per 1000 population (PH-HS-1.7) ▪ Health professionals - Number of dentistry personnel per 1000 population (PH-HS-1.8) ▪ Health professionals - Number of nurses per 1000 population (PH-HS-1.9) ▪ Health professionals - Number of midwifery personnel per 1000 population (PH-HS-1.10) ▪ Number of hospital beds per 1000 population (PH-HS-1.11) ▪ Availability of effective procurement, quality control and distribution systems (PH-HS-1.12) ▪ Health - % health facilities connected to the internet (PH-HS-1.13) ▪ % of health facilities connected to the Internet (IT-1.8.2) *Education* ▪ Pupil–teacher ratio (PD-EDU-1.9) ▪ % of schools with Internet access (ITU-ED5; IT-1.8.1) *Information technology* ▪ Household access to land lines (IT-1.1.1) ▪ Household access to mobile	CD-1.2) ▪ TB mortality rate (Deaths from TB given year per 100,000 population) (MDG 6.9.2; PH-CD-1.3) ▪ TB case detection rate (all forms of TB in given year) (MDG 6.10.1; PH-CD-1.4) ▪ Maternal mortality \ratio per 100,000 (MDG 5.1; PH-MH-1.1) ▪ Maternal mortality (number of deaths; PH-MH-1.2) ▪ Contraceptive prevalence rate (MDG 5.3; PH-MH-1.4) ▪ Adolescent birth rate (Teenage fertility rate) (MDG 5.4; PH-MH-1.5) ▪ HIV/AIDS prevalence among pregnant women (PH-SXH-1.2) ▪ STI (chlamydia) prevalence among women receiving antenatal care (PH-SXH-1.3) ▪ Condom use at last sex among people with multiple sexual partnerships (MDG 6.2; PH-SXH-1.4) ▪ Proportion of population aged 15–24 with knowledge of HIV/AIDS (MDG 6.3; PH-SXH-1.5) ▪ STI (chlamydia) prevalence amongst young people (PH-SXH-1.8) ▪ HIV prevalence among population aged 15–24 (MDG 6.1; PH-SXH-1.9) ▪ Proportion of one-year-old children immunised against	(all at the same year) (PD-ECD-1.5) ▪ Government expenditure on education as % of total government expenditure (PD-SS-1.1) ▪ Government expenditure on health as % of total government expenditure (PD-SS-1.2) ▪ Per capita health expenditure (PD-SS-1.3; See PH-HS-1.3) ▪ Proportion of seats held by women in national parliaments (HD-GEN-1.1; MDG 3.3) ▪ Share of highest three levels of public service held by women (HD-GEN-1.2) ▪ Gender fully mainstreamed across national development policy and planning (HD-GEN-1.3) ▪ Proportion of government recurrent budget to women's department/office (HD-GEN-1.4) ▪ Proportion of total aid to gender equality, gender specific projects (HD-GEN-1.5) ▪ Female labour force participation rate (HD-GEN-1.8; see also PD-LF-1.1) ▪ Female to male labour force participation ratio (Females/Males) (HD-GEN-1.9; Also see PD-LF-1.1) ▪ Female paid employment-population ratio (HD-GEN-1.10; Also see PD-LF-1.3)

	Ecosystem service	Infrastructure	Human resources	Institutional
		phones - Access to cell phone units (IT-1.1.2) ▪ Mobile cellular telephone subscriptions per 100 inhabitants (ITU-A2, MDG 8.15; IT-1.2.2) ▪ Fixed telephone lines per 100 inhabitants (ITU-A2, MDG 8.14; IT-1.2.3) ▪ Household Internet access (IT-1.3) ▪ Households with access to broad-band Internet - Proportion of household subscriptions to broad-band Internet (ITU-HH12; IT-1.3.1) ▪ Households with access to dial-up internet - Proportion of household subscriptions to narrow-band Internet (ITU-HH12; IT-1.3.2) ▪ Fixed Internet subscribers per 100 inhabitants (ITU-A3; IT-1.4) ▪ Individual access to Internet - Internet users per 100 population (census, DHS, MDG 8.16; IT-1.4.1) ▪ Affordability - Residential fixed telephone line tariff per month (USD) (IT-1.5.1) ▪ Affordability - Mobile cellular prepaid price of local call per minute (average peak time unit cost in USD) (ITU-A9; IT-1.5.2) ▪ Affordability - Fixed broad-band Internet access tariff per month (USD) (ITU-A8; IT-1.5.3) ▪ Competition - Number of fixed telephone line service providers (IT-1.6.1)	measles (MDG 4.3; PH-CH.1.1) ▪ Proportion of one-year olds fully immunised against EPI target diseases (3 doses diphtheria, tetanus, toxoid and pertussis) (PH-CH-1.2) ▪ Proportion of one-year olds fully immunised against EPI target diseases (3 doses hepatitis B - HepB3) (PH-CH-1.3) ▪ Low birth weight babies (PH-CH-1.4) ▪ Prevalence of (moderately and severely) underweight children under 5 years of age (MDG 1.8; PH-CH-1.5) ▪ Prevalence of obese children – 0–5 year olds (+2SD from median for BMI by height) (PH-CH-1.6) ▪ Prevalence of obese children – 13–15 year olds (+2SD from median for BMI by age) (PH-CH-1.7) ▪ Children under 5 with diarrhoea who received oral rehydration therapy (PH-CH-1.8) ▪ Prevalence of adult diabetes (ages 25–64) (PH-NCD-1.1) ▪ Prevalence of overweight adults - BMI = 25.0 to (PH-NCD-1.2) ▪ Prevalence of obese adults (aged 25–64) BMI = 30 (PH-NCD-1.3) **Knowledge and skills** ▪ Proportion of pupils starting grade 1 who reach last grade of	▪ Share of women in wage employment in the non-agricultural sector (MDG.3.2; HD-GEN-1.11) ▪ Attitudes towards violence against women (HD-GEN-1.13) ▪ Labor force participation - Youth (m/f) (HD-Y-1.2) ▪ Employment–population ratio - Youth (m/f) (HD-Y-1.3) ▪ Youth unemployment (male/female) (HD-Y-1.4) ▪ Paid–unpaid employment ratio - Youth (m/f) (HD-Y-1.5) ▪ Proportion of government recurrent budget to youth department/office (total, %; plus budgets dedicated to staff versus activity/programme costs) (HD-Y-1.6). ▪ Existence of dedicated youth policy (HD-Y-1.7) ▪ Proportion of national budget allocation for agriculture and forestry (%) (AF-HH-1.5) **Proposed IVA indicators:** ▪ General existence of a community climate change adaptation and disaster risk management (CCADRM) or CCADRM-supportive strategy or framework or plan supporting: ➢ Security of place and cultural identity ➢ Water security ➢ Food security

	Ecosystem service	Infrastructure	Human resources	Institutional
		▪ Competition - Number of mobile cellular service providers (IT-1.6.2) ▪ Competition - Number of Internet service providers (IT-1.6.3) ▪ e-government - % of government agencies that have an interactive website (IT-1.7) ▪ % of schools with Internet access (ITU-ED5; IT-1.8.1) ▪ % of health facilities connected to the Internet (IT-1.8.2) *Transport accessibility* ▪ Number of international passenger flights arriving per week (total number of regular passenger flights arriving from international destinations by all service providers operating in country) (T-ACS-1.1.1) ▪ Number of domestic passenger air services departing from capital city per week (total number of routes flown by all service providers) (T-ACS-1.1.2) ▪ Number of airports - total paved and unpaved (T-ACS-1.1.3) ▪ Number of inbound international container shipping services per month (T-ACS-1.1.4) ▪ Number of domestic shipping services per month (T-ACS-1.1.5) ▪ Number of main ports - ports receiving international shipping operators (T-ACS-1.1.6) ▪ Average international container volume (TEUs) unloaded per month (T-ACS-1.1.7)	primary (MDG.2.2; PD-EDU-1.1) ▪ Level of educational attainment - (Proportion of population aged 15+ years attaining secondary level education; PD-EDU-1.2) ▪ Gross enrolment rate - Primary school (PD-EDU-1.3) ▪ Gross enrolment rate - Secondary school (PD-EDU-1.4) ▪ Net enrolment ratio in primary education (%) (PD-EDU-1.10) ▪ Literacy rates of 15–24 year olds (%) (MDG 2.3; PD-EDU-1.5) ▪ Ratio of girls to boys in primary education (MDG.3.1.1; PD-EDU-1.6) ▪ Ratio of girls to boys in secondary education (MDG.3.1.2; PD-EDU-1.7) ▪ Ratio of girls to boys in tertiary education (MDG.3.1.3; PD-EDU-1.8) ▪ Female secondary education completion rate (HD-GEN-1.6; see also PD-EDU-1.1) ▪ Female tertiary education completion rate (HD-GEN-1.7) ▪ Level of youth education attainment (HD-Y-1.1) ▪	➢ Income security ▪ Consistency of local CCADRM or CCADRM-like policies with sub-national (e.g. province, island, district, ward) and national policies ▪ Diversity of stakeholders and sources of knowledge considered and utilized in local and community driven decision-making and implementing processes ➢ *Internally*: of various groups within the community (across gender, ethnicity, age, abilities, socioeconomic and power status, abilities, sexual orientation) ➢ *Externally*: government, non-governmental, technical agencies, research institutions and other external groups ▪ Existence of formal and informal rules and social processes that enable adaptation such as: ➢ encouraging stakeholders to adjust their behaviour towards adaptation and sustainable development ➢ encouraging and mobilising community leadership qualities ➢ strategically mobilising internally and externally sourced resources for implementing adaptation measures

	Ecosystem service	Infrastructure	Human resources	Institutional
		▪ Total road network in country (length, km) (T-ACS-1.1.8) ▪ Paved road as proportion of total network (%) (T-ACS-1.1.9) *Transport affordability* ▪ Average cost of economy passenger air fare (in AUD) to nearest major metropolitan hub (defined as: Polynesia to Auckland, central and western Pacific to Brisbane, Australia, North Pacific to Guam) (T-AFD-2.1.1) ▪ Average cost of air freight (AUD/kg) to nearest major metropolitan hub (defined as: Polynesia to Auckland, central and western Pacific to Brisbane, North Pacific to Guam) (T-AFD-2.1.2) ▪ Average cost of shipping (AUD) inbound from nearest major metropolitan hub (defined as: Auckland to Polynesia, Brisbane to central and western Pacific, Guam to North Pacific) (T-AFD-2.1.3) ▪ Average cost of economy passenger air fare (AUD) between Pacific Island capital cities (international airport) to Nadi, Fiji (T-AFD-2.1.4) ▪ Average cost of shipping TEU (AU$) between largest country port and the Port of Suva, Fiji (T-AFD-2.1.5) ▪ Average economy passenger international air fare as proportion of GDP per capita (Cost derived from T.2.1.1) (T-AFD-2.1.6) ▪ Average annual national		➢ encouraging stakeholders to continuously learn and improve the way things are done ➢ enhancing principles of fair governance ➢ promoting effective social mechanisms for conflict resolutions ▪ Assessing available information to guide decision-making (climate change vulnerability, impacts, adaptation measures, climate sensitivity of development activities) ▪ Adaptive development planning (adaptation option assessment; prioritisation; coordination; information management) ▪ Implementation (coordination, information management, existence of a steering committee and representation of a broad range of groups, including vulnerable groups) ▪ Monitoring and evaluation (community-based and donor-based)

	Ecosystem service	Infrastructure	Human resources	Institutional
		expenditure on container freight (TEU) costs as proportion of GDP (T-AFD-2.1.7) *Transport market access* ▪ Number of national and other air carriers currently operating (T-MKT-3.1.1) ▪ Presence of regulatory or contractual arrangements on market access - air carriers (Y/N) (T-MKT-3.1.2) ▪ Number of shipping operators currently providing scheduled service (T-MKT-3.1.3) ▪ Presence of regulatory or contractual arrangements on market access - shipping operators (Y/N) (T-MKT-3.1.4) *Transport reliability* ▪ Proportion of cancelled domestic flights per month (% of total flights) (T-REL-4.1.1) ▪ Proportion of scheduled international shipping visits cancelled per six months (% total visits) (T-REL-4.1.2)		

	Ecosystem service	Infrastructure	Human resources	Institutional
Security of place	**PACE-SD/USP open coast and inland waters vulnerability indicators** ▪ Foreshore elevation ▪ Village elevation ▪ Reef system ▪ Aspect ▪ Shore morphology, beach composition and distribution (proxy for wave intensity) ▪ Mangrove protection ▪ Flooding from inland waters ▪ Number of exposed sides of village to incoming waves ▪ Distance of shorelines to nearest dwelling or building ▪ Location on river system (proxy for bank erosion potential) ▪ Distance of river bank to nearest dwelling or building ▪ Drainage **LRD/USaid Household Food Security Indicators** ▪ Seasonal migration (people migrating for work) ▪ Distress migration (whole families moving out of an area) ▪ Regional conflict **Proposed IVA indicators:** ▪ Community access to higher ground for retreat or relocation (for future expansion to cater for growing populations as well). Proportion of communities with access to:	**Proposed IVA Indicators:** Proportion of houses, community structures and public buildings that are: ▪ cyclone proof; ▪ have stilts to protect from floods; ▪ can be deconstructed and reconstructed in another location. **Energy** **National Minimum Development Indicators and MDG Indicators** ▪ Electrification rate - % Households connected to utility grid (EN-1.1) ▪ Macroeconomic affordability - Fuel imports as % of GDP (EN-1.3) ▪ Electricity tariffs - average residential electricity tariffs for each year (USD/kWh) (EN-1.4) ▪ Household energy expenditure load - average residential expenditure on energy per year as % of household income (EN-1.5)	**Proposed IVA indicators** ▪ Proportion of communities or villages with a group of visionary people who collaborate on motivating the community to define goals and implement them ▪ Proportion of communities or villages with a group of visionary people but who do not work together at motivating the community to define goals and implement them ▪ Proportion of communities or villages with only one person motivating the community to define goals and implement them **National Minimum Development Indicators and MDGs** ▪ Ability to speak in *kastom*/vernacular language(s) (HD-CUL-1.1) ▪ Frequency of use of *kastom*/vernacular language(s) (HD-CUL-1.2) ▪ Proportion of people in specific language community who are able to read and write in their first language of their cultural group (HD-CUL-1.3) ▪ Proportion of young people in specific communities able to read and write in their first language of their cultural group	**National Minimum Development Indicators and MDGs** ▪ Index of locational disadvantage (PD-CD-1.2) ▪ Index of community well-being (PD-CD-1.3; hybrid of PD-CD-1.1 and PD-CD-1.2) ▪ Ratification of and implementation of cultural rights treaties and convention (HD-CUL-3.2) ▪ Protection of traditional knowledge policy/implementation of model law (HD-CUL-3.3) ▪ National proportion of budget allocated to culture, including for protection, preservation (heritage) and promotion (HD-CUL-3.4) **Proposed IVA indicators** ▪ Proportion of community that are: ➢ Urban traditional Pacific Island village (predominantly homogenous and most are connected by kin/clan) ➢ Urban mixed settlement (predominantly comprised of people from various parts of the country) ➢ Rural traditional Pacific Island village (predominantly homogenous and most are connected by kin/clan)

	Ecosystem service	Infrastructure	Human resources	Institutional
	➢ higher ground to retreat to or relocate to; ➢ higher ground to move to but not sufficient to cater for the whole community ➢ no viable higher ground to move to for future retreat.		(See HD-CUL-1.3) (HD-CUL-1.4) ▪ Proportion of (adult) population of community with basic traditional production skills (Composite Indicator) (HD-CUL-2.1) ▪ Proportion of people fishing with traditional tools/methods (spear) (HD-CUL-2.2) ▪ Percentage of rural population who use customary lands for housing and subsistence agriculture (%) (HD-CUL-2.3) ▪ Proportion of population with access to customary lands (HD-CUL-2.4) ▪ Existence of dedicated national cultural policy (HD-CUL-3.1) ▪ Ratification of and implementation of cultural rights treaties and convention (HD-CUL-3.2) ▪ Protection of traditional knowledge policy/implementation of model law (HD-CUL-3.3) ▪ National proportion of budget allocated to culture, including for protection, preservation (heritage) and promotion (HD-CUL-3.4) **Proposed IVA indicators:** ▪ Ability to assess and monitor physical vulnerability of homes to climate and disaster risks (as per 1.P1) ▪ Knowledge of possible climate	➢ Rural mixed settlement. (predominantly comprised of people from various parts of the country) ➢ Peri-urban traditional Pacific Island village (predominantly homogenous and most are connected by kin/clan) ➢ Peri-urban mixed settlement (predominantly comprised of people from various parts of the country) ➢ Other: ▪ Proportion of households in a community that adhere to traditional values of collective action or community cooperation: ➢ All the time ➢ Most times ➢ Sometimes ➢ A few times ➢ Not at all ➢ Other ▪ community decision-making process mutually supports cultural identity and the interests of the various community sub-groups (e.g. women, youth, immigrants) ▪ community decision-making process strongly supports cultural identity but weakly supports the interests of the various community subgroups (e.g. women, youth, immigrants) ▪ Community decision-making

	Ecosystem service	Infrastructure	Human resources	Institutional
			and disaster risk reducing measures ▪ Ability to build and maintain houses complying with climate and disaster-proof building codes ▪ Ability to construct traditional shelters using local materials ▪ Knowledge of potential external networks from which to access adaptation knowledge and resources and how to engage with them	processes are weak in supporting both cultural identity and the interests of the various community subgroups ▪ A community framework or strategy or management plan to guide spatial planning, decision-making and implementation (as per 4.2 CCADRM plan). ▪ a practical community-based monitoring system for: ➢ ***Security of place:*** weather and climate observations (using traditional and appropriate modern methods); physical exposure of homes and infrastructure to climate and disaster risks ➢ ***Water security:*** changes in land use and pollution; rainfall; availability of potable and non-potable water, water safety and efficiency practices ➢ ***Food security:*** changes in soil, crop, livestock, wild food and fisheries availability and their resilience

	Ecosystem service	Infrastructure	Human resources	Institutional
Water security	**National Minimum Development Indicators and MDGs** ▪ Area of forested land as proportion of total land area (NMDI: AF-NR-3.3; MDG 7.1) ▪ Annual rate (%) of deforestation (NMDI: AF-NR-3.4) **UNEP/SOPAC freshwater vulnerability assessment (2011)** ▪ Catchment vegetation cover ▪ Freshwater yield per capita ➢ ground water ➢ surface water ▪ Quality of freshwater yield (salinity, bacterial content) ➢ ground water ➢ surface water ▪ Changing rainfall patterns ▪ Wastewater volume in catchment areas ▪ Quantity and quality of freshwater available during and after a natural disaster (e.g. droughts, floods, cyclones)	**National Minimum Development Indicators and MDG Indicators** ▪ Proportion of households with access to improved drinking water (PH-ENV-1.1) ▪ Proportion of population with access to improved drinking water (MDG 7.8; PH-ENV-1.2) ▪ Proportion of households with access to improved sanitation (PH-ENV-1.3) ▪ Proportion of population with access to improved sanitation (MDG 7.9; PH-ENV-1.4) **SOPAC KIRIWATSAN rainwater harvesting survey (for houses and communal buildings (church/meeting hall/school/health center/etc.)** ▪ Roof area ▪ Roof material ▪ Building type ▪ Fascia board condition ▪ Guttering condition ➢ guttering coverage of roof area ➢ downpipe condition ➢ screens on tank entry points ➢ abstraction type ➢ storage dimensions ➢ storage condition ➢ overhanging vegetation ➢ bacteriological sample ➢ climate risks associated with rainwater	**Proposed IVA indicators:** ▪ Ability to assess and monitor physical vulnerability of water systems to climate and disaster risk (as per 1.P1) ▪ Knowledge of possible climate and disaster-risk reduction measures ▪ Skills to carry out basic plumbing ▪ Skills to do basic water quality test (H2S tube) ▪ Skills to assess flow rate of local surface water supply ▪ Skills to maintain pumps ▪ Skills to fix a leaking tap or toilet cistern ▪ Knowledge of potential external networks from which to access water adaptation knowledge and resources and how to engage with them	**Proposed IVA indicators:** ▪ Local water management framework or strategy or plan that supports: ➢ the protection of freshwater sources (from over extraction and pollution mainly); ➢ explores climate resilient water options; ➢ promotes water use efficiency and safety practices; ➢ capacity development of local community to sustainably manage water and wastewater. ▪ Linkages between the community water security plan, community CCADRM/sustainable development plan ▪ Activities supporting local water security knowledge, practices and investments ▪ Existence of a practical community-based monitoring system

	Ecosystem service	Infrastructure	Human resources	Institutional
		Proposed IVA Indicators: ▪ Groundwater supply system (borehole/protected well/unprotected well): ➢ catchment protection ➢ abstraction (pumping capacity) ➢ storage (volume) ➢ distribution ➢ leakage ➢ climate risks associated with groundwater infrastructure ▪ Surface water system ➢ catchment protection ➢ abstraction (pumping capacity) ➢ storage (volume) ➢ distribution ➢ leakage ➢ climate risks associated with surface water ▪ infrastructureWater and toilet accessibility and distribution in normal and stressful times ➢ number of potable water source options: o normal times o stress times ➢ distance of potable (drinking) water source(s) from house ➢ distance of non-potable water source(s) from house ➢ istance of toilet or defecation area from house ➢ access to of potable water supply to meet household		

	Ecosystem service	Infrastructure	Human resources	Institutional
		needs ○ 90–100% of the time ○ 75–89% of the time ○ 50–74% of the time ○ 25–49% of the time ○ less than 25% of the time ➢ number of consecutive dry days the water system can supply water for (without government or donor support) ➢ level of difficulties experienced in accessing potable water during and after natural disasters: ○ cyclone (nil, low, medium, high) ○ flood ○ drought ➢ prevalence of peoples exposure to wastewater ○ normal times (nil, low, medium, high) ○ during and after disasters (specify disaster and rate nil, low, medium, high) ▪ Household toilet and wastewater disposal ➢ toilet type ➢ toilet wastewater disposal ○ adequate standard centralised sewerage system ○ below standard sewerage system ○ standard septic tank		

	Ecosystem service	Infrastructure	Human resources	Institutional
		system ○ below standard septic tank ○ drum system ○ direct defecation on land environment ○ direct defecation in marine environment ○ composted sludge (from dry/compost toilets) ➢ piggery wastewater disposal method ➢ household and community drainage system ➢		

	Ecosystem service	Infrastructure	Human resources	Institutional
Food security	**National Minimum Development Indicators and MDGs** ▪ Cultivable or arable land as a proportion (%) of total land area (AF-NR-3.1) ▪ Cultivated land as a proportion (%) of total cultivable of arable land area (AF-NR-3.2) ▪ Proportion of households engaged in fisheries subsistence (F-FS-3.1) ▪ Per capita fish consumption (F-FS-3.3) **LRD/USAID household food security indicators** ▪ Meteorological data ▪ Information on natural resources (includes grazing resources) ▪ Agricultural production data (crops and animals) ▪ Agroecological models ▪ Food balance sheets ▪ Pest damage **Proposed IVA indicators:** *Land* ▪ Area for wild terrestrial food gathering ▪ Diversity and resilience of edible wild flora and fauna *Marine* ▪ Fisheries area ▪ Marine food diversity and resilience ▪ Marine food abundance	**LRD/USAID household food security indicators** ▪ Changes in access to loans and credit (number of people seeking assistance or credit) ▪ Changes in livestock sales **Proposed IVA indicators:** *Agriculture* ▪ Water supply for agriculture and livestock machinery and tools (tractor, plough, hoe) ▪ Erosion control technology ▪ Post-harvest facilities ▪ Crop and soil resilience research and monitoring facilities ▪ Composting technology ▪ Seedling and fertiliser supply and distribution ▪ Agricultural extension services (technical advice and equipment) *Marine* ▪ Aquaculture pond and support equipment ▪ Water supply system for aquaculture and post-harvest ▪ Energy supply needed for aquaculture and post-harvest ▪ Post-harvest facilities ▪ Fish feed ▪ Fish aggregating devices ▪ Fisheries research and monitoring equipment ▪ Fishing equipment (lines, hooks, baits) ▪ Boat and oar for fishing or motorised boat	**Proposed IVA indicators** ▪ Ability to assess and monitor physical vulnerability of soil, crops, livestock, wild foods and fisheries to climate and disaster risk (as per 1.P1) ▪ Knowledge of possible climate and disaster risk reducing measures for the above (a) ▪ Skills to carry out basic soil testing ▪ Skills to grow a variety of crops in a various soil types ▪ Skills for harvesting wild flora and fauna sustainably ▪ Skills for harvesting marine resources sustainably ▪ Aquaculture skills ▪ Knowledge of potential external networks from which to access water adaptation knowledge and resources and how to engage with	**Proposed IVA indicators:** ▪ local food security management strategy or framework or plan that supports: ➢ improving or maintaining soil fertility; ➢ climate resilient crop diversity and productivity; ➢ fisheries health; ➢ aquaculture efficiency ➢ habitat of wild terrestrial food; ➢ healthy food choices; ➢ local gardening; ➢ innovative food production. and preservation methods ▪ Linkages between the community food security plan and the overall community CCADRM/ Sustainable development plan ▪ Community initiated activities supporting local food security, knowledge, practices and investments ▪ Existence of a practical community-based monitoring system

	Ecosystem service	Infrastructure	Human resources	Institutional
	▪ Aquaculture area ▪ Aquaculture food diversity, productivity and resilience			
Household income security	**National Minimum Development Indicators and MDG Indicators** ▪ Proportion of household income from agriculture and forestry activities (AF-HH-1.1) ▪ Proportion of labour force engaged in agriculture and forestry activities as their main economic activity (AF-HH-1.3) ▪ Proportion of households engaged in agriculture and forestry (AF-HH-1.4) ▪ Proportion of household food expenditure on locally grown or produced food (AF-HH-1.6) ▪ Proportion of households deriving their primary source of income from small-scale commercial fisheries and small-scale aquaculture (F-FS-3.2)	**National Minimum Development Indicators and MDG Indicators** ▪ Proportion of households with access to modern cooking and lighting (EN-1.2) **LRD/USAID household food security indicators** ▪ Sale of production assets (appearance in market of unusual amounts of personal and capital goods such as jewelry, farm implements, and young female animals) **Proposed IVA indicators** ▪ Water supply, energy supply, transport services and infrastructure, telecommunications, administrational equipment, marketing support, technical advice, extension services ➢ copra ➢ coconut oil ➢ agriculture ➢ tourism ➢ handicraft ➢ forestry ➢ mining ➢ fisheries ➢ aquaculture ➢ tourism	**National Minimum Development Indicators and MDG Indicators** ▪ Labour force participation rate (PD-LF-1.1) ▪ Unemployment rate (PD-LF-1.2) ▪ Employment-Population ratio (PD-LF-1.3; MDG.1.5) ▪ Proportion of own-account and contributing family workers in total employment (PD-LF-1.4; MDG.1.7) **Proposed IVA indicators:** ▪ Ability to assess and monitor physical vulnerability of local income generating commodities to climate and disaster risk Knowledge of possible climate and disaster risk reducing measures ▪ Skills to utilise available natural resources for the production of income generating commodities (e.g. agricultural produce, fisheries, handicraft, coconut oil, honey, soap, recycled paper products) ▪ Skills to network, securing markets and ensuring supply reaches market	**National Minimum Development Indicators and MDG Indicators** ▪ Basic needs poverty rate (MDG 1.1; PD-POV-1.1) ▪ Poverty gap ratio (MDG 1.2; PD-POV-1.2) ▪ Share of poorest quintile in national consumption (MDG 1.3; PD-POV-1.3) ▪ Proportion of employed persons living below $1 (MDG 1.6; PD-POV-1.4) ▪ Proportion of population below minimum level of dietary energy consumption (MDG.1.9; PD-POV-1.5) ▪ Per capita GDP per working person (US$) (PD-ECD-1.1) ▪ Real per capita growth (PD-ECD-1.2) ▪ Population wealth index (PD-CD-1.1) **Proposed IVA Indicators:** ▪ strategy or framework or plan that supports: ➢ the development of innovative local commodity production ➢ the establishment of sustainable markets ➢ sustainable local business

	Ecosystem service	Infrastructure	Human resources	Institutional
			▪ Quality control skills ▪ Skills for sustainably managing natural resources used for commodity production ▪ Knowledge of potential external networks from which to access resources (to support local income generating activities) and how to engage with	development ➢ climate resilient commodities ▪ Linkages between the community food security plan and the community CCADRM/ sustainable development plan ▪ Community initiated activities supporting local commodity production, marketing and management ▪ Existence of a practical community-based monitoring system

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