# NATURAL DISASTERS AND CLIMATE CHANGE SURVEY MODULE

## Sourcebook

Pacific Community
Communauté du Pacifique

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# CONTENTS

# ACRONYMS

| | |
|---|---|
| CAPI | Computer Assisted Personal Interviewing |
| DDI | Data Documentation Initiative |
| DRR | Disaster Risk Reduction |
| DRSF | Disaster-Related Statistics Framework |
| EOS | Earth Observation Systems |
| FDES | Framework for the Development of Environmental Statistics |
| The Global Set | Global Set of Climate Change Indicators |
| GSBPM | Generic Statistical Business Process Model |
| IDA | International Development Association |
| IPCC | Intergovernmental Panel on Climate Change |
| EM-DAT | International Disaster Database |
| LFS | Labour Force Survey |
| LSMS | Living Standards Measurement Study |
| LSMS-ISA | Living Standards Measurement Study – Integrated Surveys on Agriculture |
| NAPs | National Adaptation Plans |
| NSOs | National Statistics Offices |
| PICTs | Pacific Island Countries and Territories |
| PSMB | Pacific Statistics Methods Board |
| PAPI | Paper-and-Pencil Interviewing |
| PAWP | Paris Agreement Work Programme |
| SOE | Slow-Onset Events |
| SIDS | Small Island Developing States |
| SDMX | Statistical Data and Metadata Exchange |
| PACSTAT | Statistical Innovation and Capacity Building in the Pacific |
| SDD | Statistics for Development Division |
| TYPSS | Ten-Year Pacific Statistics Strategy |
| ETF | The Enhanced Transparency Framework |
| SPC | The Pacific Community |
| COP | United Nations Climate Change Conference |
| UNECE | United Nations Economic Commission for Europe |
| UNISDR | United Nations International Strategy for Disaster Reduction |
| UNSD | United Nations Statistics Division |
| WB | The World Bank |
| WCA | World Programme for the Census of Agriculture |

# ACKNOWLEDGMENTS

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# 1. INTRODUCTION

Climate change is one of humanity's most significant threats, undermining the development progress in health and poverty reduction over the past 50 years. The international scientific community warned this year that climate change would increase the frequency and intensity of climate hazards in all regions of the world, with the result that many of the changes associated with the climate crisis will be irreversible for hundreds of years and even millennia (IPCC, 2023).

Vulnerability to climate change is more critical in locations experiencing poverty, governance challenges, limited access to essential services and resources, conflicts and high levels of climate-sensitive livelihoods. The economic sectors more likely to be climate-exposed are agriculture, forestry and fisheries in hotspots of high human vulnerability, including Small Island Developing States (SIDS) (IPCC,2022a).

Pacific Island Countries and Territories (PICTs) are at the frontline of climate vulnerability and urgently need to adapt to climate change impacts. They are identified among those countries most severely impacted (Nurse et al., 2014), primarily because of their disproportionately high exposure to slow-onset and extreme hydrometeorological events combined with the limitations of their economic and natural resources for mitigating such risks (Robinson 2015). In addition, meeting the challenges of natural disasters is dependant on the resources available to the affected Islands.

The measurement of the socio-economic impacts of climate change on people is necessary for designing appropriate response and adaptation actions and promoting effective public investments. Such data strengthens evidence-based policymaking at all levels for DRR and climate change adaptation. However, while substantive knowledge and case studies have been accumulated on the linkages of climate change to economic sectors, society, economics and the environment of local communities, PICTs do not have a standard methodology to regularly collect data representing the socio-economic picture of climate change impact on individuals, households and communities.

In promoting strategies for filling data gaps, sharing knowledge among PICTs, supporting countries to shape policy and support more resilient, proactive, adaptative, innovative and transformative approaches to climate change, SPC implemented a project to measure the socio-economic dimensions and determinants of climate change impacts in household surveys. Household surveys were the chosen model rather than developing new instruments, since their scope and coverage are adaptable, and their use is already the most common means of collecting SDG data.

The Statistical Innovation and Capacity Building in the Pacific (PACSTAT) project, of which SPC and SDD are the implementing partners[2], included the development of the Climate Change and Natural Disasters Survey Module (referred to hereafter as the Sourcebook). This document presents the Core Module and the expanded version of the Sourcebook. The main objective of the Core Module and Sourcebook is to encourage the production and use of socio-economic information on the impacts of natural disasters and climate change on PICTs households.

The Sourcebook consolidates recommendations from international frameworks and methodologies; country best practices; and SPC Divisions´ and other relevant regional stakeholders´ views for designing and implementing household surveys on the socio-economic effects of natural disasters and climate change. It is presented as a reference guide for household survey managers within National Statistics Offices (NSOs) or any survey practitioners in the country (such as government agencies, development partners, climate experts, the private sector, citizen organisations, researchers, and students).

Proposed as a flexible approach that PICTs could fit into their existing census/household survey programmes and including questions relevant to their information needs and survey objectives, the Sourcebook can be implemented either as short

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2   *Since 1990, SDD has provided technical assistance and professional capacity development to support a regular programme of population and housing censuses and household surveys in PICT member countries, covering all aspects of the census and survey cycle. As part of the Heads of Planning and Statistics (HOPS), SDD contributes to the achievement of the regional statistics partnership program by providing extensive and comprehensive technical support to Pacific NSOs, particularly by developing standards and best practices for household surveys, establishing priorities for future methodological innovation and technical assistance, and advising thematic and operational teams on household survey planning and implementation.*

modules or as a stand-alone survey. Depending on the policy priorities and availability of resources, each country can determine the sections and the level of detail at which data will be collected. In all cases, it aims for coherence with, and integration into, national statistical systems and regional and global monitoring frameworks.

While developed for the Pacific context, the sourcebook has applicability to all SIDS regions as well as any country with an interest in improving data collection on natural disasters and climate change impacts.

The Sourcebook design was founded on the reporting modalities established and agreed upon under the Paris Agreement Work Programme (PAWP). In addition, the 2030 Agenda, the Global Set of Climate Change Statistics and Indicators (The Global Set, 2022), the Framework for the Development of Environmental Statistics (FDES, 2013), the Sendai Framework (2015), and the Disaster-related Statistics Framework (DRSF, 2018) shaped the Survey Module design.

The subsequent chapters describe: the Rationale of the Sourcebook (Chapter 2), a summary of the findings of a Literature Review conducted by SPC-SDD (Chapter 3); the selection of Natural Disasters and Climate Change areas of interest to cover in the Core Module and Sourcebook (Chapter 4). Chapter 5 delivers the substantive sections on Collecting Climate Change and Natural Disasters Data, while Chapter 6 presents the construction and dissemination of Climate Change Indicators made possible by the questionnaire. The Annexes present the Core Module and Sourcebook questionnaires in full. Modifications will be considered based on the piloting of these resources in a few PICTs.

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# 2. RATIONALE OF THE SOURCEBOOK

Climate change risks have been impacting development in the Pacific region for a long time. Nurse et al. (2014) and Robinson (2015) studied how the PICTs are among those countries most severely impacted by climate change, primarily because of their disproportionately high exposure to both slow-onset and extreme hydrometeorological events and the limitations of their economic and natural resources for mitigating the risks.

Human communities in close connection with coastal environments, such as the ones located in the PICTs, are principally exposed to the ocean and cryosphere change and associated impacts, such as ocean acidification, sea level rise, extreme sea level events, marine heatwaves, shrinking cryosphere (predominantly polar ice caps) and permafrost thaw (IPCC, 2022b). It is estimated that 21 percent of Pacific people live within one kilometre of the coast, and 48 percent within ten kilometres of the coast[3]. These proportions increase to 57 percent and 97 percent respectively if we exclude Papua New Guinea.

Monitoring natural disasters and national climate action plans requires high-quality data. Comparable information is needed to understand awareness and experiences of natural disasters, climate change-induced impacts, and household adaptive measures. Climate change and natural disasters data enable a better assessment of the socio-economic effects and strengthens evidence-based policymaking at all levels for DRR and climate change adaptation. NSOs, agriculture, forestry, fisheries, environment and related-line ministries and agencies in the PICTs are central stakeholders in producing, compiling, organising, and disseminating climate change data and statistics.

As mentioned, PICTs are among the most vulnerable sites to climate change, particularly to sea-level rise and its associated risks (Cuffe, Noy, Taupo, 2016). SPC supports PICT governments and communities in the design and implementation of climate change actions. Specifically, SPC assists countries in formulating and achieving their National Adaptation Plans (NAPs), Disaster Risk

Reduction (DRR) strategies and other related targets and commitments for mitigation and adaptation.

In addition, SPC aids PICT progress towards better decisions through better data, allowing for reflection about the links to climate change and related data gaps. This experience enabled SPC's Statistics for Development Division (SDD) to be the implementing partner of the PACSTAT project.[4]

The PACSTAT project´s initial investigations showed PICTs could not produce national and global indicators due to the lack of sound methodologies (including questionnaire modules) for measuring the impacts of climate change and natural disasters within existing household surveys. Despite recent advances in the international statistical framework, previous studies did not provide clear guidance on monitoring the socio-economic impacts of climate change in communities, mainly due to the heterogeneity of the methodologies used to measure the impacts and, in particular, the paucity of adequate data.

> ### Box 1. Framework for international cooperation to combat climate change.
>
> The international community has mobilised to deal with the climate change threat. In 1992, countries signed an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), establishing a framework for international cooperation to combat climate change. Since then, international climate policy has gradually evolved.
>
> The Paris Agreement, adopted by 196 Parties at the United Nations Climate Change Conference COP 21 in 2015, aims to strengthen the global response to the threat of climate change in the context of sustainable development and efforts to eradicate poverty. This agreement was reaffirmed in Glasgow (Scotland) in 2021 at COP 26. In this meeting, countries agreed to limit the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit it to 1.5 °C. More recently, in COP 27, celebrated in Sharm El-Sheikh (Egypt)

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3   https://stats.pacificdata.org/vis?fs[0]=Topic%2C0%7CPopulation%23POP%23&pg=0&fc=Topic&bp=true&snb=9&df[ds]=ds%3ASPC2&df[id]=DF_POP_COAST&df[ag]=SPC&df[vs]=2.0&pd=2021%2C2021&dq=A...&ly[rw]=GEO_PICT&ly[cl]=RANGE%2CINDICATOR&to[TIME_PERIOD]=false

4    *In addition to the PACSTAT project, the Pacific Statistics Methods Board (PSMB) acts as one of the governance mechanisms accompanying the statistical work of SDD. Additional information is available at:* https://sdd.spc.int/pacific-statistics-methods-board-psmb

in 2022, participants deliberated on addressing the impacts on communities whose lives and livelihoods have been ruined by the worst effects of climate change. On this occasion, the COP27's members determined a way forward on financing for loss and damage, establishing new funding arrangements and a dedicated fund to assist developing countries in responding to loss and damage.

Reliable data is critical in informing climate change drivers, vulnerabilities, and impacts. The Enhanced Transparency Framework (ETF), the Global Stocktake of the Paris Agreement, and climate-related Sustainable Development Goal indicators are the reporting modalities established and agreed upon under the Paris Agreement Work Programme (PAWP).

In addition, four complimentary international frameworks have been endorsed to link these reporting requirements derived from the Paris Agreement: the Framework for the Development of Environment Statistics (FDES, 2013) PDF 5.3MB, The Sendai Framework for Disaster Risk Reduction (Sendai Framework, 2015), the Disaster-related Statistics Framework (DRSF, 2018) and more recently, the Global Set of Climate Change Statistics (Global Set, 2022).

In recognition of the transboundary effects of climate change, and to provide a mechanism for collecting climate change and natural disaster impacts information in regular national-level household surveys to fill critical information gaps on the effect of natural hazards to income, welfare, and livelihoods, SDD[5] developed the Natural Disasters and Climate Change Survey Module (Core Module and Sourcebook) and the related guidebooks.

The main objective of the Core Module and Sourcebook is to encourage the production and use of socio-economic information on the impacts of natural disasters and climate change on the PICTs households. While the Core Module is designed as a short set of additional questions that can be appended to existing household surveys, the sections of the Sourcebook can be either integrated into large-scale, multi-topic household surveys or used as a standalone climate change survey. The Sourcebook is an innovative tool to evolve the nature of household surveys to the climate change field. It is presented as a reference guide for household survey leaders within NSOs or any survey practitioners in the PICTs, such as development partners, researchers, and citizens.

The Sourcebook aims to streamline the production and utilisation of information on the socio-economic impacts of natural disasters and climate change by leveraging off existing household surveys. This will guide decision-making related to climate change mitigation mechanisms and adaptation strategies in the PICTs. In this sense, the Survey Module is aimed at supporting National Statistical Systems in defining and implementing requirements, roles and responsibilities across government for collecting and sharing data and making statistics on socio-economic impact of climate change and natural disasters accessible for policy-relevant research and monitoring purposes.

These tools will also help calculate relevant international indicators for reporting to the FDES, the Sendai Framework, the Global Set of Climate Change Indicators and the SDGs monitoring systems.

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5    *Within the frame of the TYPSS, the PACSTAT and the PSMB.*



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# 3. CONSTRUCTING DATA ON CLIMATE CHANGE: SUMMARY OF THE FINDINGS OF THE LITERATURE REVIEW AND DATA REQUIREMENTS ANALYSIS

This section summarises the results and recommendations from the literature review and data needs assessments.

## 3.1. Main Findings of the Literature Review

A literature review produced as part of the development of the Sourcebook looked at climate change trends in the Pacific region and the impacts on livelihoods and stability of the communities in the PICTs. The literature review also assessed globally available methodologies, census and survey questionnaires that capture the impact of climate change and natural disasters at the household or community level. The review included the results of the data requirements analysis done with SPC Divisions and other relevant regional stakeholders (SPC, 2023).

The literature review confirmed the increasing impacts of climate change on PICTs, in particular, the number, type and intensity of climatic-related hazards, the economic effects and people affected, including the projection of risks completed by the IPCC in 2022. According to the IPCC, climate change would likely increase the frequency and intensity of disasters in the Pacific Region, leading to additional erosion in the shoreline and significantly increasing the population's exposure to coastal inundations. From this review, the main consequences that should be reflected in the Sourcebook include adverse effects on:

- Human impacts, such as injuries, disabilities, diseases, missing persons, and deaths;
- Households' assets, such as infrastructure, equipment, and agricultural land;
- Food production, fish biomass and agriculture, including both crops and livestock;
- Freshwater availability, in particular groundwater, and
- Households' livelihoods, income,

employment, and displacement.

In addition, the literature review acknowledged the lack of data on the effects of climate change vulnerability and adaptation as the most severe constraint for better policymaking globally. In response, several international frameworks addressing climate change-related statistics, such as the United Nations Economic Commission for Europe (UNECE) recommendations for climate change-related statistics (UNECE, 2014), the Framework for the Development of Environment Statistics (FDES) (UNSD, 2017), the Sendai Framework for Disaster Risk Reduction (UNGA, 2015), the Disaster-Related Statistics Framework (DRSF) (ESCAP, 2018) and the Global Set of Climate Change Statistics and Indicators (the "Global Set"; UNSD, 2022) were identified as the significant frameworks guiding countries in determining/implementing their own sets of climate change statistics (See Box 1).

Regarding data collection instruments capturing climate change impacts, the literature review presented climate change as a cross-cutting and emerging topic in the Population and Housing Census programme. Population censuses have the potential to identify vulnerable population groups and provide the master frame for ensuring thematic surveys on climate change or household surveys that include related modules are representative. The literature review noted that the usual scope of Population and Housing Censuses could also be broadened to new topics such as climate change perception, natural disasters occurrence and household preventive measures.

The literature review identified recommendations for countries to monitor mitigation and adaptation actions in agriculture and agricultural households in the World Programme for the Census of Agriculture 2020 (WCA, 2020)[6]. The current round of the census of agriculture (2020–2025) involved some countries combining agricultural and population censuses, which included a few questions on climate change. In addition, the

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6    *The World Programme for the Census of Agriculture 2020 (WCA 2020) are the latest guidelines developed by the Statistics Division of FAO and elaborated based on the compilation of experiences from different countries. It has considered new data demands, such as those raised in the 2030 agenda. Volume 1 and 2 of the WCA 2020 programme can be consulted at* http://www.fao.org/world-census-agriculture/en/.

agricultural censuses conducted in countries heavily impacted by natural disasters encompass modules related to land damage or crop losses caused by natural disasters. Fiji and Benin are examples where this has been instigated.

The Living Standards Measurement Study (LSMS) programme presents modules in the recent guidelines for LSMS-type surveys, including a few climate change-related questions and alternatives of responses linked to natural disasters. These questions only cover part of the full spectrum of possible impacts of climate change on households.

In addition, the Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA) proposes relevant data collection approaches for household-level adaptation choices and mitigation strategies. In this regard, the LSMS programme produced two manuals: one related to adaptation measures and Land Management and investment options adopted by farms in LSMS-ISA countries, and the other on climate change impacts on water resources and management (McCarthy, 2011, and Bandyopadhyay et al. 2011).

The literature review also analysed national socio-economic surveys in forestry and its dedicated climate change modules. These modules cover community and household perceptions and adaptation to climate change. Similarly, the questionnaires of the 50x2030 initiative propose a solid set of questions on the environment and climate change for the agricultural sector.

Lastly, the literature review identified Nepal and Bangladesh (BBS, 2021, and CBS, 2017) as the first two countries to conduct national household surveys on climate change. These surveys aimed to characterise populations located in natural disaster-prone areas, assessing the impacts of climate change on economic activities (mainly agriculture), assets, health, and vulnerability and characterising climate change perceptions and adaptation measures.

## 3.2. Results from the Data Needs Assessment

The relevance of developing the Climate Change and Disaster Survey Module is reflected in all acts, policies, development plans, and climate vulnerability assessments of the SPC member countries.

SDD completed a data needs assessment to endorse the Sourcebook development, under the Generic Statistical Business Process Model (GSBPM). The first step of the GSBPM comprises the analysis of statistics, methods, and sources required to establish high-level objectives for the Sourcebook and determine relevant concepts and variables about climate change applicable to the Pacific countries' context.

During this process, SPC Divisions and relevant regional stakeholders specified data gaps on natural disasters' human and economic impacts, in particular the effects on livelihoods and income, as well as on households and farm assets. Health-related impacts, migration, water security and the impact on cultural and traditional values and practices were further topics requested for inclusion in the Sourcebook. Gender aspects were considered cross-cutting. Similarly, environmental health indicators were indicated as relevant topics due to their links to food and income security in the Pacific region.

Measures targeting the reduction of vulnerability of household assets to climate change as well as adaptation of economic activities, such as agriculture and fisheries, were identified as priority topics to monitor through the Sourcebook.

Other recommendations derived from consultations and meetings with regional stakeholders were: i) aligning the Core Module and Sourcebook development with countries' National Adaptation Plans (NAPs) and Disaster Risk Reduction (DRR) strategies; ii) expanding the Sourcebook potential by harnessing geospatial datasets and remote sensing tools; and iii) field-testing the Core Module and the Sourcebook within a household survey undertaken in the Pacific region.

# 4. SELECTION OF NATURAL DISASTERS AND CLIMATE CHANGE AREAS OF INTEREST TO COVER IN THE CORE MODULE AND SOURCEBOOK

The most relevant areas of interest were prioritised through the comprehensive literature review that focused on identifying and describing measurable aspects of the interactions (effects) of natural disasters and climate change with communities in the PICTs.

Areas of interest (topics) have been kept to a minimum to help focus the efforts of PICTs countries provided with less well-developed information and statistical systems. Also, efforts have been made to ensure that the identified areas streamline reporting on the SDGs, the Sendai Framework and the Global Set of Climate Change indicators.

Topics represent the feasible ones to monitor through the Core Module and Sourcebook. Their results, however, may need to be cross-checked with information from more established surveys and networks such as the Risk Disaster Reduction or meteorological monitoring systems.

In addition, using the Climate Risk and Vulnerability Framework from the IPCC (2014)[7], helped identify what impacts are significant for the Pacific communities to associate with natural disasters and climate change over short and long terms. Once the different critical socio-economic impacts were confirmed, indicators at the household level were proposed.

> **Box 2. Climate Risk and Vulnerability Framework from the IPCC**
>
> The IPCC defines vulnerability as the degree to which a system is susceptible to or unable to cope with, adverse effects of climate change, including climate variability and extremes. It is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. In simpler terms, vulnerability is the function of exposure, sensitivity and adaptive capacity in which:
>
> **Exposure** refers to the nature and degree to which a system is exposed to significant climatic variations. The climate variation includes average climate change and the extreme climate variability.

**Sensitivity** refers to the degree to which a system is affected, either adversely or beneficially, by climate related stimuli. 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 damages caused by an increase in the frequency of coastal flooding due to sea level rise) or indirect.

**Adaptive Capacity** refers to the ability of a system (in this Sourcebook the "household" or "community") to adjust to climate change (including climate variability and extremes) and moderate potential damages; to take advantage of opportunities, or to cope with its consequences. The more a community (system) is endowed with resources, that is, has access to and control over resources, the more it has the capacity to adjust to climate change and moderate its impacts. Adaptive capacity can also be understood as the ability to shift strategies as conditions change and as pre-existing livelihoods, ecosystems, institutions, infrastructure – among others – no longer provide the services on which the system depends upon.

*Source: IPCC (2014).*

In principle, data collection related to natural disasters and climate change at the household level applies to any scale or magnitude of hazard events. The primary demand for these statistics includes analysing trends and characteristics in the occurrence of hazardous events (e.g., timing, location, geographic scale, and hazard type). The Core Module and Sourcebook, however, do not focus on collecting scientific or meteorological data describing changes in weather and climate or other characteristics of the events, as they are already covered by monitoring systems at local and international levels. Still, official statistics derived from the monitoring systems are helpful in analyses or research related to the socio-economic effects of climate change at the household level.

The identification of relevant areas for monitoring the socio-economic impacts of natural hazards was based on information provided by relevant

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7   There are different frameworks for vulnerability and climate risk assessments. This Sourcebook uses the latest risk framework from the IPCC (2014), where climate risk results from the interaction of vulnerability, exposure, and hazard (See Box 2).

stakeholders in the Pacific region and guidelines from the IPCC (2014). The following are the areas investigated through the Core Module and Sourcebook.

## 4.1. Population Characteristics and Housing Conditions

The social factors underpinning household and community risk exposure, vulnerability and resilience to natural disasters and climate change need to be measured, especially in the PICT context, where three-quarters of the population live in rural areas (FAO and SPC, 2018), with high poverty rates[8] and with unique challenges in addressing their poverty condition (WB, 2016).

Risk exposure information is critical to constructing baseline statistics and for assessing impacts after a natural hazard or as a consequence of slow-onset events (SOE). The number of people, demographic changes, housing (construction materials, ownership, etc.), buildings (or built-up areas), critical infrastructure (such as transportation or water facilities, etc.), type of employment, income, land use, production capacities (crop areas, productive assets, etc.), and high nature value ecosystems are essential variables to assess households' risk exposure.

From the vulnerability point of view, determining the factors or processes which increase/decrease household members assets, and economic systems' susceptibility to the impacts of natural disasters and climate change is essential. For instance, sex, age, education level, disabilities or special conditions (such as pregnant women, household members of advanced age) can heighten individuals´ vulnerability. Less healthy or deteriorating environments can be another factor in understanding dependency on specific livelihood activities and possible vulnerable populations.

Poor access to fresh water or adequate sanitation facilities and lack of access to essential services (such as health facilities, roads, markets, electricity) could undermine resilience capacity since these services are required urgently to recover after a natural disaster.

Acknowledging that in the Pacific region relevant demographic and socioeconomic data is already collected by existing tools (PROCFISH, 2022)[9], this Sourcebook recommends exploring the availability, accessibility and quality of existing databases before adding demographic and socioeconomic variables in new natural disasters and climate change surveys.

## 4.2. Climate Change Perceptions

Consciousness about climate change has risen over the last few decades in the PICTs, and concern about the reality and severity of climate change is increasing among the Pacific communities. Understanding people´s perception of climate change is critical to developing effective public policies, communication strategies, and robust and socially sustainable programmes. However, PICTs communities do not share a clear definition of climate change.

Factors influencing perceptions of climate change include the frequency and intensity of natural disasters and weather events, economic factors, socio-political events and media coverage. Individuals' perceptions are diverse and encompass both sensory perceptions and subjective interpretations, knowledge, awareness and comprehension of the environment, beliefs about ongoing changes, experiences towards climate variability, and concern about its effect (Whitmarsh, & Capstick, 2018).

Individual perceptions of climate change can adversely impact mental health, causing psychological distress and increased rates of psychiatric disorders. Psychological distress can arise from observing modifications to one's environment over time and experiencing an associated sense of loss. This loss may be especially significant for individuals and communities with solid identity bonds to their environment, e.g., for indigenous communities. Messages conveyed through public discourse about the predicted

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8    Approximately a quarter of the PICTs population lives below the national poverty line, with 24 per cent corresponding to the median poverty rate across PICTs (*Pacific SDG Dashboard:* https://sdd.spc.int/innovation-sdd/sdg-dashboard).

9    The PROCFISH/C tool and the Socioeconomic Monitoring Guidelines for Coastal Managers in Pacific Island Countries (SEM-Pasifika) are good sources of information on factors of climate risks and vulnerability. For instance, from implementing the SEM-Pasifika guidelines, the location of coastal and marine activities indicators have been produced. These indicators are used to provide information on exposure to climate events and impacts, allowing the identification of areas where fisheries-related and other livelihood activities take place. In addition, the National Household Income and Expenditure Surveys (HIES), capture detailed information on household income and expenditures, population profile and dwelling characteristics.

future impacts of climate change, or impacts occurring elsewhere in the world, can also affect individual mental health (Gibson, et al., 2020).

In addition, climate perceptions can influence household coping, mitigation, and adaptation strategies. For example, agricultural households establish significant relationships between climate variability perceptions and coping strategies for soil and water management more than crop adjustment and nutrient management strategies. Pessimistic perceptions about climate change may lead households to change their productive activity and even relocate to another area or country.

Therefore, including variables on household members' perception of climate change could comprise various aspects, such as – but not restricted to:

- Definition and leading causes of climate change;
- Feelings when hearing or learning about future climate change impacts;
- Main source of information about climate change;
- Threats to households due to climate change now and in the future;
- Ecosystems most affected by climate change on which household livelihoods depend;
- Household perception on local Government's management and communication of climate change-related issues.

## 4.3. Impacts of Natural Disasters, including Agriculture and Fisheries

A disaster is defined by the United Nations International Strategy for Disaster Reduction (UNISDR, 2009) as a "serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources" (p. 13).

Natural disasters impact humans, economic activities and services. In the PICTs, natural disasters have been causing disturbances in critical economic sectors such as agriculture, fisheries, and tourism (SPC, 2023).[10] These economic activities have broader connections to income, food security and health. [11]

Freshwater supply is another critical aspect influenced by natural disasters in the PICTs. The decrease in rainfall, limited rainwater storage capacity and the salination of the groundwater are the main issues facing water-scarce countries with adverse effects on human health and productive activities, mainly agriculture.

Natural hazards like floods, for example, harm people´s health in the PICTs. The spread of diseases such as stomach aches and diarrhoea caused by consuming contaminated food and water, changes in food consumption patterns that have led to a higher prevalence of non-communicable diseases and the threat to mental health are examples of the health impacts caused by natural hazards. There is also some evidence of increased tropical diseases, such as dengue.

According to UNISDR (2018), disasters are described as a combination of exposure to a hazard, the present vulnerability conditions, and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other adverse effects on human physical, mental and social well-being, damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.

Therefore, natural disaster impact statistics, including analyses on economic damages and losses, are relevant in designing recovery, mitigation and adaptation strategies. In that sense, the Sendai Framework Monitor, its associated Technical Guidance (UNISDR, 2018) and the DRSF (ESCAP, 2018) provide explanatory guidance for aggregated analyses and monitoring of progress of indicators on disaster impacts at the international

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10   *In the PICTs, natural disasters and climate change have carried significant threats to agriculture, as they are associated with less predictable rainfall, more extreme rainfall events, seawater intrusion and inundation. They may result in the salination of agricultural land, reduced productivity and substantial crop losses. Coastal fisheries' productivity and sustainability have been undermined by coastal development, pollution, and sedimentation. Climate-related disasters affect tourism by impacting ecosystems, resources and infrastructure, resulting in fewer tourist arrivals after a disaster hits a country (SPC, 2023).*

11   *According to Medina et al. (2020), natural disasters affect PICTs' food production and diets. Due to livelihood transitions and climate hazards, households have become less reliant on local fisheries and agriculture for their dietary needs. Climatic factors are also linked to diet changes over the past 20 to 30 years. Changes have led to the decline in the consumption of fruits and vegetables; the reduction in the availability of fresh fish and shellfish that have led to the consumption of canned meat and tuna, eggs and chickens; and less availability of seeds and planting material; among other factors.*

level. Consequently, the scope of natural disaster impact statistics adopted by the Sourcebook is the one proposed by these international frameworks.[12]

The DRSF recognizes that one of the main challenges in producing natural hazard impact statistics is attributing particular data to a natural disaster. Some statistics can have a direct causal relationship to a disaster, for instance, human impacts, such as deaths from a catastrophe. Hence, the Sourcebook recommends monitoring human impacts related to the population affected (dead, missing, injured and ill persons; people evacuated or displaced). These variables must be analysed according to geographic regions, hazard types, and socio-economic categories.

Indirect human impacts after a natural disaster, e.g., deaths from illnesses caused by poor access to water and sanitation or exposure to unsanitary or unsafe conditions, are also important to monitor. Injuries and illnesses – varying according to the hazard intensity and social factors (for example, age, gender, disability condition) – are also suggested for measurement.

Additionally, the DRSF notes the relevance of counting physical losses and the economic value of damages and destruction inflicted on the household´s physical infrastructure (dwelling and productive infrastructure), household assets (e.g., furniture, appliances, vehicles), productive assets (e.g., machinery, tools) and access to essential infrastructure and services (e.g., roads, hospitals, energy or water supply). Disruption to regular workdays and educational attendance are also impacts that can be monitored.

Accordingly, the impacts due to natural disasters that the Sourcebook proposes to monitor are:

- Estimated economic value of the damage inflicted on dwelling and household assets;
- Estimated economic value of the damages or destruction to agriculture and forest areas, farm animals, farm assets, fisheries assets, etc.;
- Number of persons, missing, injured, ill, or dead;
- Impact on the access to local transportation;

- Impact on the access to work facilities: number of people affected and number of workdays;
- Impact on the access to education facilities: number of people affected and number of school days;
- Impact on the access to health facilities (hospitals): number of days with no access;
- Impact on the access to other services (e.g., administrative services): number of days with no access;
- Disruptions to basic services (electricity, water/sanitation, internet, etc.) and time involved;
- Displacement of household members: number of people forced to leave their locality (evacuated or displaced) – either temporarily or permanently – and destination (within or outside the country).
- Other consequences affecting households after the occurrence of a natural disaster (e.g., loss in non-farm income, increases in time spent on water collection, firewood collection, etc.).

In PICTs, agriculture (including livestock, fisheries, aquaculture and forestry) is fundamental to the livelihoods of most people, consisting, in the extreme, of a small cash and subsistence activity focused on traditional fishing and small-scale agriculture (WB, 2016). The DRSF (2018) remarks that impacts on agriculture are often the most significant after natural disasters due to its characteristic of land-intensive activity that faces considerable exposure to hazards.

The economic impacts proposed to be captured by the Sourcebook on each agriculture subsector are related to production and assets, as recommended by the Food and Agriculture Organisation of the United Nations (FAO) in the UNISDR framework (2018).

Tourism is a growing economic sector in the Pacific, providing the region with great potential for economic development. Indeed, the few formal jobs available in some countries' private sectors tend to be derived largely from tourism activities.

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12  *The DRSF recommends that Disaster Management Agencies generate direct impact statistics through observations and assessments during and immediately after an emergency as a part of the disaster response. The impacts that cannot be observed directly involve compilations of regular statistics sources within the National Statistical System, such as the population and housing census, household surveys, and collections of other records of economic activities. DRSF recommends compiling impact statistics on an annual basis, at minimum. Impact statistics are also recommended to be recorded according to a specific disaster occurrence and, as appropriate, area of the event.*

However, capturing tourism statistics through household surveys could be a complex task. As such, this Sourcebook only captures aggregated statistics on the occupation of household members in tourism activities.

## 4.4. Impacts of Slow-Onset Events (SOE)

According to UNFCCC (2012, 2017), the impacts of climate change include SOE and extreme weather events, which may both result in losses and damages. SOE evolve gradually, either from incremental changes occurring over many years or from an increased frequency or intensity of recurring events. In contrast, a rapid onset event may be a single, discrete event that occurs in days or even hours (UNFCCC, 2012). According to the Cancun Adaptation Framework[13], SOE are:

- Sea level rise;
- Increasing temperatures;
- Ocean acidification;
- Glacial retreat and related impacts;
- Salinisation;
- Land and forest degradation;
- Loss of biodiversity;
- Desertification.

There is also increasing interest in the connection between SOE and their gradual impacts on human societies. SOE impacts are cumulative and grow over time until significant scale impacts are felt, causing loss and damage to assets and livelihoods and generating particularly adverse effects on vulnerable individuals and groups.

SOE effects are not simple to measure or address in the short term. For example, SOEs are often not regarded as sufficiently extreme to trigger people's displacement, since they have a less immediate impact. Illness is a more attributed impact of climatic SOE compared to injuries. Therefore, better approaches to address SOE impacts should be part of an integrated process for managing multiple climate risks rather than actions to address a single event.

The monitoring approach recommended for SOEs is to collect data on the community's initial (baseline) situation, followed by SOE impacts and measures implemented to boost coping capacity and minimise effects on households and communities.

The Sourcebook includes a Section on SOE, covering the following aspects:

- Impacts caused by SOE on households' livelihoods, near ecosystems, and health;
- Household members displaced as a result of SOE;
- Impacts caused by SOE on household's social, cultural and communitarian activities.

## 4.5. Disaster Risk Reduction and Climate Change Adaptation Measures Adopted by Households

Disaster risk reduction, climate change adaptation, and hazard assessment are strongly linked, so distinguishing between risk reduction and adaptation actions is sometimes challenging. Identifying risk reduction and adaptation options for local communities is one of the significant challenges for governments and planners, particularly involved with coastal development and management of coastal resources (Carter & Sinay, 2020).

### 4.5.1 Disaster Risk Reduction (DRR)

The Sendai Framework describes Disaster Risk Reduction measures aimed at preventing new disaster risks, reducing existing risk and managing residual risk, all of which contribute to strengthening resilience (ESCAP, 2018).

Some examples of disaster risk reduction actions proposed in the Sourcebook are presented in the following paragraphs:

a. Disaster risk prevention

- **Risk prevention in advance of the hazardous event**: Installation of water capture and distribution facilities, rainwater tanks, sump pumps; upgrading of local infrastructure; works to prevent seawater intrusion and actions in health prevention (e.g., vaccination of children).
- **Risk prevention in or after a hazardous event**: Dissemination of early warning information from local authorities; preparation of emergency kits and basic provisions; preservation of valuable household items; identification of emergency shelters; movement of cattle/poultry to a safe place; harvest or storage of crops.

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13  *For more information consult* https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/introduction.

b. Disaster risk mitigation

- **Structural measures, and constructions**: Construction of retaining walls in the coastlines; positioning of water and chlorine tanks in critical points; protection of existing wells by cement lining open wells; installation of pumps in local wells; building of safer schools.

- **Non-structural measures**: Implement vaccination campaigns for people (particularly children) and animals and strengthening local early warning systems and institutions responsible for disaster prevention and preparedness.

- **Land-use planning**: Relocation of dwellings.

c. Disaster risk management

- **Preparedness**: Establish household emergency plans, mark evacuation routes on posts and signs, strengthen community capacities (e.g., local volunteer groups); create and train emergency and relief teams; integrate risk reduction into school programs; train teachers and students in disaster management and conducting disaster simulation exercises.

- **Disaster recovery**: Apart from the dwelling's relocation, other household actions to recover after natural disasters could be the use of own savings; selling assets; seeking help from relatives/friends, government, NGO, or religious institutions; searching for new/additional employment.

## 4.5.2 Adaptation to Climate Change

Adaptation refers to ecological, social, or economic adjustments in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or benefits from climate change threats and opportunities. In simple terms, countries and communities need to develop adaptation solutions and implement actions to respond to the impacts of climate change that are already happening, as well as prepare for future impacts (UNFCCC, 2022).

To provide a sequential structure to the actions that communities and governments in PICTs adopt in response to the effects of climate change, the Sourcebook considers the Carter & Sinay (2020) approach, which involves adaptation alternatives from the following:

a. **Retreat**: refers to moving communities, structures and/or assets from areas that are likely to be significantly affected by the impacts of climate change to areas less vulnerable.

b. **Defend**: Considered the most common response that mainly includes strategies implemented to protect assets from the impacts of events like flooding. The disadvantage of defensive adaptation actions is that they could be limited by financial costs, which can significantly vary depending on the circumstances.

c. **Co-exist**: In scenarios where nothing can be done to mitigate certain impacts and retreat and defend are either not necessary, excessively costly, or not possible, co-existing is the measure promoting more resilience actions against climate change impacts. It comprises acceptance of losses and risks and recurrent responses to the effects.

The Carter & Sinay approach permits organising adaptation measures progressively as impacts become less manageable and groups adaptation options according to their capacity to protect local properties and infrastructure, natural systems, food production, availability of fresh and drinking water and the well-being of the local population.[14]

The Sourcebook also aims to capture households' support in designing and implementing climate change adaptation measures. The type of support received, the organisation providing this support, the household's perception of the assistance received, and the involvement of household members in adaptation committees are the main variables proposed.

## 4.6. Cross-cutting Areas of Study

### 4.6.1 Gender

Climate change and environmental crises and disasters disproportionately affect women and girls, reinforcing and magnifying existing gender inequalities (UNWomen & UNSFD, 2022). In the PICTs, gender gaps are evident, especially in access to services, markets and value-addition activities, land tenure, employment and voice and political

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14  *Examples of retreat, defend and co-exist adaptation actions can be found in the Adaptation Section of the Sourcebook, included in Annex 2.*

participation. These gaps worsen for women living in poverty.

In the Pacific region, gender differences exacerbate women's vulnerability and reduce their productivity and capacity for adaption to climate change. For example, when men displace from rural to urban areas, women assume the spectrum of agricultural management roles, often without the resources or agency to do it successfully. In other cases, women have developed greater dependence on processed foods when men cannot oversee crop production or go fishing. In addition, women have less access to and control of resources or a lesser role in decision-making before, during and after a hazardous event. In post-disaster environments, the lack of decision-making increases the prevalence of sexual and physical violence and harassment. Lack of management of land and other resources, exposure to physical and psychological violence, high dependence on natural resources for livelihoods, and lack of financial alternatives prevent women from accessing livelihoods and participating in reconstruction efforts and climate change adaptation programmes (SPC, 2023; ESCAP, 2018).

Children (mainly young girls) and older women are likely to be more vulnerable during a natural disaster. Frequently, disaster victims are older women in more significant numbers. Both women and girls have less access to information, lack life skills such as swimming or running and have constrained mobility outside their homes[15]. "When water sources, land and forests are affected by natural disasters, women and girls are more likely to see their livelihoods compromised and are often forced to spend more time carrying out these tasks, which impinges on their available time for paid employment, education and leisure" (ESCAP, 2018, p.37).

Despite its relevance, existing metrics are insufficient to adequately capture the gendered drivers and impacts, the gendered differences in vulnerability and adaptive capacity, and the specific contributions of women to environmental conservation and climate change mitigation and adaptation. Accordingly, UNSD (2006), UNWomen (2022) and PROCFISH (2020) strongly advocate for the integration of the gender perspective into climate change statistics; that is, gender statistics and data disaggregated by sex on climate, environment, and disaster risk reduction.

The gender perspective has therefore been considered essential during the development of the Sourcebook, which goes beyond simply recording the sex of household members, as recommended by Oseni, et al. (2021). Accordingly, the Sourcebook first characterises household members by sex, age, education level, and special conditions (such as pregnancy or disabilities), and then proposes responses to specific impacts of climate change and natural disasters on women and girls; it also investigates issues that prevent women from coping with natural disaster impacts and adapting to climate change.

### 4.6.2  Displacement and Migration

In the past few decades, the causal relationship between climate change and migration has emerged as a central issue for both scholars and policy makers, receiving growing attention in the media and public debate, and gaining an important place among the policy priorities of the global agenda.

Displacement refers to all types of population movement as a direct consequence of a hazard, including evacuations and permanent relocations. The nature of displacement (and its measurement) varies according to the length of time (e.g., temporary or permanent) and whether displacement was arranged (or ordered, financed) by governing agencies. There are also cases, especially for large disasters, in which governing authorities order and provide support for the evacuation or relocation of populations in designated affected areas (ESCAP, 2018).

Natural disasters and climate change has become a key driver of displacement from rural to urban areas within PICTs and to other countries (Campbell & Warrick, 2014). A common cause of rapid displacement in PICTs after a disaster is damaged or destroyed dwellings. Changes in the inhabitants' security in the disaster area also affect people's stay in the locality, such as when the hazard affects the cash-based and subsistence livelihood, or when habitat conditions deteriorate. For example, loss of water supply quantity or quality, increased incidence of exposure to, and intensity of, extreme events still represent a risk for Pacific communities.

People's movements will vary depending on the speed of climate events, available adaptation opportunities, and household access to resources

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15  *Aggravated when women stay at home with children during a flood or sea-rise level.*

(Cattaneo et al., 2019). As mentioned, fast-onset extreme weather events (such as cyclones, heavy rains, floods, and landslides) are usually sudden and direct, resulting mainly in temporary movements over short distances. In contrast, SOE are not regarded initially as sufficiently extreme to trigger migration since they have less of an immediate impact on people.

Natural hazards and climate change cause or worsen liquidity constraints, incentivising poor people to migrate as an adaptative measure. Cattaneo et al. (2019) identified two different types of migration:

1. low-income families responding to natural disasters through low-return or even "survival" migration, taking the form of temporary movements across short distances,

2. wealthier families engage in risk management migration, which is typically costlier, semi-permanent and longer-distance migration.

While displacement due to natural disasters could be easily measured, tracking movements caused by SOE is more challenging. In that sense, the Sourcebook suggests we monitor:

- Number of household members forced to leave their locality (either evacuated or displaced) due to natural disaster, either temporarily or permanently;
- Duration and destination of the relocation;
- Number of household members forced to leave their locality due to SOE;
- Households that adopted migration as an adaptative measure.

# 5. COLLECTING CLIMATE CHANGE AND NATURAL DISASTERS DATA: QUESTIONNAIRE PROPOSAL

Pacific countries are at the frontline of climate vulnerability and have the imminent need to adapt to climate change impacts. Social, economic, political, and environmental development goals will not be achieved or sustained in the PICTs if climate change and natural disaster effects are not understood. In promoting better use and production of statistics to design and accelerate climate change mitigation and adaptation actions under Sustainable Development Goal (SDG) 13, SPC-SDD developed the Natural Disaster and Climate Change Survey Module (including the Core Module and Sourcebook).

The main objective in developing the Core Module and Sourcebook is to encourage the production and use of socio-economic information on the household impacts of natural disasters and climate change in the PICTs. The present document provides practical guidelines for data collection to produce socio-economic indicators that policymakers can use to determine if the interface between communities/households and the natural hazards is trending towards more climate resilient practices.

Designing the Core Module and Sourcebook required the consideration of the needs and constraints of the Pacific region stakeholders to understand how data will be used and collected, and to define the scope of the survey. SPC-SDD performed additional stakeholder consultations during the questionnaire design, to ensure the Core Module and Sourcebook cover the most relevant topics for the Pacific countries and sectors.[16] These consultations included the participation of representatives from NSOs and researchers with different expertise including demographic, social, economic and environmental statistics, among others.

Based on these consultations, more comprehensive agricultural and fisheries sections were incorporated. Moreover, additional areas

of analysis were identified, such as households' proximity to strategic ecosystems on which livelihoods depend on, and adaptation strategies.

These discussions also served to advocate this work with PICT governments, highlighting the production of indicators that policymakers can use to evaluate if climate change policies are contributing to more climate resilient livelihoods and to report on the SDG agenda, the Sendai Framework and the Global Set of indicators.

## 5.1. The Natural Disaster & Climate Change Core Module

The objective of the Natural Disasters and Climate Change Core Module is to collect information about the socio-economic impacts of natural disasters at the household level. The Core Module was designed as a short set of additional questions that can be appended to existing population or agricultural censuses and household surveys.

The Core Module provides a standardised method to monitor natural disasters and climate change's impact on households' assets, livelihoods, productive activities, health, essential services, employment and education.

> ### Box 3. Core Module Characteristics
>
> - Gathers nationally relevant and internationally comparable over time socio-economic data on impacts of climate change and natural disasters on the Pacific Islands households.
>
> - Includes eleven fixed or standard questions to be included in existing household surveys or population/agricultural censuses.
>
> - Proposes to analyse the main socio-economic effects of the climatological-related natural disasters that impacted households in the last 12 months.
>
> - Evaluates different types of natural disasters

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16 *The proposed questionnaires were presented at the PACSTAT Regional Conference on HIES methods, held on the 27th of March in Fiji, and in the 10th (core module) and 11th (sourcebook) meetings of the Pacific Statistics Methods Board (PSMB), held in Auckland, New Zealand, and Brisbane, Australia respectively. SDD also presented this methodology in the IX International Conference of Agricultural Statistics - ICAS IX, which took place in Washington DC on 17-19 May, 2023. The theme of the conference was: 'Harnessing Data to Inform an Equitable and Sustainable Agri-Food Systems Transformation'. SDD presented the climate change and natural disaster survey module at the 'Farming and Climate Change Adaptation' session.*

that occurred in the household´s locality, which have potentially negatively impacted crucial socio-economic aspects, such as: dwelling infrastructure and assets; agricultural, livestock, fishery and other productive assets; human health; employment, education, and access to primary services; and displacement.

### 5.1.1 Core Module Questionnaire Design

The Core Module addresses socio-economic impacts of natural disasters on households in the

past 12 months. It comprises thirteen questions, as presented in Table 1 below. The reference period is the last twelve months prior to the moment of the interview.[17]

The module has been designed for both PAPI and CAPI interviewing; the two versions are described in Annex 1 and 2, respectively. More accurate definitions and information on the Core Module are provided in the Sourcebook Questionnaire Design Section (Section 5.2.6).

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17   *For a complete overview of the core module, see Annex 1.*

*Table 4. Core Module Content and Key Areas of Analysis*

| Question number | Content | Key analysis areas |
|---|---|---|
| Q1: | Occurrence of Natural disasters impacting the household in the last 12 months. | Presence/absence of hazardous events and disasters, by type of hazard: 1. Flood; 2. Drought; 3. Storm; 4. Landslide; 5. Extreme temperature; 6. Wildfire; 7. Other (Specify) 8. None.<br>Number of household affected by natural disaster, by type of hazard. |
| Q2: | Type of household's asset/service impacted by the hazard. | Damages to dwelling, agricultural, fishery and other productive assets, household members' health, access to work and school facilities, access to essential services such as electricity, and other impacts.<br>Number of households suffering from damages, by type of damage and natural disaster category. |
| Q3: | Economic value of the damages inflicted to the household´s dwelling. | Direct economic loss in the housing sector attributed to disasters and number of people whose damaged dwellings were attributed to disasters. |
| Q4: | Economic value of the damages inflicted to household´s agricultural, livestock or fishery assets. | Direct economic loss to damages in productive assets attributed to disasters, by type of productive activity and disaster;<br>number of people whose productive activity was affected by disasters, by type of productive activity and disaster. |
| Q5: | Economic value of the damages inflicted to household´s other productive assets. | Direct economic loss to damages in other productive assets attributed to disasters;<br>number of people whose other productive activity was affected by disasters, by type of productive activity and disaster. |
| Q6: | Number of household members injured, missing or dead as a consequence of natural disasters. | Number of injured, missing or dead people attributed to disasters, by type of disaster. |
| Q7: | Number of household members who got sick as a consequence of natural disasters. | Incidence of cases of climate-related diseases, by type of disaster. |
| Q8: | Number of total workdays household members lose as a consequence of natural disasters. | Number of people whose livelihoods were disrupted or destroyed and total number of workdays lost, by type of disaster. |
| Q9: | Number of total school days children lose, as a consequence of natural disasters. | Number of children whose educational activities were disrupted and total number of school days lost, by type of disaster. |
| Q10: | Basic services disrupted as a consequence of natural disasters. | Public infrastructure vulnerability due to natural disasters and number of people not having coverage of basic services such as water, electricity, internet, by type of disaster. |
| Q11: | Natural disaster(s) impacting household´s other assets/services. | Direct economic loss and number of people whose damaged other assets (e.g.: private vehicles) or services were attributed to disasters, by type of disaster. |
| Q12: | Unit of measurement of variable collected with Q11. | Currency, number of days, etc. |
| Q13: | Household members forced to relocate elsewhere as a consequence of natural disasters, either temporarily or permanently. | Number of persons temporarily or permanently displaced, by natural disasters. |

## 5.1.2 Natural Disasters to Monitor through the Core Module

As mentioned, a disaster is defined by the UNISDR (2009, p.13) as a "serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources".

The International Disaster Database EM-DAT (2023) distinguishes between two generic categories for disasters: natural and technological. In addition, the Integrated Research on Disaster Risk (IRDR, 2014) provides a classification scheme for natural disasters, designed to serve multiple types of databases (global, national, and sub-national) to make impact information more comparable. IRDR classification distinguishes three levels for natural disasters (or hazards), moving from the most generalised (family), to the most specific (peril), as described in Table 2 below.

*Table 5. Natural Disaster Classification (family, definitions, main events and perils), IRDR 2014.*

| Natural Disaster family | Definition | Natural disaster main event | Peril | |
|---|---|---|---|---|
| Geophysical | A hazard originating from solid earth. This term is used interchangeably with the term geological hazard. | Earthquake<br>Mass Movement (dry)<br>Volcanic activity | Ash Fall<br>Fire following EQ<br>Ground Movement<br>Landslide following EQ | Lava Flow<br>Liquefaction<br>Pyroclastic Flow<br>Tsunami |
| Meteorological | A hazard caused by short-lived, micro- to mesoscale extreme weather and atmospheric conditions that last from minutes to days. | Convective storm<br>Extratropical storm<br>Extreme Temperature*<br>Fog<br>Storm*<br>Tropical cyclone* | Cold Wave<br>Frost/Freeze<br>Hail<br>Heat Wave<br>Lightning<br>Rain | Sandstorm/Dust storm<br>Snow/Ice<br>Storm Surge<br>Tornado<br>Wind<br>Winter Storm/Blizzard |
| Hydrological | A hazard caused by the occurrence, movement, and distribution of surface and subsurface freshwater and saltwater. | Flood*<br>Landslide*<br>Wave action | Avalanche: Snow, Debris<br>Coastal Flood<br>Coastal Erosion<br>Debris/Mud Flow/Rockfall<br>Expansive Soil | Flash Flood<br>Ice Jam Flood<br>Riverine Flood<br>Rogue Wave<br>Seiche<br>Sinkhole |
| Climatological | A hazard caused by long-lived, meso- to macro-scale atmospheric processes ranging from intra-seasonal to multi-decadal climate variability. | Drought*<br>Glacial Lake Outburst<br>Wildfire* | Forest Fire<br>Land fire: Brush, Bush, Pasture<br>Subsidence | |
| Biological | A hazard caused by exposure to living organisms and their toxic substances (e.g., venom, mould) or vector-borne diseases that they may carry. Examples are venomous wildlife and insects, poisonous plants, and mosquitoes carrying disease-causing agents such as parasites, bacteria, or viruses (e.g., malaria). | Epidemic<br>Insect infestation<br>Animal Accident | Bacterial Disease<br>Fungal Disease<br>Parasitic Disease<br>Prion Disease<br>Viral Disease | |
| Extra-terrestrial | A hazard caused by asteroids, meteoroids, and comets as they pass near-earth, enter the Earth's atmosphere, and/or strike the Earth, and by changes in interplanetary conditions that affect the Earth's magnetosphere, ionosphere, and thermosphere. | Impact<br>Space weather | Airburst<br>Collision<br>Energetic Particles<br>Geomagnetic Storm<br>Radio Disturbance<br>Shockwave | |

*\* The Core Module covers the main and peril events underlined in Table 2.*

The Core Module will address the following main natural disaster events included in the Meteorological, Hydrological and Climatological families:

- **Extreme temperature**: A general term for temperature variations above (extreme heat) or below (extreme cold) normal conditions.

- A heat wave can be considered an example of extreme temperature, which consists of significant warming of the air or an invasion of very warm air over a large area, lasting from a few days to weeks. The temperatures reached during a heat wave are within the extreme maximum values.

- **Storm**: A disturbance of the normal condition of the atmosphere, manifesting itself by winds of unusual force or direction, often accompanied by rain, snow, hail, thunder, and lightning, or flying sand or dust.

- **Flood**: A general term for the overflow of water from a stream channel onto normally dry land in the floodplain (riverine flooding), higher-than-normal levels along the coast and in lakes or reservoirs (coastal flooding), as well as ponding of water at or near the point where the rain fell (flash floods).

- **Landslide**: Any moderate to rapid soil movement, including lahar, mudslide, and debris flow. A landslide is the movement of soil or rock controlled by gravity, and the speed usually ranges between slow and rapid (but not very slow). It can be superficial or deep, with materials making up a mass that is a portion of the slope or the slope itself. The movement has to be downward and outward with a free face.

- **Drought**: An extended period of unusually low precipitation that produces water shortage for people, animals, and plants. Drought differs from most other hazards in that it develops slowly, sometimes even over the years, and its onset is generally difficult to detect. Drought is not solely a physical phenomenon because human activities and water supply demands can exacerbate its impacts. Drought is, therefore, often defined both conceptually and operationally. Operational definitions of drought, meaning the degree of precipitation reduction that constitutes a drought, vary by locality, climate, and environmental sector.

- **Wildfire**: Any uncontrolled and non-prescribed combustion or burning of plants in a natural setting such as a forest, grassland, brushland or tundra, which consumes the natural fuels and spreads based on environmental conditions (e.g., wind, topography). Wildfires can be triggered by lightnings or human actions.

- **Tropical cyclone**: A tropical cyclone originates over tropical or subtropical waters. It is characterised by a warm-core, non-frontal cyclone with a low-pressure centre, spiral rain bands and strong winds. Depending on their location, tropical cyclones are referred to as hurricanes (Atlantic, Northeast Pacific), typhoons (Northwest Pacific), or cyclones (South Pacific and Indian Ocean).

- Although an attempt was made to follow scientific classifications and terminology as much as possible, in the Core Module´s case, a pragmatic approach was chosen to align with the information needs of the PICTs. For example, in the list of natural disasters proposed by the Core Module, Volcano Eruptions and Tsunamis were included as hazards occurring in the Pacific region whose impacts merit analysis.

- **Tsunami**: A series of waves (with long wavelengths when travelling across the deep ocean) generated by a displacement of massive amounts of water through underwater earthquakes, volcanic eruptions, or landslides. Tsunami waves travel very high speeds across the ocean, but as they reach shallow water, they slow down, and the wave grows steeper.

- **Volcano eruption**: when gas and/or lava are released from a volcano — sometimes explosively.

## 5.1.3 Key Indicators Derived from the Core Module

The core intended analysis of the Core Module is about the impacts of natural disasters on households. Even though the Core Module could be used to estimate a range of indicators, as the ones proposed in Table 3, the sampling of the household survey on which the Core Module is appended would determine the level of representativeness of results, for example at national or sub-national level. The proposed indicators can then be correlated with other basic socio-economic variables, such as education, income, and asset ownership.

*Table 6. Table 3. Mapping of indicators derived from the core module and their correspondence to global frameworks' indicators*

| Indicator Category | Correspondence to the Global Set of Climate Change indicators, SDGs, SENDAI Framework or FDES indicators |
|---|---|
| Distribution of households according to the type of natural disaster that last affected them | - GS #39 Frequency of hazardous events and disasters<br>- FDES 4.1.2.a People affected by natural extreme events and disasters<br>- Sendai B-1: (Compound) Number of directly affected people attributed to disasters, per 100,000 population |
| - Percentage of households with dwellings damaged, by natural disaster category<br>- Percentage of households with other assets damaged, by natural disaster category<br>- Economic value of damages on dwellings, by natural disaster category | - SDG 1.5.2. Direct economic loss attributed to disasters in relation to GDP (and SDG 11.5.2. Direct economic loss attributed to disasters in relation to GDP)<br>-GS #41 Direct economic loss in the housing sector attributed to disasters<br>- FDES 4.1.2.b Economic losses due to natural extreme events and disasters<br>- Sendai C-4: Direct economic loss in the housing sector attributed to disasters |
| - Percentage of households with productive assets damaged, by natural disaster category | - GS #40 Direct economic loss to all other damaged or destroyed productive assets attributed to disasters<br>- Sendai C-3: Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. |
| Number of persons sick or injured, by natural disaster category | - FDES 4.1.2.a People affected by natural extreme events and disasters<br>- GS #44 Incidence of cases of climate-related diseases<br>- Sendai B-2: Number of injured or ill people attributed to disasters, per 100,000 population. |
| Number of fatalities, by natural disaster category | -SDG 1.5.1. Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population<br>- SDG 11.5.1. Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population.<br>- SDG 13.1.1. Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population<br>- GS #42 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population<br>- FDES 4.1.2.a People affected by natural extreme events and disasters<br>- Sendai A-1 (Compound): Number of deaths and missing persons attributed to disasters, per 100,000 population |
| Number of missed working days per household due to natural disasters | Sendai B-5: Number of people whose livelihoods were disrupted or destroyed, attributed to disasters |
| Number of school days per child missed due to natural disasters | - |
| - Percentage of households that suffered from essential services disruption due to natural disasters | - GS #77 Impacts of climate change on transport<br>- Sendai D-1 (compound): Damage to critical infrastructure attributed to disasters |
| Number of persons forced to leave their locality because of the natural disaster | - GS #43 Number of climate refugees, climate migrants and persons displaced by climate change<br>- Sendai B-5: Number of people whose livelihoods were disrupted or destroyed, attributed to disasters |

## 5.2. The Sourcebook

### 5.2.1 Objectives

The general objective is to guide PICTs in producing statistics on natural disasters and climate change vulnerabilities, impacts and responses at the household level in any scale or magnitude of natural disasters or climatic-related hazard events.

The sourcebook supports a flexible approach whereby countries could fit questions relevant to their information needs and survey objectives into their household survey programmes. The sections of the Sourcebook can be integrated into large-scale, standalone and multi-topic household surveys, meaning that it can be implemented either as short modules included in pre-existing surveys, or as a stand-alone survey. Whatever the

approach, the sourcebook will allow countries to standardise data collection on climate change and socio-economic impacts.

National policy priorities and availability of resources will determine the sections and the level of detail at which data will be collected. The present document is presented as a reference guide for NSOs or any survey practitioners (such as development partners, researchers, and citizens) in the PICTs.

> **Box 4. Sourcebook Characteristics**
>
> - Guides PICTs in producing statistics on natural disasters and climate change vulnerabilities, impacts and responses at the household level, allowing them to monitor several areas beyond those covered by the Core Module, such as perceptions of climate change and household adaptation measures.
>
> - Consists of an 8-section questionnaire covering Household Roster, Housing, Climate Change Perceptions, Impact of Natural Disasters, Slow-Onset Events, Agriculture, and Fishery, Prevention, Mitigation, Coping Strategies and Adaptation to Climate Change.
>
> - It is a flexible tool, because the sections can be either integrated in pre-existing survey questionnaires, or used for stand-alone surveys on climate change.
>
> - Allows countries to standardise data collection on climate change and socio-economic impacts.
>
> - Includes the corresponding guidebook.

### 5.2.2  Target Population and Unit

The target population is the population of elements or "units" we are interested in surveying. The choice of the target population depends on the objective of the study, i.e., on what has to be measured. For example, for national Household Income and Expenditure Surveys (HIES), the target population is people living in households (i.e., excluding institutionalised populations such as those in dormitories, boarding schools, prisons, military barracks, etc.) in a country.

A statistical unit is a unit of observation for which data are collected or derived. It also depends on the objective of the study. Both the core module and the sourcebook focus on the household as the unit or element of the target population. The implementation of the Sourcebook as a

stand-alone survey will allow the analysis of overall natural disasters and climate change impacts at the household level.

The definition of a household is adopted from the United Nations "Principles and Recommendations for Population and Housing Censuses" (UN, 2017). According to this definition, the concept of household is based on the "arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for residing". A household may consist of one person or a group of two or more people. The people in the group may pool their incomes, may have a common budget, may be related, unrelated or may constitute a combination of people both related and unrelated.

### 5.2.3  Sampling

A sample survey refers to a survey that aims to collect or observe data from a subset or sample of the population of interest – i.e., from only some of the elements or units in the target population – but still make quantitative statements about the whole population.[18]

According to Pfeffermann & Rao (2011), the sampling plan must contain three basic principles: (1) efficiency, (2) practicality and (3) cost-effectiveness.

Because the core module is intended to be included in pre-existing survey questionnaires, the sampling strategy will be the one adopted by the PICT NSOs in their respective HIES, LFS, etc. It is suggested, however, that the sampling strategy adopted allows – for both the core module and the stand-alone survey on climate change and natural disasters – for inferencing results not only at national level, but also at urban and rural level and, if possible, regional (or other administrative boundaries) level. The examples of Bangladesh and Nepal Climate Change national surveys could guide the decisions on inference domains:

- Bangladesh Disaster-related Statistics: the Climate Change and Natural Disaster Perspectives survey, administrated in 2021 on a sample of about 130,000 households, produces results about the twelve main natural disaster-prone areas of the country. The survey uses a stratified two-stage random sampling technique. The first stage involved a simple random sampling of the

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18   *From the SPC Guidance Note on Sampling (work in progress), to be presented at the 12th PSMB Meeting, in October 2023. Further details on sampling and sampling strategy can be found in this document.*

Primary Sampling Units (PSUs) from disaster affected districts among the country's 64 domains (districts). The second stage involved taking 30 households that were affected by natural disasters from each of the disaster-affected PSUs using systematic sampling (BBS, 2021).

- The 2016 National Climate Change Impact Survey of Nepal enumerated 5,060 households and presented results at the national level, by urban/rural area and by each of the three main ecological belts of the country. For the selection of the nationally representative sample of household, the five development regions of Nepal were divided into three ecological belt areas each, resulting in fifteen areas of interest plus Kathmandu Valley[19]. Each of these sixteen areas are referred to as a domain of interest, for which survey estimates were produced. Then, the sample was stratified in three stages using random sample technique: in stage one, districts were selected; in the second stage, the Primary Sampling Unit (PSU) was selected; at stage 3, finally, households were selected (CBS, 2017).

### 5.2.4 Reference Period, Frequency and Timing

Temporal considerations are critical for the correct evaluation of the socio-economic impact of natural disaster and climate change statistics. Calendar or physical years do not necessarily coincide with the occurrence of climatic-induced events that occur in ecosystems (e.g., coral bleaching, salination, desertification), where there may be longer periods of time, different to traditional variables of the statistical system.

The DRSF highlighted that disaster impact statistics must be produced consistently over time and across different occurrences. Its recommendation is to monitor the impacts of natural disasters every year. This information would facilitate the construction of trends across occurrences for risk assessment, which may require analysis over a long period (perhaps 50–100-year trends) (ESCAP, 2018). Considering the nature of natural hazards' occurrence in the Pacific region and their impacts on households and communities, collection of data should be ideally conducted on a yearly basis. This can be achieved by including the Core Module

and/or the Sourcebook Sections as additional modules within planned regular national surveys (household or agricultural surveys).

However, in the PICTs, the frequency of household surveys is three to five years and agricultural survey frequency is mainly attached to agricultural production seasonality. Understanding the limitations on periodically collecting climate change impacts data should also be considered to establish a frequency that will be maintained through time and from which patterns can be derived. Data collection will depend on national goals, the feasibility of data collection and the competing needs of other statistical areas.

It is also possible to recommend prioritisation of those indicators which would change on an annual basis for the annual survey (for example, the proposed ones derived from the Core Module) and then include indicators that change over extended periods in other collections at broader temporal scales, such as household surveys and population/agricultural censuses which might occur every five to ten years. For example, results of SOE events (for example, change in the types of crops being cultivated and food consumption patterns) are expected to show up more slowly, compared to immediate impacts of hazards at the household level, such as the disruption of essential services, work facilities, or school infrastructure.

Regarding the recall period – the period of time with reference to which the respondent is asked to provide relevant details – high-frequency events, such as the hazards occurring in the Pacific, require yearly recall periods to make it easier for respondents to recall information accurately. Longer periods, in fact, could cause problems such as recall bias, while shorter periods might not be enough to cover the occurrence of a hazard. Therefore, the questions proposed in the Core Module and Sourcebook about the socio-economic impacts of climatic-induced events and adaptation practices that affect (or were implemented by) the household should be asked with reference to the twelve months prior to the time of the interview.

Some questions of the Core Module and Sourcebook, however, require shorter recall periods to allow respondents to recall information accurately. Among them, inquiries related to energy and water shortages, and those on Fisheries have a recall period of *30 days*.

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19  *Located in the Central development region, it was treated separately.*

## 5.2.5 The Sourcebook Questionnaire Design

Each section of the household survey instrument[20] focusses on one of the different areas potentially impacted by natural disasters and climate change, covering productive activities, food consumption, and health, among other things; they can be included as additional modules in an already established household survey, or implemented as a stand-alone survey.

The inclusion of this instrument in national household surveys could support the development of a standardised statistical methodology to help monitor whether (and by what amount) climate change and natural hazards bring negative impacts for the people of a country, or whether they are contributing towards more favourable and climate-resilient livelihoods.

The survey instrument has eight Sections, besides the Cover, namely: 1) Household Roster; 2) Housing Condition; 3) Climate Change Perceptions; 4) Natural Disaster Impacts; 5) Impacts of Slow-Onset Climatic Events (SOE) ; 6) Impacts on Agriculture; 7) Impacts on Fisheries; and 8) Adaptation to Climate Change.

A field test is currently being implemented in Kiribati to ensure that the questions are well understood by the respondents and that the information (e.g., the economic value of damages in the household dwelling, productive assets, etc.) can be captured adequately. Finally, language adaptation is crucial for correctly implementing the Sourcebook. Countries interested in implementing this survey should adapt contents to the local language.

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20  See Annex 2 for the Sourcebook Questionnaire – English version.

*Table 7. Sourcebook Content and Key Areas of Analysis*

| Sourcebook Section | Content | Key analysis areas |
|---|---|---|
| 0. Interview cover | Introduction, locality-specific information, household location, enumerator information, GPS coordinates, interview date and time, permission to interview, respondent identification, main language spoken at the household, language of the interview. | - |
| 1. Household roster | Household composition, demographics, educational level, economic activities, disability, internet access via mobile phone. | Household size, distribution of household members by sex and age; percentage of female-headed households; distribution of household members by education level, disabilities, pregnant women; percentage of households' income dependent on primary activities (family farming, crops, fishing, etc.) and non-primary activities (tourism, trade, etc.); population relying on subsistence and pastoral farming; household members connected to internet via mobile phones. |
| 2. Housing condition | Dwelling characteristics, tenure, dwelling distance to main roads, ports and ecosystems, energy, water, sanitation, internet connection and households with access to Early Warning Information Systems. | Dwellings´ exposure level, household´s ownership status of the dwelling, average distance of houses to main roads, ports, and strategic ecosystems, households´ access to essential services, internet and Early Warning Information Systems |
| 3. Climate change perceptions | Household's members' perception on climate change causes, and threatened ecosystems; feelings about present and future impacts of climate change; primary source of information on government actions, and communication strategies. | Households' distribution according to main perceived characteristics causes of climate change, level of threat on welfare, feelings, source of information and government interventions. |
| 4. Impacts of natural disasters | Natural disaster(s) impacting household´s dwelling, agricultural and other productive assets, household members' health, access to work facilities and school, and access to essential services; the economic value of the damages inflicted to the household´s dwelling, agriculture, forest, livestock, fishery or other productive assets; the economic value of the damages inflicted to household´s other assets, number of household members injured or permanently disabled, sick or permanently sick, missing, or dead; the number of total workdays household members lose; | Frequency of natural hazard events, households climatic vulnerability (percentage of households with dwellings, household assets, productive assets damaged and their economic value); number of fatalities; number of (temporarily or permanently) sick or injured (disabled) persons; persons that saw their jobs and income disrupted; number of children not attending school; localities infrastructure vulnerability (distribution of households according to the type of essential service disrupted) and number of persons forced to leave their locality because of the natural disaster, by duration and destination. |

| Sourcebook Section | Content | Key analysis areas |
|---|---|---|
| | the number of total school days children lose, number of household members who permanently lost their job; essential services disrupted (hospitals, local administration, etc.); household members forced to relocate elsewhere as a consequence of natural disasters, either temporarily or permanently, duration and destination and experiences confronted by household members due to the natural disasters occurrence. | |
| 5. Impacts of SOE | SOE affecting household´s locality in the past 12 months, effects on households' livelihoods, type of ecosystems near the household, health and displacement of household members and impacts on social, cultural and communitarian activities. | Household and community vulnerability to climate change (Distribution of households affected by SOE, by type of event; distribution of the households according to type of livelihood´s impact due to SOE, distribution of households according the ecosystems near their localities impacted by SOE; distribution of households according to the type of health impact due to SOE, number of persons per household forced to leave their locality because of SOE, percentage of households declaring SOE have affected their participation in social, cultural and communitarian activities and type of social, cultural and communitarian activity impacted by SOE. |
| 6. Impacts on agriculture | **Crops**: Land ownership and total area, list of crops planted by the household in the last 12 months, crop area, harvested area, reasons for the area harvested being less than planted, percentage of lost harvest, economic value of the loss, economic value of lost machinery/equipment and infrastructure. | Area and use type for all land owned or used, crop type, crop harvested, and economic impacts of natural disasters and SOE on crop harvest, machinery/equipment and infrastructure. |
| | **Livestock**: Livestock raised/kept (number of animals) by the household in the past 12 months, average price per animal head sold, number of animals that died or were lost, reason for the loss and economic value of machinery/equipment and infrastructure losses. | Type and quantity of livestock owned/kept, details on economic value and losses attached to natural disasters and SOE on animals, machinery/equipment and infrastructure. |
| | **Aquaculture**: Type and quantity of fish collected by the household in the past 12 months, lost quantity, and reasons for the loss of aquaculture production, and economic value of machinery/equipment and infrastructure losses. | Type, quantity of production and earnings from aquaculture; economic value of production losses, machinery/equipment and infrastructure, by natural hazard and SOE attributed to the losses. |
| | **Forestry**: Amount and type of forest products collected in the past 12 months by the household, number of months dedicated to the collection, market prices, natural disasters and SOE affecting forest products collection and economic value of machinery/equipment and infrastructure losses. | Production and earnings from forest products and economic value of the losses attributed to natural disasters and SOE on collection, machinery/ equipment and infrastructure. |
| 7. Impacts on fisheries | Type, quantity of fish caught, equipment used, | Locations where household members go fishing, type of fishing equipment used by the household and ownership, average number of fishing days, types, quantities of fisheries collection by the household in the past 30 days, reasons for changes in the fish caught compared to the same period of the last year, percentage of lower fish catch in the past 30 days and economic value of losses, selling prices per unit of fish. |
| 8. Adaptation to climate change | Household coping strategies implemented to face natural disasters and SOE events. | Risk prevention measures adopted by the household during natural disasters, disaster recovery measures adopted by the household, retreat, defend and co-exist adaptation measures adopted by the households to respond to the impacts of flooding and other disasters on productive activities, to protect fresh and drinking water availability, and to protect natural systems, households opinion on the effectiveness of adaptative actions, institutional support and type of support received, household members involvement in climate change related committees, personal challenges limiting household members´ response to climate change and natural disaster impacts |

### 5.2.5.1 Interview Cover[21]

The Interview Cover Section includes questions on the geographic location of the household, the responsible survey staff and primary respondent personal information. An introductory paragraph to the survey and its relevance to household welfare is provided for the survey staff to adapt to their country/organisation context.

Apart from collecting relevant information about the enumerator and basic information such as the date and start time of survey application, the interview cover includes one question for the enumerator on reasons for not being able to start the survey: household refusal, qualified respondent not found, inability to locate the proper household, etc.

An important aspect to be considered is the selection of the proper respondent. The person to be interviewed should be the most knowledgeable of the household's composition and assets, members' health condition and work/school activities. This person may be either the household head or any other adult member able to answer questions about the occurrence of natural disasters in the locality and their impacts on the household in the past 12 months. In case two people are identified as needed for a complete overview of the household activities (say: one for productive activities, dwelling, income, economic loss, and another one for household member condition, e.g., children, elderly, ill, disabled, women) both should be interviewed: each of them will only be asked the questions of the relevant section of the core module. Individuals should self-report their demographic information. When this is not possible (if adults are absent during the interview or children are too young to respond on their own) then the primary respondent or another knowledgeable household member can serve as their proxy.

### 5.2.5.2 Household Roster

The Household Roster section identifies the general socio-economic status of the household, specific population groups, household members' connectivity, etc. It starts with fifteen lines to register each household member, and ten questions to be administered to each member.

Questions 1 to 5 collects basic demographic information (name, sex, age, relationship to the head of household, and marital status). These questions are also expected to facilitate gender-based comparable analysis.

Questions 6 and 9 on pregnancy and disability status of household members provide information on household members requiring daily care or with physical or mental conditions that make the household more vulnerable in the event of a natural disaster.

Question 7 on household members' level of education supports the analysis of climate change sensitivity and adaptation capacity, since completing primary school, for example, indicates basic competency in reading, writing and arithmetic or population educational challenges to consider when designing adaptation strategies for communities.

Question 8 intends to capture the family members' source of livelihood and related economic activities performed during the last 12 months. This question is used as a filter for the Agriculture and Fisheries Sections, to be administrated later in the survey. In addition, the results from question 8 could be correlated with poverty measures and climate change sensitivity, since poorer households lack resources to respond effectively to natural disasters, are more likely to reside in highly exposed areas to disasters and have a lower ability to displace.

Question 10, investigates household members' access to the Internet through their mobile phones, and hence their ability to respond in emergencies, to receive warning information, alerts, or have access to other relevant information, locate family members, save emergency contacts, save photos of essential documents, install emergency apps, etc.

### 5.2.5.3 Housing Conditions

Some households are more exposed than others to natural disasters and SOE. The Housing Conditions Section can help identify structural determinants of dwellings exposure and settlement sensitivity.

Question 1 investigates dwelling ownership, while questions 2 and 3 are about the construction materials used for walls and roofs, providing insights about underlying income and households' ecological dynamics, which are relevant to the climate change sensitivity analysis. For example, it is possible that on alluvial plains, proximity to

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21  *The Cover, Roster and Housing Conditions sections presented in this publication are not to be used where the modules are incorporated in existing household survey questionnaires; they are only needed for stand-alone climate change surveys.*

clay brick factories facilitates the construction of stronger houses less vulnerable to damage caused by windstorms and other climatic events. In isolated areas, houses can be constructed of timber from local forests, which are less resistant to storms or floods.

Questions 4 and 5 on households' proximity to main paved roads and ports are also intended to analyse some infrastructural climate change sensitivity. Inadequate transportation affects not only the ability of households to earn a living from fishing and agriculture but also to evacuate or displace in case a climatic event affects the household. Also, households' proximity to strategic ecosystems (e.g., forest, mangroves, wetlands, reef barriers, dunes, salt marshes, etc.) that family members use for their livelihood or that can protect the dwelling from a natural hazard are investigated in questions 6 and 7.

The households´ availability and quality of the provision of essential services such as electricity, water, sanitation, and the Internet are investigated in questions 9, 10, 11, 12, 13, 15 and 16. Question 14, on the other hand, explores the main energy source used for cooking. These questions are related to the strength of public service infrastructure and households´ dependency on natural resources.

Finally, question 17investigates households' access to Early Warning Information Systems to help understand the access to emergency-related information and the level of development of emergency networks in the households' locality.

### 5.2.5.4   Climate Change Perceptions

This section includes nine questions on household members' climate change perceptions. Questions 1 and 2 discuss the households' definitions of climate change and its leading causes. Questions 3 to 6 are on the households' appraisal of climate change threats, strategic ecosystems surrounding their homes and their feelings when hearing or learning about future climate change impacts.

Question 7 seeks the primary source of information on climate change; lastly, the local government's capacity and infrastructure to combat climate change are investigated by questions 8 and 9.

### 5.2.5.5   Impacts of Natural Disasters Section

The section on monitoring the impact of natural disasters is the core of the Sourcebook. In this sense, the questionnaire proposes thirty-one questions for attributing possible socio-economic and health impacts to nine different types of natural hazards affecting the household over the past 12 months.

As mentioned in the Section on the core module (section 5.1.1), disaster impacts include loss of life, injury, disease and other adverse effects on human physical, mental, cultural, and social well-being, damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation.

In this Section, question 1 asks the enumerator to record all natural disasters, of any scale or magnitude, that hit the household. If a natural disaster is not included in the list, the respondent must record the event(s)' type(s) as the respondent indicates in the space for "others".

The subsequent questions of the Section can be completed only if the primary respondent has

stated that their household was affected by any of the natural disasters on the roster in the past twelve months.

Question 2 is a filter-question listing the possible impacts or damages inflicted on the household´s members and assets, such as the dwelling structure, farm assets, agricultural and forest area, farm animals, fisheries assets, other productive[22] and personal[23] assets, individuals' health, access to transportation infrastructure, to work facilities, school, and hospitals, access to basic services and other services. In this question, the enumerator must record all the impacts the respondent declares for each reported natural disaster occurred in the last 12 months.

Physical elements can be either damaged or destroyed. Damages are the partial physical destruction of dwellings, buildings, productive infrastructure, tools or other objects. Destroyed assets are assets which are beyond repair. A destroyed asset is a total loss of asset value, and replacement would require a complete reconstruction (ESCAP, 2018, p.88).

Questions 3 to 9 refer to economic value of damages inflicted on the household dwelling, agriculture area, productive assets, other personal assets, etc. Regarding the dwelling (question 3), the physical damage or destruction suffered must only be registered for the house where the primary respondent and the household members live. Damages on a house owned/rented by this household in the same or a different village or island but where the respondent or his family does not live should not be registered in this interview.

Since the response consists of an economic value estimate of the house´s damage or loss, it may be subject to bias in the respondent's value appreciation. The enumerator can validate this estimate by observing/inquiring during the interview about the house´s area, its condition, the value of the properties in the village, household taxes, etc. In the same way, if the respondent does not know the value, the enumerator could give reference values that help to estimate it.

In relation to the economic value of damages on agricultural assets in the aftermath of a natural disaster (questions 4 to 8), the DRSF (ESCAP, 2018) provides a recap of definitions of agricultural assets to be considered for this set of questions:

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22  *Used, for instance, in tourism activities, home processed food activity, or production of handicrafts.*

23  *Vehicles, motorbikes, etc.*

*Table 8.  Agricultural Assets at Risk of Damage or Lost due to Natural Disasters*

| Agricultural asset | Definition |
|---|---|
| Agricultural land | Agricultural land consists of the ground, including the soil covering and any associated surface waters, over which ownership rights are enforced and from which economic benefits can be derived by their owners by holding or using them. Agricultural land includes the land and improvements to land used for agricultural production. |
| Managed forests | Managed forests include areas that have a long-term documented management plan. They include planted forests, predominantly composed of trees established through planting and/or deliberate seeding. |
| Work-in-progress Agricultural Crops – for all primary crops | Work-in-progress consists of output produced by an enterprise that still needs to be sufficiently processed to be in a state in which it is normally supplied to other institutional units. Work-in-progress occurs in all industries but is especially important in those in which some time is needed to produce a unit of finished output, for example, in agriculture or industries producing complex fixed assets such as ships, dwellings, software or films. Although work-in-progress is the output that has yet to reach the state it is usually supplied to others, its ownership is nevertheless transferable, if necessary. For example, it may be sold under exceptional circumstances, such as the liquidation of the enterprise. |
| Annual crops | Annual crops are sown and harvested during the same agricultural year, sometimes more than once. |
| Perennial crops | Perennial crops are sown or planted once and are not replanted after each annual harvest. Annual perennial crops include cereals, pulses, roots and tubers, sugar crops, some oil-bearing crops, some fibre crops and vegetables, tobacco, and fodder crops. Perennial primary crops include fruits and berries, nuts, oil-bearing crops, spices and herbs. |
| Machinery and equipment | Machinery and equipment cover transport equipment, tools for crops/animals/fisheries grow/catch or transformation. |
| Agricultural infrastructure | The physical structures and facilities providing services essential to the functioning of agricultural activities. |

*Source: ESCAP (2018).*

The economic agricultural assets damage or loss must be registered only for the land operated by the household (parcels, gardens, etc.) in the locality where the natural disaster was registered. This land could have crops owned by the household or crops that the household is taking over. Damages must be recorded in both cases. Damages or losses of agricultural assets suffered in another land operated by the same household but located in a different village or island should not be registered in this survey questionnaire. Damages, destruction or loss of agricultural infrastructure, machinery, and equipment owned by the household must also be registered in this part.

Livestock are animal resources yielding repeated products and includes animals whose natural growth and regeneration are under the direct control, responsibility and management of the household. They include breeding stocks, dairy cattle, draft animals, sheep, or other animals used for wool production and transportation, racing or entertainment (ESCAP, 2018, p.6). All economic value of livestock raised by the household that perish or go missing, are injured or ill due to the natural disaster will be investigated, as well as buildings (pigsties, sheds, corrals, etc.), including the ones outside the household land but located in the same village where the natural disaster was registered and operated by the household (question 6). If within the household land, there are cattle not owned but tended by household members this must be included in the register of livestock damages. Economic value of damages, destruction or loss of livestock infrastructure, machinery, and equipment owned by the household must also be registered.

Fish stock and fisheries include aquatic resources yielding repeated products and maintained for controlled reproduction. These include aquatic plants (seaweeds), crustaceans, diadromous fishes[24] freshwater fishes, marine fishes, and molluscs (ESCAP, 2018). All the economic value on fish collection/aquaculture harvest losses due to the natural disaster must be registered, along with fisheries-related infrastructure (e.g., boat ramp, marketplace, etc.) owned by the household and located in the same village where the natural disaster occurred. The economic value of fishing gear damages or losses must also be registered (question 7).

If the respondent mentions economic damages in other productive activities such as handicraft, collection of forestry products[25], tourism activities, home-processed food activities, transport, small-business operated by the household, etc., they must be registered in question 8.

Handicraft involves the making of decorative domestic or other objects by hand and often represents a major activity. It can include weaving, carving, jewellery making, canoe building, clothes printing, custom clothes tailoring and similar activities. The enumerator must investigate all the damages or loss of handicraft raw material stocks, final products stocks, tools, machinery and infrastructure associated with their production in the household. Lastly, question 9 explores the economic value of damages inflicted on "other personal assets", such as home appliances (power plant, fridge, etc.), household furnishing, vehicles, motorbikes, etc.

Regarding health impacts on household members (questions 10 to 15), as stated in Section 4.3., attributing particular health impacts to a specific event is challenging. Dead or missing[26] persons from a catastrophe have a direct causal relationship; however, natural disasters occasion indirect fatalities, e.g., deaths from illnesses caused by poor access to water and sanitation or exposure to unsanitary and unsafe conditions. Injuries vary according to hazard intensity and social factors (age, gender, etc.). Besides, natural hazards harm the health of communities, especially for those living in rural areas. (ESCAP, 2018).

In answering questions 10 to 15, the primary respondent should report the household members who died, are missing or who were hurt due to the natural disasters affecting the household in the past twelve months. In addition, the respondent should report the number of ill household members due to the natural disasters. These counts should be done only for members who lived with the household during the previous twelve months. Injured household members and members who got sick must be counted regardless of whether they have recovered prior to the day of the interview.

Question 16 is on the number of days the household experienced disruptions to access to main roads or other islands. These impacts

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24  *Fishes that spend part of their life cycle in salt water and part in fresh water, such as the Pacific salmon.*

25  *Firewood, other wood, fruits, honey, mushrooms, flowers, medicinal plants, bushmeat, sand, rocks, etc.*

26  *A missing person corresponds to an individual whose whereabouts since the disaster is unknown. It includes people who are presumed dead. After some time (in most cases country defined), missing becomes part of the count of deaths.*

refer mostly to critical damages to road and port infrastructure.

Temporary or permanent job loss are included in the impact evaluation of natural disasters since the results are crucial for planning and designing initiatives aimed at creating jobs and restoring lifestyles in the long-term. Questions 17 and 18 refer to temporary job disruptions affecting family members due to a lack of access to normal work facilities. The amount of temporary job loss is obtained by summing the number of workdays lost by each household member that has seen their job temporarily affected.

Temporary job loss in the immediate aftermath of a natural disaster can be associated with difficulties in accessing work facilities due to damages or destruction of work sites infrastructure (factories/ offices buildings, warehouses, etc.), damage to productive machinery/equipment at work sites, damage to basic infrastructure (roads, ports, airports, electricity, water supply, telephones, internet, etc.). Temporary job loss may also occur because the worker got injured or sick from a natural disaster, or because the roads used to commute to work are damaged.

Permanent loss of work may be due to the permanent closure of work sites or because the worker was prevented from doing their job again. Question 19 investigates family members losing their jobs permanently.

Losses in school days can occur in the immediate aftermath of a natural disaster if educational facilities[27] are damaged or destroyed. This can result in the temporary or permanent disruption of education services or the reduction of the educational centres' capacity. Damage to basic infrastructure (paths, roads, ports, etc.) can also prevent students and teachers from attending school/work. Students and teachers can also lose school days if they contract diseases due to natural disasters or if they are hurt. Questions 20 and 21 ask the primary respondent to inform the number of school days lost by the children´s household.

Disruptions in basic services are consequences of physical impacts on critical infrastructure. UNISDR (2009) developed a list of the basic services that could be disrupted by disasters as follows:

- Health Services,
- Educational Services,
- Public Administration Services,
- Transport Services (including "Land transport", "Water transport", "Air transport");
- Electricity and Energy Services (including Electricity, gas, steam and air conditioning supply);
- Water Services (including water collection, treatment and supply); and
- ICT Services (including Telecommunications, broadcasting and information supply services).

Restoration of basic services should be a priority as disruptions to basic services have direct consequences on affected people; especially for vulnerable individuals such as the elderly and disabled people.

The Sourcebook suggests measuring the disruption in basic services by type of service impacted, as follows:

- Question 22 asks for the number of days the household lost access to hospital services,
- Question 23 asks for other services disrupted such as public administration services, markets, etc.
- Question 24 asks for the number of days these services were disrupted.
- Question 25 asks for essential services disrupted, such as electricity, water, sanitation, etc.
- Question 26 asks for the number of days these essential services were disrupted.

This information is relevant for public administration to manage immediate needs, given impacts on local services and also to be prepared for future natural hazards. This information can assist on how to reinforce local public infrastructure and address temporary interference to local services supply.

Regarding displacement of household members as a consequence of natural disasters, question 27 asks about household members forced to relocate, either temporarily or permanently. The primary respondent should report this number only for the individuals who were living permanently in the household in the past twelve months. In addition, questions 29, 30 and 31 capture further details about the destination of relocation, its duration and the type of facility where the household members were received after the natural disaster.

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27  *Play schools, kindergartens, primary, secondary or middle schools, technical-vocational schools, colleges, universities, training centres, adult education, military schools and prison schools.*

Question 28 is gender oriented. Since the sourcebook does not have a dedicated gender section, this section proposes a question with gender-related answer options that explore gender dynamics exacerbated by climatic-induced natural disasters, such as an increase in time spent on water collection, firewood collection, childcare, domestic violence, or school dropout.

### 5.2.5.6 Impacts of Slow Onset Events

The Sourcebook includes six questions on SOE impacts. The SOE considered for the analysis are the most commonly observed that have an impact on households' livelihoods in the PICTs, based on a consultation with SPC staff. Definitions are provided in Table 6 below; from this list, the respondent should indicate those that affected the household in the past 12 months.

Question 2 records the manner in which SOE have been affecting the household livelihoods (e.g., by reducing or increasing crop/livestock/fisheries yields, changing crop planting and harvesting seasonality, decreasing soil fertility due to salinization and soil erosion, etc.). The results from pilot surveys in Kiribati and the Cook Islands will be used to assess the validity and usefulness of Question 2. Question 3 addresses SOE impacts on ecosystems in the household village. The way SOE affect household members´ health is detailed in question 4[28]. The number of household members relocated due to SOE is investigated in questions 5 and 6. Impacts on social, cultural and communitarian activities, such as recovering and applying of ancient knowledge, or lower willingness to attend community events, are analysed in question 7.

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28 *For instance, because of reduced food or water availability and quality, increase anxiety, or illnesses such as dengue and yellow fever.*

*Table 9. Definitions of SOE Analysed in the Sourcebook*

| SOE | Definition |
|---|---|
| Sea level rise | "Sea level rise results from the thermal expansion of the oceans and through the melting of glaciers and ice sheets resulting from rising atmospheric temperatures. The term "global sea level rise" refers to the worldwide average rise in mean sea level. Sea level rise at any given location may be greater or less than the global average depending on factors such as local land elevation. Thus, "relative sea level rise" is the rise in sea level measured with respect to a specified vertical reference point relative to the land, which may also be changing in elevation over time (e.g., due to subsidence)" (UNFCCC, 2012, p.8). "Relative sea level rise" is the relevant metric for local analyses. |
| Increasing temperatures | The unusually rapid increase in Earth's average surface temperature. "Increasing temperatures intensify the hydrologic cycle, causing dry regions to become drier and wet regions to become wetter." Increased sea surface temperatures resulting from rising air temperatures are producing coral "bleaching" (UNFCCC, 2012, p.9). |
| Ocean acidification | "Refers to changes in ocean chemistry that have occurred as a result of carbon dioxide (CO2) emissions. The ocean absorbs about one quarter of the CO2 released into the atmosphere every year. The CO2 absorbed by the ocean makes seawater more "acidic", thereby interfering with the formation of the hard parts of corals and some shellfish" (UNFCCC, 2012, p.9). |
| Salinisation | Increasing evaporation from rising temperatures contributes to the salinisation of soil and water. Salts accumulate in the soils of arid environments. Saline soils contain large amounts of water-soluble salts that inhibit seed germination and plant growth, thereby reducing crop yields. (UNFCCC, 2012, p.10). |
| Land and forest degradation | Land degradation results from a number of interacting climatic processes and human activities, such as deforestation, pollution, destruction of mangroves, etc. (UNFCCC, 2012). But the leading cause of forest degradation is unsustainable and illegal logging (WWF, 2023). Deforestation disrupts watershed processes, including the infiltration of precipitation into soils. During periods of limited rainfall, soils dry out and heavier rainfall results in greater and more rapid runoff, thereby increasing flooding and erosion. These processes reduce the productivity of the land, resulting in declining food production. (UNFCCC, 2012). |
| Loss of biodiversity | Refers to affects on the structure, composition, and functions of ecosystems, resulting in the declining variety of all living things on the planet and reductions in the ecosystem services that help support human well-being (UNFCCC, 2012). |
| Desertification | "Refers to land degradation in arid, semi-arid and dry sub-humid areas (drylands). Processes that contribute to desertification include alterations in temperature and precipitation patterns; soil erosion caused by wind and/or water; the deterioration of soil properties; and the long-term loss of natural vegetation. Climate change may exacerbate desertification by altering spatial and temporal patterns in temperature, rainfall, solar radiation and winds. Increasing temperatures affect soil properties and processes, including organic matter decomposition, leaching, and soil water regimes." (UNFCCC, 2012, p.11). |

*Source: UNFCCC (2012) and WWF (2023).*

### 5.2.5.7  Impacts on Agriculture

A supplementary Agriculture Section aims to capture detailed data on the economic impacts of natural disasters and SOE on agriculture, livestock, aquaculture, and forestry activities performed by the household.

The Agriculture Section would only be displayed if question 8 of the Household Roster was marked for the options 1 (family garden), 2 (crops), 3 (livestock), 4 (aquaculture) or 6 (forestry).

Questions on the impacts on family garden and crops activities (from 1 to 11) address agricultural land ownership, land area, utilised area (corresponding only to temporary[29], permanent crops[30] and kitchen gardens[31] planted in the past 12 months), harvested area, the reason why the harvested area has been less than the planted area, percentage of harvest lost, the economic value of crop, machinery, equipment and infrastructure losses.

Questions on livestock activities (from 12–17) refer to the impacts suffered by the animals under the responsibility of the household on their land in the past 12 months. The respondent would report the number of all animals regardless of ownership, including those that are boarded (animals in pension), owned by another member of the household, custom-fed or fed under contract. Additionally, the respondent is asked to include the selling or purchase price for any animal per head by type, the number of animals lost or died, the reasons for these losses and the economic value of any machinery, equipment and infrastructure losses.

Questions on impacts on aquaculture (from 18–24) investigate the type and quantities harvested of aquaculture products[32] cultivated and harvested by the household members in the past 12 months, harvest losses, the reason for those losses, the average purchase price per unit of product and machinery, equipment and infrastructure losses.

Finally, questions on forestry impacts (from 25–31) register the type of forest products collected by household members in the past 12 months, followed by the amount of forest products and units, market prices, changes observed by the household members in the availability of forest products and reasons affecting the availability of these products. The economic value of equipment, machinery and infrastructure losses is also investigated.

### 5.2.5.8  Impacts on Fisheries

The impacts of natural disasters and climate change on fisheries activities are analysed in a dedicated section due to the importance and value of reefs, lagoons and open ocean resources to PICTs communities. The analysis derived from this section will help local governments understand the relationship between households whose livelihood is dependent on fisheries, and climate-induced hazard events, as well as potential management measures for reducing negative impacts and expanding the effects of adaptation measures on the communities.

The Fisheries Section design followed the approach of the Manual for the Collection of a Minimum Dataset of Socioeconomic Fisheries Surveys in Pacific Islands (Kronen, et al., 2007). The proposed questions (from 1 to 11) address aspects related to particular habitats where household members fish, frequency and duration (hours, weeks and months of the year) fishers go out to specific habitats, vessels and fishing gear per

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*29  Temporary crops: includes all areas of the household land used for crops with a growing cycle that lasts less than one year. Following national classification practices, this may include some crops that remain in the fields after harvest for more than one year, such as strawberries, pineapples, bananas and cassava. It excludes temporary grassland. The area refers to the physical area of land, regardless of the number of harvests on the same land during the reference period. This category is broken down in the survey into two subcategories: a) temporary crops under greenhouses or high shelters (permanent installations that can be entered); and b) temporary crops outdoors or under low shelters (non-permanent installations covering only the crop) (FAO, 2017b).*

*30  Permanent crops: Ligneous crops, meaning trees or shrubs, with a growing cycle longer than one year, not grown in rotation, occupying the soil and yielding harvests for several (usually more than five) consecutive years. Includes land under trees and shrubs producing flowers (rose, jasmine, etc.), and nurseries of fruit trees. It excludes nurseries for forest trees and permanent grassland. The area refers to the physical area of land, regardless of the number of harvests on the same land during the reference period. In the survey, this category is broken down into two subcategories: a) permanent crops under greenhouses or high shelters (permanent installations that can be entered); and b) permanent crops outdoors or under low shelters (non-permanent installations covering only the crop) (FAO, 2017).*

*31  Kitchen gardens: refer to the area devoted to cultivating agricultural products intended exclusively for own consumption by the holder or manager and his family. Crops in kitchen gardens will not be detailed on a crop-by-crop basis (FAO, 2017b).*

*32  Fish species, crustaceans, clams/molluscs, seaweed, corals, etc.*

household and ownership, catch composition (weights in kg of fish, crustaceans, clams, molluscs, etc.) in the past 30 days, main reasons for changes in catch level compared to the same period of the last year, the economic value of losses in the fish catch and average selling prices per unit of catch composition.

### 5.2.5.9 Adaptation to Climate Change

The last Section of the Sourcebook addresses the measures households adopt to prevent, mitigate and recover from the impacts of climate change.

It is divided into three sections, as follows:

a) **Prevention, mitigation, and coping strategies adopted at the household level**: Includes two questions capturing the measures households adopt to reduce damage before and during natural disasters and actions to recover afterwards.

b) **Adaptation measures adopted at the household level**: question 3 investigates the type of retreat alternatives adopted by households to respond to threats of natural disasters and climate change. Questions 4 and 5 present defensive and co-existing options for households to respond to impacts of multiple threats, flooding on housing, productive activities and availability of fresh water. Question 6 asks the household's opinion on the measures' effectiveness.

c) **Institutional support**: Investigates whether the household has received support in the implementation of adaptive measures, the type of support received, organisations supporting families, and whether this support was enough. In addition, this section includes two questions on the primary respondent´s participation in climate change-related committees or groups and the household members' personal challenges that limit them from acting against climate change.

### 5.2.6 Key Indicators Derived from the Sourcebook

The list included in table 7 below details the main indicators that can be estimated based on the information collected through the different Sections of the Sourcebook survey instrument.

*Table 10. Mapping of indicators derived from the Sourcebook and their correspondence to global frameworks' indicators*

| INDICATOR CATEGORY | Correspondence to the SDGs, Global Set, FDES and Sendai Framework indicators |
|---|---|
| Socio-demographic | |
| Distribution of household members by sex and age. | - |
| Percentage of female headed households. | - |
| Average age of female headed household. | - |
| Average household size. | - |
| Percentage of households' dependent on primary activities (family farming, crops, fishing, etc.). | GS#86 Population relying on subsistence and pastoral farming. |
| Percentage of households' dependent on non-primary activities (tourism, trade, etc.). | - |
| Percentage of households with access to a mobile telephone. | SDG 5.b.1 |
| **Housing Conditions** | |
| Distribution of household by ownership status of the dwelling. | - |
| Percentage of dwellings vulnerable to natural disasters. | GS #91 Infrastructure vulnerable to climate change<br>GS #92 Buildings (settlements) vulnerable to climate change. |
| Percentage of households connected to the electricity grid. | FGS #95 Proportion of population with access to electricity.<br>SDG 7.1.1 |
| Percentage of households connected to the internet. | SDG 17.8.1 |
| Percentage of households having pipe borne water. | FGS #98 Proportion of population using safely managed drinking water services.<br>SDG 6.1.1 |
| Average number of days per month without sufficient water to cover the household's needs. | FGS #98 Proportion of population using safely managed drinking water services.<br>SDG 6.1.1 |

| INDICATOR CATEGORY | Correspondence to the SDGs, Global Set, FDES and Sendai Framework indicators |
|---|---|
| **Perception of climate change** | |
| Distribution of households according to the main perceived characteristic of climate change. | - |
| Distribution of households according to the leading perceived causes of climate change. | - |
| Distribution of households according to the perceived threat on welfare from climate change. | - |
| Distribution of households according to the perceived feelings caused by climate change. | - |
| Distribution of households by sources of climate change information. | FGS #138 Proportion of population with access to climate information. |
| Distribution of households according to their perceptions of government climate change communication. | - |
| **Impact of natural disasters on Households** | |
| Distribution of households according to the type of natural disaster that last affected them. | FGS #39 Frequency of hazardous events and disasters. |
| Percentage of households with dwellings damaged by natural disaster category. | FGS #41 Direct economic loss in the housing sector attributed to disasters. <br> SDG 1.5.2; SDG 11.5.2 <br> FDES 4.1.2.b Economic losses due to natural extreme events and disasters. <br> Sendai C-4: Direct economic loss in the housing sector attributed to disasters. |
| Percentage of households with productive assets damaged by natural disaster category. | FGS #40 Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. <br> SDG 1.5.2; SDG 11.5.2 <br> Sendai C-3: Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. |
| Number of fatalities by natural disaster category. | FGS #42 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population. <br> SDG 1.5.1; SDG 11.5.1; SDG 13.1.1 <br> FDES 4.1.2.a People affected by natural extreme events and disasters. <br> Sendai A-1 (Compound): Number of deaths and missing persons attributed to disasters per 100,000 population. |
| Number of persons sick or injured by natural disaster category. | FGS #44 Incidence of cases of climate-related diseases. |
| Economic value of damages on dwellings by natural disaster category. | FGS #41 Direct economic loss in the housing sector attributed to disasters. <br> SDG 1.5.2; SDG 11.5.2 <br> FDES 4.1.2.b Economic losses due to natural extreme events and disasters. <br> Sendai C-4: Direct economic loss in the housing sector attributed to disasters. |
| Economic value of damages on productive assets by natural disaster category. | FGS #40 Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. <br> SDG 1.5.2; SDG 11.5.2 <br> Sendai C-3: Direct economic loss to all other damaged or destroyed productive assets attributed to disasters. |
| Number of missed working days per household due to natural disasters. | Sendai B-5: Number of people whose livelihoods were disrupted or destroyed, attributed to disasters. |
| Number of missed school days per child due to natural disasters. | - |
| Percentage of households that suffered from essential services disruption due to natural disasters. | FGS #77 Impacts of climate change on transport. <br> Sendai D-1 (compound): Damage to critical infrastructure attributed to disasters. |

| INDICATOR CATEGORY | Correspondence to the SDGs, Global Set, FDES and Sendai Framework indicators |
|---|---|
| Distribution of households according to the type of essential service disrupted due to natural disasters. | FGS #77 Impacts of climate change on transport. Sendai D-1 (compound): Damage to critical infrastructure attributed to disasters. |
| Number of persons forced to leave their locality because of the natural disaster. | FGS #43 Number of climate refugees, climate migrants and persons displaced by climate change. Sendai B-1: (Compound) Number of directly affected people attributed to disasters, per 100,000 population. |
| Distribution of household members according to the duration of their absence from their locality due to natural disasters. | - |
| Distribution of household members according to their destination. | - |
| **Impact of SOE on Households** | |
| Distribution of households affected by SOE, by type of SOE. | - |
| Distribution of the households by type of economic impact of SOEs. | - |
| Distribution of the households by type of health impact due to SOE. | - |
| Average number of persons per household forced to leave their locality because of SOE. | - |
| Percentage of households declaring that SOE have affected their participation in social, cultural and communitarian activities. | - |
| Distribution of households according to the social, cultural and communitarian activity impacted by SOE. | - |
| **Adaptation to climate change** | |
| Percentage of households taking preparatory actions to prevent natural disaster (total; by sex of household head). | - |
| Distribution of households taking preparatory actions according to the type of actions. | - |
| Percentage of households that took actions to recover from natural disasters. | - |
| Percentage of households that took actions to recover from natural disaster, by sex of household head. | - |
| Percentage of households that implemented retreat defend and co-exist climate change adaptation measures. | - |
| Percentage of households that implemented retreat, defend, and co-exist climate change adaptation measures, by sex of household head | .- |
| Distribution of households according to the type of retreat, defend and co-exist climate change adaptation measures. | - |
| Percentage of households that received external support on climate change adaptation (total and by sex of household head). | - |
| Distribution of households according to the type of organisation or agency that provided support on climate change adaptation. | - |
| Distribution of households according to the type of support received on climate change adaptation. | - |
| Percentage of households declaring that the support received helped them to adapt to climate change. | - |

# 6. CONSTRUCTING AND DISSEMINATING CLIMATE CHANGE INDICATORS

## 6.1. Estimation Methods

Once the data has been collected using the survey tools and adequately cleaned and validated, the target indicators must be estimated using a method that properly reflects the sampling strategy.

The overall approach draws average estimates from individual household data (microdata) using the appropriate sampling weights. In its most simple expression, average indicators will consist of averages of individual indicators weighted by the sampling weights, which correspond to the inverse of the probability of selection. This process allows us to "extrapolate" survey data to the whole population.[33]

In addition to averages or point estimates, it is also good practice to present confidence intervals, i.e., ranges of values within which the true value should belong to with a certain likelihood (e.g., 90% or 95%). These confidence intervals are based on the calculation of variances and standard deviations of the estimates and are therefore dependent on the sampling design. It is not the purpose of this sourcebook to discuss in detail estimation procedures, but just to lay down the basic steps and logic of the process. We invite the interested reader to refer to the many books on the topic, such as Thompson (2012) and the Sampling Guidelines for the Pacific prepared by SPC under the PACSTAT project.

## 6.2. Data Presentation

Household data can be presented by: household size and composition; household location (region, province, urban/rural, depending on the sampling strategy adopted, or by ecological regions); gender of the head of the household; etc. The tables below provide a few examples.

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33  For additional information on sampling strategy, weights, etc., see the Sampling Guidelines for the Pacific.

- Household Roster:

*Table 11. Distribution of Household by Level of Education of Respondent*

| Analytical domain | Level of education of respondent (%) | | | |
|---|---|---|---|---|
| | **Primary** | **Secondary** | **Bachelor** | **Master** |
| Sex | | | | |
| Age | | | | |
| Region/Province/Village | | | | |

*Table 12. Distribution of Household Head by Occupation*

| Analytical domain | Occupation of the household head (%) | | | |
|---|---|---|---|---|
| | **Agriculture** | **Government** | **Tourism** | **No Work** |
| Urban/Rural | | | | |
| Region/Province/Village | | | | |
| Ecological Region | | | | |

- Housing Conditions:

*Table 13. Distance of the dwelling to nearest road or port*

| Analytical domain | Distance to the main paved Road | Distance to the main port |
|---|---|---|
| Urban/Rural | | |
| Region/Province/Village | | |
| Ecological Region | | |

*Table 14. Percentage of Dwellings vulnerable to Natural Disasters.*

| Analytical domain | Type of construction of the dwelling | | | | | |
|---|---|---|---|---|---|---|
| | Dwellings with natural walls | Dwellings with rudimentary walls | Dwellings with finisher walls | Dwellings with natural roofing | Dwellings with rudimentary roofing | Dwellings with finished roofing |
| Urban/Rural | | | | | | |
| Region/Province/Village | | | | | | |
| Ecological Region | | | | | | |

- Climate Change Perceptions:

*Table 15. Distribution of Households by Sources of Climate Information*

| Analytical domain | Source of Information About Climate Change (%) | | | | | |
|---|---|---|---|---|---|---|
| | Radio | Television | Internet/social media | Newspaper/Journals / magazines | Church | Meteorological service |
| Urban/Rural | | | | | | |
| Region/Province/Village | | | | | | |
| Ecological Region | | | | | | |

- Impacts of Natural Disasters

*Table 16. Households impacted by natural disasters in the Past 12 Months , by area and region*

| Analytical domain | Households impacted by natural disasters (%) | | | | | |
|---|---|---|---|---|---|---|
| | Flood | Drought | Storm | Land Slide | Extreme temperature | Wildfire |
| Urban/Rural | | | | | | |
| Region/Province/Village | | | | | | |
| Ecological Region | | | | | | |

*Table 17. Households Affected by Climate-Induced Disasters in the Last 12 Months*

| Natural Hazard | Number of households impacted by natural disasters | | | |
|---|---|---|---|---|
| | Affected | Not affected | No disaster | Total |
| Flood | | | | |
| Drought | | | | |
| Storm | | | | |
| Landslide | | | | |
| Extreme temperature | | | | |
| Wildfire | | | | |
| Etc. | | | | |

- Impacts of SOE events

*Table 18. Households Facing Food Availability Problems in the Last 12 Months Due to SOE*

| SOE | Households (%) | |
|---|---|---|
| | Yes | No |
| Increasing temperatures | | |
| Ocean acidification | | |
| Salinisation | | |
| Land and forest degradation | | |
| Loss of biodiversity | | |
| Desertification | | |

▪   Impacts of Climate Change on Agriculture

*Table 19. Climate Change Economic Impacts on Agriculture*

| Natural Hazard | Economic impact (US$) | | | | |
|---|---|---|---|---|---|
| | Crops | Livestock | Aquaculture | Forestry | Fisheries |
| Flood | | | | | |
| Drought | | | | | |
| Storm | | | | | |
| Landslide | | | | | |
| Extreme temperature | | | | | |
| Wildfire | | | | | |

▪   Climate Change Adaptation

*Table 20. Adaption Measures Adopted in the Last 12 Months*

| Adaptation measures | Households (%) | | |
|---|---|---|---|
| | Yes | No | Total |
| Retreat | | | |
| Defend | | | |
| Co-exists | | | |

## 6.3.   Data Dissemination and Access

Statistics on the socio-economic impacts of climate change are still in an early stage of development, particularly in low and middle-income countries. The concerns about climate-induced impacts on households and communities, however, are expanding the demand for information.

In the PICTs, many government agencies have statistical information on climate change topics. Numerous publication formats have been developed across countries for disseminating these statistics, depending on national policies and targets, international commitments, and participation in regional initiatives or information systems.

It is recommended that the National Statistics Offices of the PICTs determine the strategy, form and means of disseminating the Natural Disasters and Climate Change survey results from the design phase of the investigation. This strategy must be reflected in the methodological documentation of the survey, including activities related to developing a national database and information system on the socio-economic impacts of climatic-

induced hazards. Ideally, NSOs should consider the development of a web-based climate change and natural disaster platform for data sharing among national and international stakeholders.[34]

Another relevant aspect in disseminating information is documentation. Household surveys are generally documented using international metadata standards such as the Statistical Data and Metadata Exchange (SDMX)[35] and the Data Documentation Initiative (DDI)[36]. These standards enable the consistent archiving of data and metadata on standard platforms, significantly facilitating access to information for external users and advancing a broader picture of Natural Disasters and Climate Change impacts across PICTs.

The microdata derived from the survey should be available to all users subject to confidentiality and legal requirements. The raw data sets are helpful for researchers and analysts to carry out further analyses, increasing the usability of the collected information and its use for policy analysis and decision-making.

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34   *Additional information on data dissemination can be found in the SPC Guidance Note on Microdata dissemination, available at:* https://sdd.spc.int/methodology-knowledge-base.

35  *See:* https://sdmx.org

36  *See:* https://ddialliance.org/

## 6.4. Use of Geo-referenced Data for Socio-economic Analyses

Combining geo-referenced data with household survey data is ideal for enriched socio-economic analyses. It is therefore recommended to take advantage of large geo-referenced data sets and software tools to gather specific variables (such as: households located in areas prone to landslides, floodplain areas, coastal flood areas, etc.) from monitoring systems rather than through field measurements. As long as the households are geo-referenced, the matching data from these large data sets can be found and used.

If NSOs keep a household register including geo-referenced information of the dwellings, variables from GIS data sets can be added to that household register and support the verification of survey data. In this case, survey samples could be pulled based on, for example, location, if the survey focuses on assessing dwellings' exposure.

If there are no household registers or the dwellings are not geo-referenced before the survey, then including geo-referencing as part of the survey protocol will allow the matching of new variables into the survey data sets. These new geo-referenced data could be used to validate responses from the household survey; for example, responses to the ecosystems nearby the households/villages could be verified from ground cover information, if the resolution of the satellite pictures is good enough.

The more significant potential of Earth Observation Systems (EOS) data is realised in the analysis. Adding EOS information to the household survey data can open new insights. For example, spotting potential areas at higher risk for coastal erosion and combining it with data on the distance of the dwellings to the coast[37], their elevation and the construction materials of the dwelling can derive in comprehensive climate change exposure analysis. Distance of dwellings to the coast and altitude can be obtained from satellite photo analyses, and construction materials of the dwelling can be obtained from the household level survey. Precipitation data can also be included in this analysis, depending on the number of monitoring stations in the study area.

EOS and geospatial datasets are growing at an unprecedented rate in size, variety and complexity, creating new opportunities for accurate and timely monitoring as well as generating new challenges in accessing, archiving, processing and analysing such wealth of data (Karmas & Tzotsos, 2015). The Sourcebook methodology recommends using geospatial and biophysical datasets as fundamental and necessary information source to integrate into field surveys and national statistics.

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37   *See for example:* https://sdd.spc.int/mapping-coastal



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# 7.  FINAL CONSIDERATIONS

The urgency with which SIDS need to adapt to climate change led SPC-SDD and the PACSTAT project to undertake this research into the data gaps in climate change statistics. The aim is to support countries in shaping policy, driving action and shifting the focus to more resilient, proactive, adaptive, innovative and transformative approaches. The Natural Disasters and Climate Change Survey Module (Core Module and Sourcebook) and guidebooks were developed in response.

The main objective of developing the Core Module and Sourcebook is to encourage the production and use of socio-economic information on the household impacts of natural disasters and climate change in the PICTs. SPC encourages PICTs to implement the Natural Disasters and Climate Change Survey Module and integrate the results into decision-making and resource allocation.

Implementing a single survey will not fill the data gaps on the impact of climate change in the PICTs. Building informed climate resilience requires the development of climate change information systems, where climate change data is central to producing transformative and resilient climate actions.

The 2030 Agenda, the Sendai Framework and the Global Set of Climate Change Statistics and Indicators are critical to build on and articulate climate change data systems in the SIDS. These agendas present an opportunity to solve structural problems and consolidate climate change data ecosystems.

The development of climate change data systems imposes challenges and actions on NSOs and line ministries. Improving inter-institutional coordination mechanisms and incorporating non-traditional data sources (such as EOS data and meteorological information) are important recommendations derived from the Sourcebook design.

The Natural Disaster and Climate Change Survey Module is an activator for the climate change data system setup that can help PICTs mobilise resources to start and regularise data production. However, the Core Module and Sourcebook versions are a starting point. They must be field tested,[38] and results derived from the tests need to be incorporated in the corresponding guidelines for their refinement and for these tools to fit appropriately to the information needs of countries. These steps will be undertaken in phase 2 of the project. The present document represents the final product of phase 1.

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38  *A field test is currently underway in Kiribati, where the core module has been incorporated into the HIES questionnaire. The CAPI version of the module used in Kiribati is displayed in Annex 3.*

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# ANNEX 1. THE CORE MODULE (PAPI VERSION)

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATURAL DISASTER | | In the last 12 months, was your household impacted by the following natural disasters?  YES ......1  NO........2 | Have these natural disasters damaged, destroyed or impacted your household's:  Dwelling ................ 1  Agricultural/ Livestock/ Fishery assets.................... 2  Other productive assets (specifiy) ..... 3  Health.................... 4  Acces to work facilities ................ 5  Access to school ..... 6  Access to basic services (water, electricity, internet). 7  Other (specifiy) ...... 8 | "(If Q2 = 1) What is the estimated value of the damages inflicted on your dwelling?" | (If Q2 = 2) What is the estimated value of the damages inflicted on your agricultural, livestock or fishery assets? | (If Q2 = 3) What is the estimated economic value of the damages or destruction inflicted on your other productive assets? | (If Q2 = 4) How many people in your household were injured, missing or died as a consequence of these natural disasters? | (If Q2 = 4) How many people in your household got sick as a consequence of these natural disasters? | (If Q2 = 5) How many work days did you and your household members lose, as a consequence of these natural disasters? | (If Q2 = 6) How many days of school did your children lose, in total, as a consequence of these natural disasters? | (If Q2 = 7) Which basic services were disrupted as a consequence of these natural disasters?  Electricity .............. 1  Water/Sanitation ... 2  Internet, TV, Mobile Phone connection .. 3  Transport .............. 4 | (If Q2=8): What is the estimated damage inflicted to your [name of asset/ service]?  [for example: private vehicles; access to health facilities; etc.] | (If Q11>0) What is the unit of measurement?  [AUD, days, etc.] | How many of your household members were forced to relocate elsewhere as a consequence of these natural disasters, either temporarily or permanently? |
| | | CODE | CODE | ($) | ($) | ($) | No. of persons | No. of persons | No. of days | No. of days | CODE | | | No. of persons |
| 1 | Flood | | | | | | | | | | | | | |
| 2 | Drought | | | | | | | | | | | | | |
| 3 | Storm | | | | | | | | | | | | | |
| 4 | Landslide | | | | | | | | | | | | | |
| 5 | Extreme temperature | | | | | | | | | | | | | |
| 6 | Wildfire | | | | | | | | | | | | | |
| 7 | Tropical cyclone | | | | | | | | | | | | | |
| 8 | Tsunami | | | | | | | | | | | | | |
| 9 | Other, specify | | | | | | | | | | | | | |
| 10 | NONE | | | | | | | | | | | | | |

# ANNEX 2. THE CORE MODULE – CAPI VERSION (KIRIBATI EXAMPLE)

**6. HOUSEHOLD DETAILS**
**[27] NATURAL DISASTER & CLIMATE CHANGE IMPACTS - SUPPLEMENTARY**
: odd_even==1

| ND01. In the last 12 months, was your household impacted by the following natural disasters? | MULTI-SELECT: YES/NO           natura_diaster |
|---|---|
| | 01   □/□ Flood |
| | 02   □/□ Drought |
| | 03   □/□ Storm |
| | 04   □/□ Landslide |
| | 05   □/□ Extreme temperature |
| | 06   □/□ Tsunami |
| | 07   □/□ Volacano eruption |
| | 08   □/□ Others (specify) |
| | 09   □/□ NONE |

| ND01n. What was the other natural disaster? | TEXT        other_disaster |
|---|---|
| E natura_diaster.Yes.Contains(8) | _____ |

**6. HOUSEHOLD DETAILS / [27] NATURAL DISASTER & CLIMATE CHANGE IMPACTS - SUPPLEMENTARY**
**Roster: %ROSTERTITLE%**
generated by multi-select question natura_diaster       n_disaster_roster

| ND02. Did this %rostertitle% damage, destroy or impact your household's: | MULTI-SELECT: YES/NO       damage_hhld |
|---|---|
| | 01   □/□ Dwelling |
| | 02   □/□ Agricultural assets |
| | 03   □/□ Livestock assets |
| | 04   □/□ Fishery assets |
| | 05   □/□ Handicrafts |
| | 06   □/□ Other productive assets |
| | 07   □/□ Health |
| | 08   □/□ Access to work facilities |
| | 09   □/□ Access to school |
| | 10   □/□ Access to basic services( water, electricity, internet, etc..) |
| | 11   □/□ Other (specify) |

| ND02n1. What was the other productive assets? | TEXT        other_assets |
|---|---|
| E natura_diaster.Yes.Contains(6) | _____ |

| ND02n2. Specify other household's asset damaged. | TEXT        other_damaged |
|---|---|
| E natura_diaster.Yes.Contains(11) | _____ |

| ND02a. What is the estimated value (in AUD) of the damages inflicted to your household's dwelling? | NUMERIC: INTEGER      dwelling_estimate |
|---|---|
| E damage_hhld.Yes.Contains(1) | _____, |

| ND02b. What is the estimated value (in AUD) of the damages inflicted to your household's Agricultural assets, in AUD? | NUMERIC: INTEGER      agricultural_estimate |
|---|---|
| E damage_hhld.Yes.Contains(2) | _____, |

| ND02c. What is the estimated value (in AUD) of the damages inflicted to your household's Livestock assets, in dollars? | NUMERIC: INTEGER      livestock_estimate |
|---|---|
| E damage_hhld.Yes.Contains(3) | _____, |

| ND02d. What is the estimated value (in AUD) of the damages inflicted to your household's fishery assets, in dollars? | NUMERIC: INTEGER      fishery_estimate |
|---|---|
| E damage_hhld.Yes.Contains(4) | _____, |

| | | |
|---|---|---|
| **ND02e.** What is the estimated value (in AUD) of the damages inflicted to your household's han dicrafts assets, in dollars?<br><br>E  damage_hhld.Yes.Contains(5) | NUMERIC: INTEGER<br><br>_____ | handicrafts_estimate |
| **ND02f.** What is the estimated value (in AUD) of the damages inflicted to your household's "oth er productive assets", in dollars?<br><br>E  damage_hhld.Yes.Contains(6) | NUMERIC: INTEGER<br><br>_____ | oth_productive_estimate |
| **ND02g.** How many people were injured, missin g or died in your household as a consequence of this %rostertitle%?<br><br>E  damage_hhld.Yes.Contains(7) | NUMERIC: INTEGER<br><br>_____ | ppl_injured |
| **ND02h.** How many people got sick in your hous ehold as a consequence of this %rostertitle%?<br><br>E  damage_hhld.Yes.Contains(7) | NUMERIC: INTEGER<br><br>_____ | ppl_sick |
| **ND02i.** How many work days did you and your household members lose, in total, as a conseq uence of this %rostertitle%?<br><br>I  Report the sum of all working days lose by all members. [example,one member lost 2 days and another member 3 days, the number to be re ported is 5]<br>E  damage_hhld.Yes.Contains(8) | NUMERIC: INTEGER<br><br>_____ | days_lose |
| **ND02j.** How many days of school did your child ren lose, in total, as a consequence of this %ros tertitle%?<br><br>I  Report the sum of all days lose by all members. [example,one member lost 2 days and another member 3 days, the number to be reported is 5]<br>E  damage_hhld.Yes.Contains(9) | NUMERIC: INTEGER<br><br>_____ | days_absent |
| **ND02k.** Which basic services were disrupted as a consequence of this %rostertitle%?<br><br>E  damage_hhld.Yes.Contains(10) | MULTI-SELECT: YES/NO<br>01    ☐/☐ Electricity<br>02    ☐/☐ Water<br>03    ☐/☐ Sanitation<br>04    ☐/☐ Transport<br>05    ☐/☐ Internet,TV, mobile ph one connection<br>06    ☐/☐ Garbage collection<br>07    ☐/☐ Other, specify | service_dirupted |
| **ND02l.** What is the estimated damage inflicted to your %other_damaged%?<br><br>E  damage_hhld.Yes.Contains(11) | NUMERIC: INTEGER<br><br>_____ | other_estimate |
| **ND02m.** What is the unit of measurement?<br><br>E  damage_hhld.Yes.Contains(11) | TEXT<br><br>_____ | unit_other |
| **ND02n.** How many of your household member s were forced to relocate elsewhere as a conse quence of this %rostertitle%, either temporaril y or permanently? | NUMERIC: INTEGER<br><br>_____ | num_relocate |

# ANNEX 3. THE SOURCEBOOK

## Household roster

| ID CODE | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|---|---|
| | NAME<br><br>*Make a complete list of all individuals who normally live and eat their meals together in this household, starting with the head of household (if the respondent is not the head of household).*<br><br>*(CONFIRM THAT HOUSEHOLD HEAD HERE IS SAME AS HOUSEHOLD HEAD LISTED ON COVER).* | What is the sex of [NAME]?<br><br>Male.....1<br>Female..2 | How old is [NAME]?<br><br>*If 5 years and over, give years only. If less than 5 years in age, give years and months.* | "What is [NAME]'s relationship to the head of household?<br><br>Head ........................ 1<br>Wife/Husband ..................... 2<br>Child/Adopted child.... .... ..... 3<br>Grandchild ......................... 4<br>Niece/Nephew..................... 5<br>Father/Mother ..................... 6<br>Sister/Brother ..................... 7<br>Son/Daughter-in-law ........... 8<br>Brother/ Sister-in-law .......... 9<br>Grandfather/Mother............ 10<br>Father/Mother-in-law ......... 11<br>Other relative ..................... 12<br>Servant or servant's relative . 13<br>Lodger/Lodger's relative...... 14<br>Other non-relative............... 15<br>Other (specify) ................... 16 | What is [NAME]'s present marital status?<br><br>Monogamous married or non-formal union ...................... 1<br>Polygamous married or non-formal union ...................... 2<br>Seperated............................ 3<br>Divorced ............................ 4<br>Widow or widower.......... ..... 5<br>Never maried....................... 6 | *(In the case of women)* Is [NAME] pregnant?<br><br>Yes.....1<br>No .....2 | What is the highest educational level [NAME] has completed?<br><br>Nursery/Pre-school.1<br>Primary ................. 2<br>Secondary ............. 3<br>Tertiary ................. 4<br>None of the above.. 5<br>Other (specify) ........ 6 | Which of the following activities did you perform in the last 12 months as a source of livelihood? *(This question would be used as a filter for displaying the Agriculture and Fishery Module)*<br><br>Family garden................ 1<br>Crops ............................ 2<br>Livestock ...................... 3<br>Aquaculture................... 4<br>Fishing/Seafood collection ..................... 5<br>Forestry........................ 6<br>Tourism........................ 7<br>Government employment.................. 8<br>Handicrafts.............. .....9<br>Other (specify) ............ 10 | Does [NAME] have difficultiy(ies):<br>*(Select all that apply)*<br><br>Seeing ................. 1<br>Hearing ................. 2<br>Walking ................ 3<br>Remembering ........ 4<br>Concentrating........ 5<br>Self-caring ............ 6<br>Communicating ..... 7<br>None..................... 8<br>Other (specify) ....... 9 | Does this household member have access to the Internet through a mobile phone?<br><br>Yes.....1<br>No .....2 |
| | | CODE | YEARS/MONTHS | CODE | CODE | CODE | EDUCATIONAL LEVEL | CODE | DISABILITY CODE | CODE |
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |

# CAPI version as prepared for the 2023 Cook Islands Climate Change and Labour Force Survey (Climate Change section)

Note that the Cook Islands used a recall period of 5 years. The Sourcebook suggests a recall period of 12 months.

---

### CLIMATE CHANGE

E  hh_available == 1

---

STATIC TEXT

*"Please share information on climate change perception and household impact to help the Climate Change Cook Islands Division identify key areas for community support and prepare for extreme weather"*

---

CLIMATE CHANGE
### SECTION 1. CLIMATE CHANGE PERCEPTION

**1. In your own opinion, what do you think best defines climate change?**

I  Select all that apply
V1  !(self.ContainsAny(1,2,3,4,5,6,7,8,10) && self.Contains(9)) || self.ContainsOnly(9)
M1  You cannot select "I do not know" with other answer options.

MULTI-SELECT    climate_change
- 01 ☐ Rise in terrestrial temperatures
- 02 ☐ Rise in sea temperatures
- 03 ☐ Increase in the number of extreme events
- 04 ☐ Growth in the intensity of extreme events
- 05 ☐ Increase in sea level
- 06 ☐ Changing of season
- 07 ☐ Melting of glaciers
- 08 ☐ Melting of polar ice
- 09 ☐ I do not know
- 10 ☐ Other (specify)

---

**1a. Specify other understanding of climate change**

E  climate_change.Contains(10)

TEXT    other_climate_change
......................................................

---

**2. In your own opinion, what do you think are the leading causes of climate change?**

I  Select all that apply
V1  !(self.ContainsAny(1,2,3,4,6) && self.Contains(5)) || self.ContainsOnly(5)
M1  You cannot select "I do not know" and any other option

MULTI-SELECT    leading_causes
- 01 ☐ Use of fossil fuels (used for transport, industries, etc)
- 02 ☐ Deforestation
- 03 ☐ Cattle raising
- 04 ☐ Non-human causes (natural climate variability)
- 05 ☐ I do not know
- 06 ☐ Other (specify)

---

**2a. Specify other leading causes of climate change**

E  leading_causes.Contains(6)

TEXT    other_leading_causes
......................................................

---

**3. Do you feel concerned about climate change and its impacts?**

SINGLE-SELECT    concerned
- 01 ○ Yes
- 02 ○ No
- 03 ○ I don't know

---

**4. Which of these areas do you use for your livelihood (for food, medicine, earn income)?**

I  Select all that apply
V1  !(self.ContainsAny(1,2,3,4,5,6,7,8,9,12) && self.Contains(10)) || self.ContainsOnly(10)
M1  Cannot select "None of the above" with other answer options.
V2  !(self.ContainsAny(1,2,3,4,5,6,7,8,9,12) && self.Contains(11)) || self.ContainsOnly(11)
M2  Cannot select "I do not know" with other answer options.
V3  !(self.Contains(10) && self.Contains(11))
M3  Cannot select these two options together.

MULTI-SELECT    ecosystem_livelihood
- 01 ☐ Forest lands
- 02 ☐ Flat/Grass lands
- 03 ☐ Wetlands/Swamps
- 04 ☐ Coastal reefs
- 05 ☐ Outer reefs
- 06 ☐ Open ocean
- 07 ☐ Lagoons
- 08 ☐ Streams
- 09 ☐ Agricultural lands
- 10 ☐ None of the above
- 11 ☐ I do not know
- 12 ☐ Other (specify)

---

**4a. Specify other climate change threatining ecosystems.**

E  ecosystem_livelihood.Contains(12)

TEXT    other_threat_ecosystem
......................................................

---

**4b. Are these areas threatened by Climate Change?**

I  Read out each answer option and select Yes or No.
F  ecosystem_livelihood.Contains(@optioncode)
E  ecosystem_livelihood.ContainsAny(1,2,3,4,5,6,7,8,9,12)

MULTI-SELECT: YES/NO    ecosystem_threatened
- 01 ☐/☐ Forest lands
- 02 ☐/☐ Flat/Grass lands
- 03 ☐/☐ Wetlands/Swamps
- 04 ☐/☐ Coastal reefs
- 05 ☐/☐ Outer reefs
- 06 ☐/☐ Open ocean
- 07 ☐/☐ Lagoons
- 08 ☐/☐ Streams
- 09 ☐/☐ Agricultural lands
- 10 ☐/☐ Others

| | |
|---|---|
| 5. Do you think climate change threatens or will threaten your household's future welfare? | SINGLE-SELECT      future_welfare<br><br>01 ○ Yes, strongly<br>02 ○ Yes, somewhat<br>03 ○ No, not very much<br>04 ○ No, not at all<br>05 ○ I do not know |

| | |
|---|---|
| 6. What do you feel when hearing or learning about future climate change impacts?<br><br>I   Select all that apply | MULTI-SELECT      future_impact<br><br>01 ☐ Fear<br>02 ☐ Helplessness<br>03 ☐ Sadness<br>04 ☐ Guilt<br>05 ☐ Anger<br>06 ☐ Worry/Anxiety<br>07 ☐ Apathy / Not concerned<br>08 ☐ Impotence<br>09 ☐ Distrust<br>10 ☐ Willingness to cooperate in adaptation/mitigation actions<br>11 ☐ Other (specify) |
| 6a. Specify other feelings about future climate change impacts.<br><br>E   future_impact.Contains(11) | TEXT      other_climate_change_impacts<br><br>................................................................ |
| 7. What is your primary source of information about climate change? | SINGLE-SELECT      primary_source_info<br><br>01 ○ Radio<br>02 ○ Television<br>03 ○ Internet/Social media<br>04 ○ Church<br>05 ○ School/university/research center<br>06 ○ Family/members/neighbors/friends<br>07 ○ Community workshops / Climate change consultations<br>08 ○ Meteorological services<br>09 ○ Phone (text or call)<br>10 ○ App<br>11 ○ None<br>12 ○ Other (specify) |
| 7a. Other primary source of climate change information<br><br>E   primary_source_info == 12 | TEXT      other_primary_source<br><br>................................................................ |

| | |
|---|---|
| 8. What do you think of your Island/National government's actions to counter the impact of climate change...?<br><br>I   Read out the first two answers ONLY | SINGLE-SELECT      gov_role<br><br>01 ○ Good and sufficient to address the impacts on people and localities<br>02 ○ Not enough to address the impacts on people and localities<br>03 ○ I don't know |
| 9. What do you think of your government's communication with the public on climate change? | SINGLE-SELECT      gov_communication<br><br>01 ○ It generates positive incentives to act in response to climate change<br>02 ○ It does not incentivize people to act in response to climate change<br>03 ○ My government does not communicate enough about climate change<br>04 ○ I do not know<br>05 ○ Other (specify) |
| 9a. Specify other opinions on government's communications<br><br>E   gov_communication == 5 | TEXT      other_gov_comm<br><br>................................................................ |

CLIMATE CHANGE
SECTION 2. IMPACT OF NATURAL DISASTERS AND CLIMATE-INDUCED EVENTS AT HOUSEHOLD-LEVEL

STATIC TEXT

*SEC 2.1. IMPACT OF NATURAL DISASTERS ON HOUSEHOLDS*

| | | |
|---|---|---|
| 1. In the past 5 years, did any of the following natural disasters impacted your household?<br><br>I READ OUT EACH OPTION AND SELECT YES/NO FOR EACH OPTION<br>V1 self.Missing.Length == 0<br>M1 Must answer Yes OR No for each option | MULTI-SELECT: YES/NO | natural_disasters |
| | 01 ☐/☐ Flood caused by heavy rain | |
| | 02 ☐/☐ Flood caused by king tides / sea surge | |
| | 03 ☐/☐ Drought | |
| | 04 ☐/☐ Storm / Strong winds | |
| | 05 ☐/☐ Landslide | |
| | 06 ☐/☐ Extreme temperature | |
| | 07 ☐/☐ Wildfire | |
| | 08 ☐/☐ Tropical cyclones | |
| | 09 ☐/☐ Tsunami | |
| | 10 ☐/☐ Other (specify) | |

| | | |
|---|---|---|
| 1a. Please specify other natural disasters<br><br>E natural_disasters.Yes.Contains(10) | TEXT | other_impacted |
| | ............................................................... | |

| | | |
|---|---|---|
| 2. Have these natural disaster(s) affected your household:<br><br>I READ OUT EACH OPTION AND SELECT YES/NO FOR EACH OPTION<br>E natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)<br>V1 self.Missing.Length==0<br>M1 Must answer Yes/No to all of the options | MULTI-SELECT: YES/NO | affected_hh |
| | 01 ☐/☐ Dwelling / House | |
| | 02 ☐/☐ Agricultural area | |
| | 03 ☐/☐ Farm assets | |
| | 04 ☐/☐ Fisheries assets | |
| | 05 ☐/☐ Farm animals | |
| | 06 ☐/☐ Vehicle including motorcycles and scooters | |
| | 07 ☐/☐ Other productive assets (specify) | |
| | 08 ☐/☐ Health | |
| | 09 ☐/☐ Access to transportation infrastructure or to other islands | |
| | 10 ☐/☐ Access to work facilities | |
| | 11 ☐/☐ Access to school | |
| | 12 ☐/☐ Access to basic services (water, electricity, internet) | |
| | 13 ☐/☐ Forest area or trees, water bodies | |
| | 14 ☐/☐ Other (specify) | |

| | | |
|---|---|---|
| 2a. Please specify other productive assets<br><br>E affected_hh.Yes.Contains(7) | TEXT | other_assets |
| | ............................................................... | |

| | | |
|---|---|---|
| 2b. Please specify other impacts.<br><br>E affected_hh.Yes.Contains(14) | TEXT | other_affected |
| | ............................................................... | |

| | | |
|---|---|---|
| 3. What is the estimated economic value of the damages to your dwelling/house?<br><br>E affected_hh.Yes.Contains(1) | SINGLE-SELECT | dwelling_estimate |
| | 01 ○ Less than $2000.00 | |
| | 02 ○ $2001.00 - $3,999.00 | |
| | 03 ○ $4000.00 - $5,999.00 | |
| | 04 ○ $6000.00 - $7,999.00 | |
| | 05 ○ $8000.00 - $9,999.00 | |
| | 06 ○ $10,000.00 - $15,000.00 | |
| | 07 ○ $15001.00 - $19,999.00 | |
| | 08 ○ More than $20,000.00 | |

| | | |
|---|---|---|
| 4. What is the estimated economic value of the damages to your agricultural area?<br><br>E affected_hh.Yes.Contains(2) | SINGLE-SELECT | agri_estimate |
| | 01 ○ Less than $2000.00 | |
| | 02 ○ $2001.00 - $3,999.00 | |
| | 03 ○ $4000.00 - $5,999.00 | |
| | 04 ○ $6000.00 - $7,999.00 | |
| | 05 ○ $8000.00 - $9,999.00 | |
| | 06 ○ $10,000.00 - $15,000.00 | |
| | 07 ○ $15001.00 - $19,999.00 | |
| | 08 ○ More than $20,000.00 | |

| | | |
|---|---|---|
| 5. What is the estimated economic value of the damages to your farm assets?<br><br>E affected_hh.Yes.Contains(3) | SINGLE-SELECT | farm_assets_estimate |
| | 01 ○ Less than $2000.00 | |
| | 02 ○ $2001.00 - $3,999.00 | |
| | 03 ○ $4000.00 - $5,999.00 | |
| | 04 ○ $6000.00 - $7,999.00 | |
| | 05 ○ $8000.00 - $9,999.00 | |
| | 06 ○ $10,000.00 - $15,000.00 | |
| | 07 ○ $15001.00 - $19,999.00 | |
| | 08 ○ More than $20,000.00 | |

| | |
|---|---|
| 6. What is the estimated economic value of the damages to your fisheries assets?<br><br>E `affected_hh.Yes.Contains(4)` | SINGLE-SELECT      fishery_estimate<br>01 ○ Less than $2000.00<br>02 ○ $2001.00 - $3,999.00<br>03 ○ $4000.00 - $5,999.00<br>04 ○ $6000.00 - $7,999.00<br>05 ○ $8000.00 - $9,999.00<br>06 ○ $10,000.00 - $15,000.00<br>07 ○ $15001.00 - $19,999.00<br>08 ○ More than $20,000.00 |
| 7. What is the estimated economic value of the damages to your farm animals?<br><br>E `affected_hh.Yes.Contains(5)` | SINGLE-SELECT     farm_animals_estimate<br>01 ○ Less than $2000.00<br>02 ○ $2001.00 - $3,999.00<br>03 ○ $4000.00 - $5,999.00<br>04 ○ $6000.00 - $7,999.00<br>05 ○ $8000.00 - $9,999.00<br>06 ○ $10,000.00 - $15,000.00<br>07 ○ $15001.00 - $19,999.00<br>08 ○ More than $20,000.00 |
| 8. What is the estimated economic value of the damages to your vehicle(s)/motorcycle(s)/scooter(s)?<br><br>E `affected_hh.Yes.Contains(6)` | SINGLE-SELECT      vehicles_estimate<br>01 ○ Less than $2000.00<br>02 ○ $2001.00 - $3,999.00<br>03 ○ $4000.00 - $5,999.00<br>04 ○ $6000.00 - $7,999.00<br>05 ○ $8000.00 - $9,999.00<br>06 ○ $10,000.00 - $15,000.00<br>07 ○ $15001.00 - $19,999.00<br>08 ○ More than $20,000.00 |
| 8.n. What is the estimated economic value of the damages to your %other_assets%?<br><br>E `affected_hh.Yes.Contains(7)` | SINGLE-SELECT     other_assets_estimate<br>01 ○ Less than $2000.00<br>02 ○ $2001.00 - $3,999.00<br>03 ○ $4000.00 - $5,999.00<br>04 ○ $6000.00 - $7,999.00<br>05 ○ $8000.00 - $9,999.00<br>06 ○ $10,000.00 - $15,000.00<br>07 ○ $15001.00 - $19,999.00<br>08 ○ More than $20,000.00 |
| 9. How many people in your household died due to these natural disasters?<br><br>I Enter 0 if none<br>E `natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)` | NUMERIC: INTEGER      hh_death<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 10. How many people from your household are still missing due to these natural disasters?<br><br>I Enter 0 if none<br>E `natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)` | NUMERIC: INTEGER      hh_missing<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 11. How many people were injured in your household due to these natural disasters?<br><br>I Estimate if can't remember or enter "0" if none<br>E `affected_hh.Yes.Contains(8)` | NUMERIC: INTEGER      hh_injured<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 12. How many people got sick in your household due to these natural disasters?<br><br>I Estimate if can't remember or enter "0" if none<br>E `affected_hh.Yes.Contains(8)` | NUMERIC: INTEGER      hh_sick<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 13. How many people in your household got permanently disabled due to these natural disasters?<br><br>I Estimate if can't remember or enter "0" if none<br>E `affected_hh.Yes.Contains(8)` | NUMERIC: INTEGER      hh_disabled<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 14. How many days did your household not have access to main roads or other islands due to these natural disasters?<br><br>E `affected_hh.Yes.Contains(9)`<br>V1 `self > 0`<br>M1 This cannot be "0" because you answered "Yes" to this option above. Give an estimate. | NUMERIC: INTEGER     access_road_islands<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 15. How many of the household members have permanently lost their jobs as a consequence of these natural disasters?<br><br>I Estimate if can't remember or enter "0" if none.<br>E `affected_hh.Yes.Contains(10)` | NUMERIC: INTEGER      jobs_lost<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 16. How many of the household members have seen their jobs temporarily disrupted due to these natural disasters?<br><br>I Estimate if can't remember or enter "0" if none.<br>E `affected_hh.Yes.Contains(10)` | NUMERIC: INTEGER      jobs_disrupted<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |
| 17. In total, how many work days did you and/or your household members lose due to these natural disasters?<br><br>I Estimate if can't remember<br>E `jobs_lost > 0 \|\| jobs_disrupted > 0`<br>V1 `self > 0`<br>M1 This answer can't be "0". | NUMERIC: INTEGER      lose_work_days<br><br>- - - - - - - - - - - - - - - - - - - - - - - - - - . |

18. How many children in the household, did not attend school due to these natural disasters?

E   `affected_hh.Yes.Contains(11)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          not_attend_school

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19. In total, how many days of school did the children in the household lose due to these natural disasters?

E   `not_attend_school > 0`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          lose_school_days

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20. Which essential services were disrupted as a consequence of these natural disasters?

I   SELECT ALL THAT APPLY
E   `natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)`
V1   `!(self.ContainsAny(1,2,3,4,5,6,7,8,10) && self.Contains(9)) || self.ContainsOnly(9)`
M1   Cannot select "None" with other answer options

MULTI-SELECT          services_disrupted

01 ☐ Electricity
02 ☐ Water/Sanitation
03 ☐ Transport
04 ☐ Internet, TV, Mobile phone connection
05 ☐ Garbage collection
06 ☐ Health services
07 ☐ Local administration services
08 ☐ Markets
09 ☐ None
10 ☐ Other (specify)

---

20a. Please specify other essential services?

E   `services_disrupted.Contains(10)`

TEXT          other_services

.................................................................

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21a. How many days were the Electricity services disrupted due to these natural disasters?

E   `services_disrupted.Contains(1)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          elec_disrupted

-------------------------------------- .

---

21b. How many days were the Water/Sanitation services disrupted due to these natural disasters?

E   `services_disrupted.Contains(2)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          water_disrupted

-------------------------------------- .

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21c. How many days were the Transport services disrupted due to these natural disasters?

E   `services_disrupted.Contains(3)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          trans_disrupted

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21d. How many days were the Internet, TV, Mobile phone connection services disrupted due to these natural disasters?

E   `services_disrupted.Contains(4)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          connection_disrupted

-------------------------------------- .

---

21e. How many days were the Garbage collection services disrupted due to these natural disasters?

E   `services_disrupted.Contains(5)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          garbage_disrupted

-------------------------------------- .

---

21f. How many days were the Health services disrupted due to these natural disasters?

E   `services_disrupted.Contains(6)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          health_disrupted

-------------------------------------- .

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21g. How many days were the Local administration services disrupted due to these natural disasters?

E   `services_disrupted.Contains(7)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          local_admin_disrupt

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21h. How many days were the Markets services disrupted due to these natural disasters?

E   `services_disrupted.Contains(8)`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          markets_disrupted

-------------------------------------- .

---

22. Have your household members been forced to displace (either temporarily or permanently) due to these natural disasters?

E   `natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)`

SINGLE-SELECT          hh_displace

01 ○ Yes
02 ○ No

---

23. From the members that belonged to your household 5 years ago, how many were displaced due to these natural disasters?

E   `hh_displace == 1`
V1   `self > 0`
M1   This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER          members_displaced

-------------------------------------- .

**23. From the members that belonged to your household 5 years ago, how many were displaced due to these natural disasters?**

E hh_displace == 1
V1 self > 0
M1 This cannot be "0" because you answered "Yes" to this option above. Give an estimate.

NUMERIC: INTEGER      members_displaced

- - - - - - - - - - - - - - - - - - - - - - - - - - - - .

---

**23a. For how long were they displaced?**

I READ OPTIONS
E members_displaced > 0

SINGLE-SELECT      displace_duration

01 ○ A few days
02 ○ A few weeks
03 ○ Several months
04 ○ Permanently

---

**23b. Where did the household member(s) go when displaced?**

I READ OPTIONS
E members_displaced > 0

SINGLE-SELECT      displace_location

01 ○ To another locality of the same island
02 ○ To another island in the same country
03 ○ Abroad (AU or NZ)
04 ○ Abroad (Other)

---

**23c. What type of facility hosted the household member**

I SELECT ALL THAT APPLY
E members_displaced > 0

MULTI-SELECT      facility_type

01 ☐ Government facility
02 ☐ Friend's home
03 ☐ Family or relative's home
04 ☐ Buy/rent a new place

---

**24. As a result of these natural disasters, did you experience any of the following consequences?**

I READ OUT EACH OPTION AND SELECT YES/NO FOR EACH OPTION
E natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)
V1 self.Missing.Length == 0
M1 Must answer Yes OR No for each option

MULTI-SELECT: YES/NO      exp_consequence

01 ☐/☐ Loss in non-farm income (e.g., reduction in sales)
02 ☐/☐ Time spent on water collection increased
03 ☐/☐ Time spent on firewood collection increased
04 ☐/☐ Time spent on child care increased
05 ☐/☐ Time spent on caring for adult family members increased
06 ☐/☐ Time spent on any domestic work activities increased
07 ☐/☐ Found difficulties accessing personal hygiene products
08 ☐/☐ Domestic violence increased
09 ☐/☐ School dropout increased
10 ☐/☐ Other (specify)

---

**24a. Please specify other consequences**

E exp_consequence.Yes.Contains(10)

TEXT      other_conseq

..................................................................................

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**25. By which means did you receive any early information regarding these natural disasters?**

I SELECT ALL THAT APPLY
E natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)
V1 !(self.ContainsAny(1,2,3,4,5,6,7,8,9,10,12) && self.Contains(11)) || self.ContainsOnly(11)
M1 Cannot select "None" with other answer options.

MULTI-SELECT      info_source

01 ☐ Radio
02 ☐ Television
03 ☐ Internet/social media
04 ☐ Newspaper/publications
05 ☐ Church/Community
06 ☐ School/university/research centre
07 ☐ Family members/neighbours/friends
08 ☐ Meteorological services
09 ☐ Phone (text or call)
10 ☐ App
11 ☐ None
12 ☐ Other (specify)

---

**25a. Please specify other source of receiving information?**

E info_source.Contains(12)

TEXT      other_source

..................................................................................

**26. How did your household reduce or avoid da mages during these natural disasters?**

I SELECT ALL THAT APPLY
E natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)
V1 !(self.ContainsAny(1,2,3,4,5,6,7,8,9,11) && self.Contain s(10)) || self.ContainsOnly(10)
M1 Cannot select "None" with the other answer options

MULTI-SELECT — reduce_damange

- 01 ☐ Stayed informed and attenti ve to the updates from local authorities
- 02 ☐ Prepared emergency kits, b asic provisions, etc
- 03 ☐ Preserve valuable househol d items and tie the house do wn
- 04 ☐ Identified/prepared an eme rgency shelter for the house hold
- 05 ☐ Moved cattle/poultry to a sa fe place
- 06 ☐ Harvest or store crops
- 07 ☐ Cover/protect crops
- 08 ☐ Move household assets to a safer place
- 09 ☐ Protect productive assets (e. g., move the fishing vessel t o a safer harbour, etc.)
- 10 ☐ None
- 11 ☐ Other (specify)

**26a. Please specify other strategy**

E reduce_damange.Contains(11)

TEXT — other_strategy

...................................................................................

**27. What actions did your household take to re cover after these natural disasters?**

I SELECT ALL THAT APPLY
E natural_disasters.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10)
V1 !(self.ContainsAny(1,2,3,4,5,6,7,8,9,11) && self.Contain s(10)) || self.ContainsOnly(10)
M1 Cannot select "Didn't do anything" with other answer options.

MULTI-SELECT — actions_recover

- 01 ☐ Used own savings
- 02 ☐ Sold assets
- 03 ☐ Sought help from relatives/f riends
- 04 ☐ Sought help from governme nt
- 05 ☐ Sought help from NGO/relig ious institution
- 06 ☐ Searched for new/additional employment
- 07 ☐ Took credit
- 08 ☐ Increased agricultural, livest ock, fishing, forestry or othe r productive activity
- 09 ☐ Sent children or another ho usehold member to live else where
- 10 ☐ Didn't do anything
- 11 ☐ Other (specify)

**27a. Please specify other actions**

E actions_recover.Contains(11)

TEXT — other_actions

...................................................................................

STATIC TEXT

*SEC 2.2. IMPACT OF SLOW-ONSET CLIMATE AND CLIMATE-INDUCED EVENTS ON HOUSEHOLDS*

**31. In the past 12 months, was your locality or area affected by these slow-onset climate and climate-induced events?**

I READ OUT EACH OPTION AND SELECT YES/NO FOR EACH OPTION
V1 self.Missing.Length == 0
M1 Must answer Yes OR No for each option

MULTI-SELECT: YES/NO — locality_affected

- 01 ☐/☐ Irregular rains
- 02 ☐/☐ Sea level rise
- 03 ☐/☐ Coastal erosion
- 04 ☐/☐ Less availability of fres hwater
- 05 ☐/☐ Rise in sea surface tem perature
- 06 ☐/☐ Lesser amount of fish
- 07 ☐/☐ Smaller fishes
- 08 ☐/☐ Coral bleaching
- 09 ☐/☐ Increase of invasive sp ecies
- 10 ☐/☐ Saltwater intrusion
- 11 ☐/☐ Other (specify)

**31a. Please specify other climate-induced event s**

E locality_affected.Yes.Contains(11)

TEXT — other_laffected

...................................................................................

STATIC TEXT

*Impacts on Livelihoods*

| 32. Which of your household's livelihoods have been affected by the slow-onset climatic events selected? | MULTI-SELECT     livelihood_impacts |
|---|---|
| I   SELECT ALL THAT APPLY<br>E   locality_affected.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10,11)<br>V1   !(self.ContainsAny(1,2,3,4,5,6,7,8,9,10,12) && self.Contains(11)) \|\| self.ContainsOnly(11)<br>M1   Can't select "No effects" with other answer options | 01 ☐ Reducing crop/livestock/fisheries yields<br>02 ☐ Increasing crop/livestock/fisheries yields<br>03 ☐ Changes in crop planting and harvesting seasonality<br>04 ☐ Decreasing soil fertility due to salination and soil erosion<br>05 ☐ Less availability and diversity of seeds and planting material<br>06 ☐ Past areas for crops becoming too warm<br>07 ☐ Reducing fish stock<br>08 ☐ Reducing housing materials, bushmeat, water, firewood...etc<br>09 ☐ Loss of employment<br>10 ☐ Reducing non-farm business income<br>11 ☐ No effects<br>12 ☐ Other (specify) |

| 32.a. Specify other livelihood(s) impacted | TEXT     other_livelihood_impacts |
|---|---|
| E   livelihood_impacts.Contains(12) | ...................................................... |

STATIC TEXT

*Impacts on Health*

| 33. How have the selected slow-onset climatic events affected the health of your household? | MULTI-SELECT     health_impact |
|---|---|
| I   SELECT ALL THAT APPLY<br>E   locality_affected.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10,11)<br>V1   !(self.ContainsAny(1,2,3,4,5,6,7,9) && self.Contains(8)) \|\| self.ContainsOnly(8)<br>M1   Cannot select "None" with any other answer option. | 01 ☐ Reducing food availability<br>02 ☐ Reduced food diversity<br>03 ☐ Increasing the dependence on processed foods<br>04 ☐ Increasing prevalence of diseases like dengue, yellow fever, etc<br>05 ☐ Increasing prevalence cardiovascular diseases, diabetes, etc<br>06 ☐ Increasing stress, anxiety<br>07 ☐ Reducing water availability and quality<br>08 ☐ None<br>09 ☐ Other (specify) |

| 33a. Specify other health impact(s). | TEXT     other_health_impacts |
|---|---|
| E   health_impact.Contains(9) | ...................................................... |

STATIC TEXT

*Displaced Household Members*

| 34. Have these events pushed members of your household to displace temporarily or permanently? | SINGLE-SELECT     displace |
|---|---|
| E   locality_affected.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10,11) | 01 ○ Yes<br>02 ○ No |

| 34a. How many members of your household were forced to leave? | NUMERIC: INTEGER     members_displace |
|---|---|
| E   displace == 1 | ------------------------------- |

| | |
|---|---|
| 35. How have these slow-onset climatic events affected the your household's social, cultural and community activities?<br><br>I   SELECT ALL THAT APPLY<br>E   `locality_affected.Yes.ContainsAny(1,2,3,4,5,6,7,8,9,10,1 1)`<br>V1 `!(self.ContainsAny(1,2,3,4,5,6,7,8,10) && self.Contains( 9)) \|\| self.ContainsOnly(9)`<br>M1 Cannot select "None" with any other answer option. | MULTI-SELECT       hh_social_cultural<br>01 ☐ Recovering and applying an cient knowledge<br>02 ☐ Less willingness to attend c ommunity events<br>03 ☐ Promote the creation of dis aster-related or climate cha nge committees or groups<br>04 ☐ Fewer possibilities to partici pate in social/cultural/leisur e/religious and sports activit ies<br>05 ☐ Increased participation in sp iritual activities, prayer servi ces, etc<br>06 ☐ Disappearance of sites cons idered a heritage of the com munity<br>07 ☐ Increasing conflicts betwee n community members<br>08 ☐ Increasing crime in the com munity<br>09 ☐ None<br>10 ☐ Other (specify) |
| 35a. Specify other social, cultural and communi ty activies impacted.<br><br>E   `hh_social_cultural.Contains(10)` | TEXT       other_hh_social_cultural<br>⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ |

STATIC TEXT

*SEC 2.3. IMPACTS OF NATURAL DISASTERS AND CLIMATE CHANGE ON CROPS, LIVESTOCK, FISHERIES/AQUACULTURE AND FORESTRY*

STATIC TEXT

*CROPS*

| | |
|---|---|
| 1. Did your household cultivate any crops durin g the past 12 months? | SINGLE-SELECT       cultivate_crops<br>01 ○ Yes<br>02 ○ No |
| 2.Please select from the list below all the crops that you have planted in the past 12 months on the land that you operate<br><br>E   `cultivate_crops==1` | MULTI-SELECT       id_roster_crop<br>01 ☐ Taro<br>02 ☐ Maniota<br>03 ☐ Bananas<br>04 ☐ Pawpaw<br>05 ☐ Vegetables (tomatoes, cucu mbers, gabbages...etc)<br>06 ☐ Lemons<br>07 ☐ Pineapple<br>08 ☐ Other (specify) |
| 2a. Specify other crop(s).<br><br>E   `id_roster_crop.Contains(8)` | TEXT       other_crop<br>⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯ |

CLIMATE CHANGE / SECTION 2. IMPACT OF NATURAL DISASTERS AND CLIMATE-INDUCED EVENTS AT HOUSEHOLD-LEVEL

Roster: CROPS GROWN - %ROSTERTITLE%
generated by multi-select question `id_roster_crop`       roster_crop

| | |
|---|---|
| 3. In the past 12 months, what was the area in square meters planted with %rostertitle%?<br><br>I   Give an estimate if can't remember. Planted Area (m2)<br>V1 `self > 0`<br>M1 Area must be more than 0. Give an estimate if you can't remember. | NUMERIC: INTEGER       area_planted<br>– – – – – – – – – – – – – – – – – – – – – – – – – – . |
| 4. Has this %rostertitle% been harvested ? | SINGLE-SELECT       harvested_crops<br>01 ○ Yes<br>02 ○ No |
| 5. What was the harvested area for %rostertitle %?<br><br>E   `harvested_crops == 1`<br>V1 `self <= area_planted`<br>M1 Harvested area cannot be bigger than the area planted. Please double check.<br>V2 `self > 0`<br>M2 Area cannot be 0. Give an estimate if you can't remember. | NUMERIC: INTEGER       harvested_area<br>– – – – – – – – – – – – – – – – – – – – – – – – – – . |

**6. Why was the area harvested of %rostertitle% less than the area planted?**

I SELECT ALL THAT APPLY
E harvested_area <= area_planted

MULTI-SELECT      less_area

- 01 ☐ Too little or no rain (drought)
- 02 ☐ Flooding from too much rain
- 03 ☐ Strong winds / Storm
- 04 ☐ Flooding from sea (king tides / storm surge)
- 05 ☐ Landslide
- 06 ☐ Temperature too hot
- 07 ☐ Temperature too cold
- 08 ☐ Wildfire
- 09 ☐ Pest/disease
- 10 ☐ Other (specify)

**6a. Specify other weather condition.**

E less_area.Contains(10)

TEXT      other_weather_condition

.....................................................

**7. If you were to sell your %rostertitle% that was lost, what would the economic value be?**

I Give an estimate dollars.
E harvested_area <= area_planted

NUMERIC: INTEGER      eco_value

- - - - - - - - - - - - - - - - - - - - - - - - - .

**8. What was the total economic losses in agriculture equipment/machinery due to the factors selected?**

I Enter "0" if none This question refers to the factors selected in Q6 above!
E less_area.ContainsAny(1,2,3,4,5,6,7,8,9,10)

NUMERIC: INTEGER      loss_cropagri

- - - - - - - - - - - - - - - - - - - - - - - - - .

**9. What was the total economic losses in agricultural infrastructure (buildings/facilities) due to the factors selected?**

I Enter "0" if none This question refers to the factors selected in Q6 above!
E less_area.ContainsAny(1,2,3,4,5,6,7,8,9,10)

NUMERIC: INTEGER      loss_cropinfra

- - - - - - - - - - - - - - - - - - - - - - - - - .

STATIC TEXT

*LIVESTOCK*

**11. In the past 12 months, did your household raise any livestock?**

SINGLE-SELECT      raise_livestock

- 01 ○ Yes
- 02 ○ No

**12. Please select all the livestock raised by your household in the past 12 months, regardless of ownership.**

E raise_livestock==1

MULTI-SELECT      id_roster_livestock

- 01 ☐ Pigs
- 02 ☐ Poultry / Chickens
- 03 ☐ Goats
- 04 ☐ Cows
- 05 ☐ Other (Specify)

**12a. Specify other livestock raised.**

E id_roster_livestock.Contains(5)

TEXT      other_livestock

.....................................................

CLIMATE CHANGE / SECTION 2. IMPACT OF NATURAL DISASTERS AND CLIMATE-INDUCED EVENTS AT HOUSEHOLD-LEVEL

**Roster: LIVESTOCK RAISED - %ROSTERTITLE%**
generated by multi-select question id_roster_livestock

roster_livestock

**13. What was the average selling price for a %rostertitle% in the past 12 months?**

I Give an estimate if can't remember.

NUMERIC: INTEGER      aveprice_livestock

- - - - - - - - - - - - - - - - - - - - - - - - - .

SPECIAL VALUES

- 97    I don't know / I don't sell my stock

**14. Over the past 12 months, how many %rostertitle%s were lost or died due to climate events?**

I Enter "0" if none.

NUMERIC: INTEGER      live_lostdied

- - - - - - - - - - - - - - - - - - - - - - - - - .

**15. What was the cause(s) of death for your %rostertitle% or how were they lost?**

I SELECT ALL THAT APPLY
E live_lostdied > 0

MULTI-SELECT      cause_lostdeath

- 01 ☐ Too little rain/drought
- 02 ☐ Too much rain/flood
- 03 ☐ Strong winds / Storm
- 04 ☐ Flooding from sea (king tides / storm surge)
- 05 ☐ Landslide
- 06 ☐ Temperature too hot
- 07 ☐ Temperature too cold
- 08 ☐ Wildfire
- 09 ☐ Pest/disease
- 10 ☐ Other (specify)

**15a. Provide other reasons for livestock losses**

E cause_lostdeath.Contains(10)

TEXT      other_reason

.....................................................

**16. What was the economic losses in livestock equipment/machinery due to selected factors?**

I Write the appropriate amount in local currency, or 0 if not received. This questions refers to the factors selected in Q15 above!
E cause_lostdeath.ContainsAny(1,2,3,4,5,6,7,8,9,10)

NUMERIC: INTEGER      loss_liveequip

- - - - - - - - - - - - - - - - - - - - - - - - - .

| 17. What was the economic losses in livestock infrastructure (building/facilities) due to selected factors.<br><br>I  Write the appropriate amount in local currency, or 0 if not received. This questions refers to the factors selected in Q15 above!<br>E  `cause_lostdeath.ContainsAny(1,2,3,4,5,6,7,8,9,10)` | NUMERIC: INTEGER        `loss_liveinfra`<br><br>------------------------------------. |

STATIC TEXT

*FISHERIES / AQUACULTURE*

| 18. Did your household conduct any fishing or aquacultural activities in the past 12 months? | SINGLE-SELECT        `pract_aqua`<br>01 ○ Yes<br>02 ○ No |
| 19. Which of the following items did your household fish or collect in the past 12 months?<br><br>I  SELECT ALL THAT APPLY<br>E  `pract_aqua==1` | MULTI-SELECT        `id_roster_aqua`<br>01 ☐ Fish (reef)<br>02 ☐ Fish (ocean/pelagic)<br>03 ☐ Tupa(crabs), koura (crayfish /lobster/shrimp) or other crustaceans<br>04 ☐ Paua or other shellfish<br>05 ☐ Remu<br>06 ☐ Other (Specify) |
| 19a. Please specify other<br><br>E  `id_roster_aqua.Contains(6)` | TEXT        `other_aqua`<br><br>................................................. |

CLIMATE CHANGE / SECTION 2. IMPACT OF NATURAL DISASTERS AND CLIMATE-INDUCED EVENTS AT HOUSEHOLD-LEVEL
### Roster: MAIN PRODUCTS - %ROSTERTITLE%
generated by multi-select question `id_roster_aqua`        `roster_aquaculture`

| 20a. What was the total QUANTITY of %rostertitle% fished or collected in the past 12 months?<br><br>I  Give an estimate if can't remember. | NUMERIC: INTEGER        `quantity_aqua`<br><br>------------------------------------. |
| 20b. What was that total in kilograms?<br><br>I  Give and estimate if cannot remember the exact total. | NUMERIC: INTEGER        `unit_aqua`<br><br>------------------------------------. |
| 21. Considering the amount of %rostertitle% fished or collected in the past 12 months, do you think you have collected more or less than you usually collect? | SINGLE-SELECT        `quantity_lossaqua`<br>01 ○ More than usual<br>02 ○ Less than usual<br>03 ○ About the same |
| 22. What were the reasons for these losses?<br><br>I  SELECT ALL THAT APPLY<br>E  `quantity_lossaqua == 2` | MULTI-SELECT        `reason_lossaqua`<br>01 ☐ Too much rain/flood<br>02 ☐ High sea level (king tide/storm surge)<br>03 ☐ Low sea level (very low tides)<br>04 ☐ Large waves/seas/swell<br>05 ☐ Temperature too hot<br>06 ☐ Temperature too cold<br>07 ☐ Coral bleaching<br>08 ☐ Other (specify) |
| 22a. Please specify Other reasons<br><br>E  `reason_lossaqua.Contains(8)` | TEXT        `otherreason_lossaqua`<br><br>................................................. |
| 23. In the past 12 months, what was the AVERAGE selling price of a kilogram of %rostertitle%?<br><br>I  Write the appropriate amount in local currency. Give an estimate if can't remember | NUMERIC: INTEGER        `aveprice_aqua`<br><br>------------------------------------.<br><br>SPECIAL VALUES<br>97    I dont know. I don't sell or buy |
| 24. What was the economic losses in fishing/aquaculture equipment/machinery due to selected factors.<br><br>I  Write the appropriate amount in local currency, or 0 if none.<br>E  `reason_lossaqua.ContainsAny(1,2,3,4,5,6,7,8)` | NUMERIC: INTEGER        `loss_aquaequip`<br><br>------------------------------------. |
| 25. What was the economic losses in fishing/aquaculture equipment/machinery due to selected factors.<br><br>I  Write the appropriate amount in local currency, or 0 if none.<br>E  `reason_lossaqua.ContainsAny(1,2,3,4,5,6,7,8)` | NUMERIC: INTEGER        `loss_aquainfra`<br><br>------------------------------------. |

STATIC TEXT

*FORESTRY*

| 26. Have you or any member in your household collected or hunt forest produce/wild animals and birds or natural wild produce from grasslands or fallows in the past 12 months for own use or sale? | SINGLE-SELECT        `forest_prod`<br>01 ○ Yes<br>02 ○ No |

**27. Please select the collected items or hunted animals and birds in the past 12 months?**

I SELECT ALL THAT APPLY
E forest_prod==1

MULTI-SELECT      id_roster_forestry

- 01 ☐ Firewood
- 02 ☐ Wild chickens
- 03 ☐ Coconuts
- 04 ☐ Chesnuts
- 05 ☐ Herbs
- 06 ☐ Mushrooms
- 07 ☐ Ornamental flowers
- 08 ☐ Medicinal Plants
- 09 ☐ Wild birds inluding bats
- 10 ☐ Wild pigs
- 11 ☐ Wild goats
- 12 ☐ Rocks, stone, mud
- 13 ☐ Other (Specify)

**27a. Please specify other**

E id_roster_forestry.Contains(13)

TEXT      other_forest_prod

．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．．

CLIMATE CHANGE / SECTION 2. IMPACT OF NATURAL DISASTERS AND CLIMATE-INDUCED EVENTS AT HOUSEHOLD-LEVEL
**Roster: FORESTRY PRODUCTS - %ROSTERTITLE%**
generated by multi-select question id_roster_forestry      roster_forestry

**27b. How much of %rostertitle% was collected/ hunted in a typical month during the past 12 months?**

I Give an estimate if can't remember

NUMERIC: INTEGER      quantity_forest

－－－－－－－－－－－－－－－－－－－－－－－－－－－．

**27c. How much was that in kilograms?**

I Give and estimate if cannot remember

NUMERIC: INTEGER      unit_forest

－－－－－－－－－－－－－－－－－－－－－－－－－－－．

SPECIAL VALUES
97      Less than 1 kilogram

**28. For how many months did you collect %rostertile% in the past 12 months?**

I Rough estimate if can't remember.

NUMERIC: INTEGER      forest_collect

－－－－－－－－－－－－－－－－－－－－－－－－－－－．

**29. If you were to purchase %rostertitle% in the market, what would be its AVERAGE PRICE per kilogram?**

I Give an estimate if can't remember Write the appropriate amount in local currency.

NUMERIC: INTEGER      forest_aveprice

－－－－－－－－－－－－－－－－－－－－－－－－－－－．

**30. During the past 12 months, indicate the events that severely or negatively affected the collection of forest produce or hunting for animals and birds.**

V1 !(self.ContainsAny(1,2,3,4,5,6,7,8,9,11) && self.Contains(10)) || self.ContainsOnly(10)
M1 Cannot select "Collection of forest products was not affected" with any other answer option

MULTI-SELECT      affected_forestcol

- 01 ☐ Too little rain/drought
- 02 ☐ Too much rain/flood
- 03 ☐ Strong winds / Storm
- 04 ☐ Flooding from sea (king tides / storm surge)
- 05 ☐ Landslide
- 06 ☐ Temperature too hot
- 07 ☐ Temperature too cold
- 08 ☐ Wildfire
- 09 ☐ Pest/disease
- 10 ☐ Collection of forest products was not affected
- 11 ☐ Other (specify)

**31. What was the economic loss in forestry equipment/machinery due to selected factors.**

I Write the appropriate amount in local currency, or 0 if none.
E affected_forestcol.ContainsAny(1,2,3,4,5,6,7,8,9,11)

NUMERIC: INTEGER      loss_forequip

－－－－－－－－－－－－－－－－－－－－－－－－－－－．

**32. What was the economic loss in forestry infrastructure (buildings/facilities) due to selected factors.**

I Write the appropriate amount in local currency, or 0 if none.
E affected_forestcol.ContainsAny(1,2,3,4,5,6,7,8,9,11)

NUMERIC: INTEGER      loss_forinfra

－－－－－－－－－－－－－－－－－－－－－－－－－－－．

CLIMATE CHANGE
## SECTION 3. CLIMATE CHANGE ADAPTATION OPTIONS ADOPTED AT THE HOUSEHOLD LEVEL

STATIC TEXT

*SEC 3.1. RETREAT ADAPTATION MEASURES*

| | | |
|---|---|---|
| 1. In the past 5 years, did you and/or your household do any of the following to address natural disasters and climate change threats to your household? | SINGLE-SELECT | retreat_adaptation |
| | 01 ○ We relocated our house to another area/locality in the same island without a managed retreat approach | |
| | 02 ○ We relocated our house to another island in the same country without a managed retreat approach | |
| | 03 ○ Our house was relocated to another area/locality in the same island under a managed retreat approach | |
| | 04 ○ Our house was relocated to another island in the same country under a managed retreat approach | |
| | 05 ○ I do not know | |
| | 06 ○ None of the above | |
| | 07 ○ Other (specify) | |

| | | |
|---|---|---|
| 1a. Other retreat adaptation | TEXT | other_retreat_adaptation |
| E retreat_adaptation==7 | ................................................................ | |

STATIC TEXT

*SEC 3.2. DEFENSIVE ADAPTATION MEASURES*

| | | |
|---|---|---|
| 2. In the past 5 years, did you and/or your household members do any of the following to prevent your house from the impacts of flooding? | MULTI-SELECT | flood_housing |
| I Select only three most important options | 01 ☐ Construct embankments/levees around the house | |
| V1 !(self.ContainsAny(1,2,3,4,5,6,7,10) && self.Contains(8)) \|\| self.ContainsOnly(8) | 02 ☐ Improve drainage system | |
| M1 Cannot select "I do not know" and other options. | 03 ☐ Improve gardens to safety redirect water | |
| V2 !(self.ContainsAny(1,2,3,4,5,6,7,10) && self.Contains(9)) \|\| self.ContainsOnly(9) | 04 ☐ Use roofs capable of coping with the high intensity rainfall events using impact and moisture resistant materials | |
| M2 Cannot select "None of the above" and other options. | 05 ☐ Reinforce house structure | |
| V3 !(self.Contains(8) && self.Contains(9)) | 06 ☐ Maximize use of water-resistant materials | |
| M3 Cannot select both options at the same time. | 07 ☐ Raise floor heights | |
| | 08 ☐ I do not know | |
| | 09 ☐ None of the above | |
| | 10 ☐ Other (specify) | |

| | | |
|---|---|---|
| 2a. Specify other measures to prevent impacts of flooding on housing. | TEXT | flood_housing_other |
| E flood_housing.Contains(10) | ................................................................ | |

| | | |
|---|---|---|
| 3. In the past 5 years, did you and/or your household members do any of the following to prevent natural disasters and climate change from impacting yours and/or your household's productive activities? | MULTI-SELECT | pro_activities |
| I Select the three most important options | 01 ☐ Reforest in areas likely to flood | |
| V1 !(self.ContainsAny(1,2,3,4,5,6,7,8,9,12) && self.Contains(10)) \|\| self.ContainsOnly(10) | 02 ☐ Enrich the soil with organic matter | |
| M1 Cannot select "I do not know" and other options. | 03 ☐ Improve irrigation system and did local dams | |
| V2 !(self.ContainsAny(1,2,3,4,5,6,7,8,9,12) && self.Contains(11)) \|\| self.ContainsOnly(11) | 04 ☐ Substitute crops with drought and salt resistant cultivars | |
| M2 Cannot select "None of the above" and other options. | 05 ☐ Incorporate agro-forestry, shade and inter-cropping | |
| V3 !(self.Contains(10) && self.Contains(11)) | 06 ☐ Prepare vegetal material in nurseries | |
| M3 Cannot select both options at the same time. | 07 ☐ Strengthen/upgrade land infrastructure used for agriculture | |
| | 08 ☐ Select animals and/or species that are more resistant to heat and disease | |
| | 09 ☐ Reinforce turistic assets (lodges, restaurants, hotels, beach facilities | |
| | 10 ☐ I do not know | |
| | 11 ☐ None of the above | |
| | 12 ☐ Other (specify) | |

| | | |
|---|---|---|
| 3a. Other impacts of productive activities | TEXT | productive_activities_other |
| E pro_activities.Contains(12) | ................................................................ | |

4. In the past 5 years, did you and/or your household do any of the following to prevent and ensure the availability of fresh and drinking water from the impacts of natural disaters and climate change?

I SELECT ALL THAT APPLY
V1 `!(self.ContainsAny(1,2,5) && self.Contains(3)) || self.ContainsOnly(3)`
M1 Cannot select "I do not know" with other answer options.
V2 `!(self.ContainsAny(1,2,5) && self.Contains(4)) || self.ContainsOnly(4)`
M2 Cannot select "None of the above" with other answer options.
V3 `!(self.Contains(3) && self.Contains(4))`
M3 Cannot select both options at the same time.

MULTI-SELECT — drinking_water

- 01 ☐ Install water tanks/capture and distribution facilities
- 02 ☐ Install filtering systems in the water supply to the house.
- 03 ☐ I do not know
- 04 ☐ None of the above
- 05 ☐ Other (specify)

---

4a. Other Options for protecting availability of fresh and drinking water

E `drinking_water.Contains(5)`

TEXT — drinking_water_other

............................................................

STATIC TEXT

*SEC 3.3. CO-EXISTING ADAPTATION MEASURES*

5. In the past 5 years, did you and/or your household members do any of the following to prepare in response to multiple threats presented by natural disasters and climate change?

I Select the three most important adaptation options for each subheading
V1 `!(self.ContainsAny(1,2,3,4,5,6,7,8,9,12) && self.Contains(10)) || self.ContainsOnly(10)`
M1 Cannot select "I do not know" and other options.
V2 `!(self.ContainsAny(1,2,3,4,5,6,7,8,9,12) && self.Contains(11)) || self.ContainsOnly(11)`
M2 Cannot select "None of the above" and other options.
V3 `!(self.Contains(10) && self.Contains(11))`
M3 Cannot select both options at the same time.

MULTI-SELECT — multi_threats

- 01 ☐ Family member participated in education and public awareness campaigns
- 02 ☐ Family members trained and enrolled in volunteer/comunitarian emergency and relief teams/groups
- 03 ☐ Family members enhanced labor and professional skills
- 04 ☐ Family members remained attentive of warning systems
- 05 ☐ My family had disaster management plan and evacuation plan
- 06 ☐ Family members had their vaccination schedule up to date
- 07 ☐ Children attended risk reduction programes at school
- 08 ☐ Family members participated in disaster simulation exercises
- 09 ☐ My family changed food consumption habits
- 10 ☐ I do not know
- 11 ☐ None of the above
- 12 ☐ Other (specify)

5a. Specify other activities.

E `multi_threats.Contains(12)`

TEXT — other_multi_threats

............................................................

---

6. In the past 5 years, did you and/or your household members do any of the following to prepare for the impacts of flooding on your house?

I SELECT ALL THAT APPLY
V1 `!(self.ContainsAny(1,2,3,6) && self.Contains(4)) || self.ContainsOnly(4)`
M1 Cannot select "I do not know" with any other answer option.
V2 `!(self.ContainsAny(1,2,3,6) && self.Contains(5)) || self.ContainsOnly(5)`
M2 Cannot select "None of the above" with any other answer option.
V3 `!(self.Contains(4) && self.Contains(5))`
M3 Cannot select both options together.

MULTI-SELECT — floodhouse_coex

- 01 ☐ Secure vulnerable equipment above the forecasted flooding level
- 02 ☐ Build transportable and/or floatable house
- 03 ☐ Clear constantly the water drains of the streets near the house
- 04 ☐ I do not know
- 05 ☐ None of the above
- 06 ☐ Other (specify)

6a. Specify other housing preparation for impact of flooding.

E `floodhouse_coex.Contains(6)`

TEXT — other_floodhouse_coex

............................................................

**7. In the past 5 years, which of the following productive activities did you carry out to prepare for or minimise the impact of natural disaster and climate change on your livelihood?**

I   Select the three most important adaptation options for each subheading
V1   !(self.ContainsAny(1,2,3,4,5,6,7,8,9,10,13) && self.Contains(11)) || self.ContainsOnly(11)
M1   Cannot select "I do not know" with any other answer option.
V2   !(self.ContainsAny(1,2,3,4,5,6,7,8,9,10,13) && self.Contains(12)) || self.ContainsOnly(12)
M2   Cannot select "None of the above" with any other answer option.
V3   !(self.Contains(11) && self.Contains(12))
M3   Cannot select both options together

MULTI-SELECT                                pro_act_coex

- 01 ☐ Farm on higher ground to avoid flood-prone areas
- 02 ☐ Adopt vertical farms
- 03 ☐ Grow crops undercover
- 04 ☐ Diversity cropping species
- 05 ☐ Adjust planting and harvest or fishing dates
- 06 ☐ Regulate the use of agritoxics that exterminate pollinizers
- 07 ☐ Participate in financial and technical assistance programmes
- 08 ☐ Constitute women's groups to plant household gardens, recover women's ancestral knowledge, etc
- 09 ☐ Sought paid jobs in the other sectors less exposed to climate change
- 10 ☐ Introduce aquaculture projects
- 11 ☐ I do not know
- 12 ☐ None of the above
- 13 ☐ Other (specify)

**7a. Specify other productive activities**

E   pro_act_coex.Contains(13)

TEXT                                otherpro_act_coex

....................................................................

**8. In the past 5 years, did you do any of the following to ensure the availability of fresh and drinking water during natural disasters and climate change events?**

I   SELECT ALL THAT APPLY
V1   !(self.ContainsAny(1,2,3,6) && self.Contains(4)) || self.ContainsOnly(4)
M1   Cannot select "I do not know" with any other answer option.
V2   !(self.ContainsAny(1,2,3,6) && self.Contains(5)) || self.ContainsOnly(5)
M2   Cannot select "None of the above" with any other answer option.
V3   !(self.Contains(4) && self.Contains(5))
M3   Cannot select both options together.

MULTI-SELECT                                fredrink_water_coex

- 01 ☐ Install water filtering systems
- 02 ☐ Install tanks to supplement the household reticulated water supply system
- 03 ☐ Support community projects or programs to improve supply of water during droughts
- 04 ☐ I do not know
- 05 ☐ None of the above
- 06 ☐ Other (specify)

**8a. Verify other activities for fresh and drinking water**

E   fredrink_water_coex.Contains(6)

TEXT                                fredrink_water_coex_other

....................................................................

**9. Overall, would you say that the adaptation options implemented in the past 12 months have reduced the impact or natural disasters and climate change on your household?**

SINGLE-SELECT                                opinion_adaptations

- 01 ○ Yes, it strongly did
- 02 ○ Yes, it somewhat did
- 03 ○ No, not very much
- 04 ○ No, not at all
- 05 ○ I do not know

STATIC TEXT

*SEC 3.4. INSTITUTIONAL SUPPORT*

**10. In the past 5 years, has your household received any support for designing or implementing climate change adaptation measures?**

SINGLE-SELECT                                ins_sup

- 01 ○ Yes
- 02 ○ No
- 03 ○ I do not know

**11. In the past 5 years, what type of support have you received for implementing adaptation measures?**

I   SELECT ALL THAT APPLY
E   ins_sup.InList(1,3)
V1   !(self.ContainsAny(1,2,3,4,5,6,9) && self.Contains(7)) || self.ContainsOnly(7)
M1   Cannot select "None" with any other answer option.
V2   !(self.ContainsAny(1,2,3,4,5,6,9) && self.Contains(8)) || self.ContainsOnly(8)
M2   Cannot select "I do not know" with any other answer option.
V3   !(self.Contains(7) && self.Contains(8))
M3   Cannot select both options together.

MULTI-SELECT                                type_sup

- 01 ☐ Subsidies, loans, grants, insurance, etc
- 02 ☐ Programs and projects aimed at women, children and elderly
- 03 ☐ Technical assistance/support to adapt economic/income activities
- 04 ☐ Support to improve food security
- 05 ☐ Support to improve the household dwellings and infrastructure
- 06 ☐ Support from the community strengthening and organisation
- 07 ☐ None
- 08 ☐ I do not know
- 09 ☐ Other (specify)

| 11a. Specify other support type | TEXT | other_support_type |
| --- | --- | --- |
| E  type_sup.Contains(9) | ................................................................. | |

**12. In the past 5 years, from which organisatio n/agency did the household receive financial/te chnical/assistance suppot?**

I  Select all that apply
E  type_sup.ContainsAny(1,2,3,4,5,6,9)

MULTI-SELECT            org_sup

- 01 ☐ Government
- 02 ☐ NGO (Non Government Org anisations)
- 03 ☐ Private sector
- 04 ☐ International organizations
- 05 ☐ Local community/civil societ y organization
- 06 ☐ Faith-based groups
- 07 ☐ Other (specify)

| 12a. Specify other organisation | TEXT | other_support_org |
| --- | --- | --- |
| E  org_sup.Contains(7) | ................................................................. | |

**13. Overall, would you say that the adaptation s upport provided in the last 5 years…?**

E  type_sup.ContainsAny(1,2,3,4,5,6,9)

SINGLE-SELECT            overall_support

- 01 ○ Was good and sufficient for adapting to climate change
- 02 ○ Was not enough for adaptin g to climate change
- 03 ○ I do not know

**14. In the past 12 months, have you been involv ed in any committees or groups (e.g., disaster r esponse teams) engaged in climate change ad aptation?**

SINGLE-SELECT            inv_group

- 01 ○ Yes
- 02 ○ No

**15. In the past 12 months, what are the leading personal challenges limiting your action on nat ural disaster prevention and climate change re sponse?**

I  Select the three most important challenges
V1  !(self.ContainsAny(1,2,3,4,5,6,7,8,9,11) && self.Contain s(10)) || self.ContainsOnly(10)
M1  Cannot select "None" with other answer options

MULTI-SELECT            challenges

- 01 ☐ Lack of physical skills (runni ng, swimming, etc)
- 02 ☐ Lack of education level
- 03 ☐ Lack of difficulty in access a nd control of clean water, fir ewood, land, productive ass ets, bank account, financing , etc
- 04 ☐ Lack of other abilities (build or fix infrastructure, interne t use, technologies use, etc
- 05 ☐ High dependency on forest products, water, or other na tural resources compromise d because of natural disaste rs and climate change
- 06 ☐ Little influence on decision-making during and after nat ural disaster events
- 07 ☐ Lack of time for find a job or participate in adaptation pr ogrammes
- 08 ☐ Long distance of my dwellin g to main road
- 09 ☐ Long distance of my dwellin g to capital
- 10 ☐ None
- 11 ☐ Other

**Tap to collect GPS location**

I  Make sure you are in a location well clear of tall buildings, and mountai ns before tabbing to collect the GPS location.

GPS            gps_loc

N  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

W  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

A  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -