



Project Final Evaluation:  
*“Improving Community Climate Resilience in Nissan”,*  
Autonomous Region of Bougainville, Papua New Guinea

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## Disclaimer

The views in this paper are those of the authors alone and do not necessarily represent those of the CARE or its programs, USAID, the Government of the United States of America /any other partners.

Cover page photo: detail of a carving by the Pinepel Cultural Group, highlighting the various components of the project. This was presented to CARE during the project closure ceremony in March 2017. Image: E. Boydell.



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## Executive Summary

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CARE International in PNG is supporting women and men living on Nissan and Pinepel Island to build resilience to the impacts of climate change. The communities that live on these remote coral atolls in the Autonomous Region of Bougainville are highly exposed to the impacts of climate change.

Support has been provided the "Improving Community Resilience in Nissan" project since April 2015. The **overall objective** of the project is:

***"Increased community resilience to the impacts of climate change, through improved coastal and marine resource management and enhanced livelihoods in Nissan District"***

The project is funded by the United States Agency for International Development (USAID) through the Pacific American Climate Fund (PACAM). It builds on previous work with Nissan and Pinepel communities, where CARE has been working since 2009. It introduced new activities related to marine and coastal resource management, livestock management, as well as continuing to support resilient agricultural practices. The project also worked to increase the capacity of a number of actors to manage climate risk. These included community-based organisations, the Nissan District Administration, and the Autonomous Bougainville Government.

This end of project evaluation, completed in February and March 2017, is intended to assess performance and support accountability and learning. It used qualitative methods. The gender-balanced evaluation team emphasised the participation of women, paying attention to outcomes for both women and men.

The findings of this evaluation confirm that the "Improving Community Resilience in Nissan" project supported women and men in the process of adapting to the impacts of climate change. These included changes to knowledge and behaviour related to marine resource management, improvements in the management of livestock, and the continued uptake of more resilient agricultural practices. CARE's ongoing emphasis on women's empowerment has strengthened gender equality and women's voice, with both women and men reporting significant changes at household and community level.

However, other elements of the project were not fully realised. The ambitious design of the project was limited by the capacity of Government partners and at times, the project team itself. Staff turnover created delays, and these challenges were not adequately managed.

The headline findings, presented against evaluation criteria of relevance, effectiveness, efficiency, sustainability and impact, are presented below.

### Relevance

- Women and men on Nissan and Pinepel are highly exposed to climate risk, with villages on Pinepel frequently experiencing food stress.
- The project directly addressed the foundation of food and livelihood: marine resources and growing staple foods and vegetables. Livestock management was introduced at the request of the communities.
- The project gender strategy and design were grounded in CARE's Women's Empowerment Framework
- The project aligns with relevant ABG and PNG policies on climate change, conservation and marine resource



management. However, the expectations of the NDA were over-ambitious

## Effectiveness

### **Marine Resource Management**

- Knowledge of coastal and marine ecology has increased, and marine resource management has improved as a result of awareness raised by the project.
- The development of 16 management plans for coastal and marine resource management was underway, but incomplete, at the time of evaluation. These plans covered the lagoon and coast adjacent to all 21 villages on Nissan. Women, men and youth were engaged through a participatory planning process.
- Fisheries and ecosystem research involved a large number of community members, and strengthened knowledge and motivation for marine resource management. However, the fisheries survey was completed too late to feed into the development of management plans.

### **Resilient Agriculture and livestock management**

- Climate resilient agricultural practices have continued to spread, with strong uptake of Kitchen Gardens, composting and mulching and composting. At least 200 households on Nissan and Pinepel are using these practices.
- After a slow start, over 180 households are now enclosing pigs - a significant behavioural change that will reduce damage to gardens.
- A nutrition training raised awareness of non-marine sources of protein and infant nutrition. Participants have repeated this training in at least 2 villages.

### **Nissan District Policy and Planning**

- Research on marine and coastal ecosystems and fisheries involved community members, and shared results with district and local level government

- A policy forum brought together stakeholders from Nissan, the ABG and the National Climate Change and Development Authority

- While strong partnership with maintained with the Bougainville Environment Bureau, engagement with other ABG departments was inconsistent.

## Efficiency

- The project took measures to ensure cost-efficient implementation of activities and manage the challenge of working in a remote area, including working through partners, local CBOs, and creating efficiencies by combining funding to deliver a more comprehensive programme.
- Staff absence and turnover created implementation delays, and for a period the project did not receive adequate senior management support. Staffing capacity was augmented in the final 6 months of the project, which meant that key activities could be completed.

## Sustainability

- Uptake of climate-resilient agricultural activities, including kitchen gardens, is continuing without project support. The diffusion of other agricultural practices, including mulching and composting, has also grown steadily.
- Livestock management is likely to continue in Pinepel, where uptake was widespread and legal sanctions
- It is too early to determine the sustainability of coastal and marine resource management measures, as plans were only put into place late in the project. However, there has been strong buy-in from District Government and community-leaders, which could support sustained uptake. In Balil, coastal clean-up activities have become a regular activity, and a ban on fine fishing nets is being enforced.
- The project supported the development of two community-based organisations: Balel Environment, and Kirapim Laip – the

second of which has registered as an NGO. However, the project did not support gender-balanced management groups to sustain marine and livelihood activities.

### Impact

- Planning, assessment and awareness raising has laid the foundation for sustainable management of marine ecosystems, which are an important safety net during drought
- There is evidence that improved agricultural practices are contributing to reduced pressure on marine resources. Significant improvements in livestock management is reducing risks, kitchen gardens have unlocked a new food source for people on Nissan and Pinepel.

### Gender equality and women's voice

Particular attention was paid to the impact of CARE's ongoing work on Gender Equality and Women's voice. The emphasis that CARE has placed on participation and gender-responsive

facilitation has generated sustained changes for women. The project has included single mothers and marginalised women, and has improved relationships between young women and men. Changes have occurred in a number of areas

- **Agency:** women have new sources of income, improved access to water and diverse sources of nutrition, and are more confident to participate in household and village decision making.
- **Relationships:** communication between women and men has improved, and men are taking a greater level of responsibility for household, child-raising and agricultural duties.
- **Structures:** women are more involved in community decision-making and affairs, and women's voice extends beyond CARE-led activities. However, some male community leaders expressed resistance to this change.

### Recommendations

<b>A. Consolidate and complete: priorities for project completion and follow up</b>
A1. Ensure community-based marine resource management plans and research reports are lodged with the Bougainville Environment Bureau and other departments in in the ABG
A2. Look for mechanisms to sustain achievement under Outcomes 1 and 3, including developing an island-wide management plan, and link ABG, NDA and CBOs to small grant providers.
A3. Continue to monitor the spread of a fatal disease affecting coconut palms, and identify response options
A4. Support ABG to establish a coordination mechanism for sharing information about climate change adaptation activities in Bougainville.
<b>B. Learn and expand: recommendations for future programming</b>
B1. Develop clear, people-centred theories of change with staff and partners, grounded in a clear analysis of the resilience challenge the projects are seeking to address, and linked to clear strategies to promote women's empowerment and voice.
B2. Develop and share models for climate resilient agriculture in small islands in Bougainville, exploring links with agri-climate information and improved use of seasonal forecasts.
B3. Support equitable access to emerging markets, as well promoting village savings and financial management as a safety net
B4. Undertake further consideration of extension and community organising approaches.
<b>C. Partnerships for wider impact</b>
C1: Establish formal partnership with WCS for future marine resource management work, to

ensure ongoing technical support and rigour. Establish Memoranda of Understanding with the relevant government staff, and work to engage elected officials and senior advisors to strengthen the impact of the work.

C2: Continue to support the establishment of community-based organisations such as Balel Environment and *Kirapim Laip*. Provide gender training to partner organisations, and support local organisations develop gender strategies and action plans.

C3: Build stronger linkages between CARE PNG's work on Bougainville Atolls and CARE Vanuatu's work in Tafea province, including building links between subnational governments

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## Glossary

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ABG	Autonomous Region of Bougainville Government
ADB	Asian Development Bank
ANU	Australian National University
ARB	Autonomous Region of Bougainville
BBE	Bougainville Bureau of Environment
CBA	Community Based Adaptation
CCA	Climate Change Adaptation
COE	Council of Elders
CVCA	Climate Vulnerability and Capacity Analysis
DDC	District Disaster Committee
DLLG	Department of Local Level Government
DPI	Department of Primary Industries
DMO	Disaster Management Office
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
ENSO	El Niño Southern Oscillation
EU	European Union
IEC	Information, Education and Communication (materials)
IOM	International Organisation for Migration
LRSP	Long Range Strategic Plan
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
NAQIA	National Agriculture Quarantine and Inspection Authority
NARI	National Agricultural Research Institute
NCG	Nehan Community Government
NDA	Nissan District Administration
NDC	National Disaster Centre
NGO	Non Government Organisation
NOAA	National Oceanic and Atmospheric Administration
OCCD	Office of Climate Change and Development
PACAM	Pacific American Climate Fund
PCCSP	Pacific Climate Change Science Program
PMERL	Participatory Monitoring Evaluation Reflection and Learning
PECCN	Poverty Climate Change and Environment Network
SPREP	South Pacific Regional Environment Program
TNC	The Nature Conservancy
USAID	United States Agency for International Development
VA	Village Assembly
VHF	Very High Frequency Radio
WASH	Water and Sanitation and Hygiene
WCS	Wildlife Conservation Society
WEF	Women's Empowerment Framework

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To the women and men of Pinepel and Nissan, for your openness and frank reflections during the evaluation process and hospitality, we are very grateful.

# 1. Project Context and Overview

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Nissan District is located about 50km Northwest of Buka Island (110km from Buka Town) in the Autonomous Region of Bougainville, PNG. The District's two remote atolls, Nissan and Pinepel, are home to 6,810 people living in 21 villages (National Statistical Office, 2011, Table 1 & Figure 1).

Nissan, the larger of the two islands, is a circular atoll approximately 30 kilometres in circumference with a total land area of 20 square kilometres. Most of Nissan has steep cliffs on its seaward side and graduated incline on the lagoon side, which is fringed by mangroves and a sandy shoreline. Pinepel forms an elongated atoll 11 kilometres long, with a total land area of approximately 5 square kilometres.

CARE International in PNG has been working with women and men in Nissan District since 2009, with a series of project including Water, Sanitation and Hygiene, Climate Change Adaptation, Food Security, and Disaster Risk Reduction

*Table 1: Population of Nissan and Pinepel (National Census, 2011)*

	Population	Number of Households
Nissan	5,809	1,074
Pinepel	1,001	154

In April 2015, CARE commenced implementation of the "Improving Community Resilience in Nissan" project. The project is funded by the United States Agency for International Development (USAID) through the Pacific American Climate Fund (PACAM). The initial project implementation period lasted until August 2016, and the project subsequently received a no-cost extension to March 2017.

The project builds on CARE's previous work by improving coastal and marine resource management at the community level, as well as enhancing climate-resilient livelihoods in order to reduce pressure on marine resources. The **overall objective** of the project is:

***"Increased community resilience to the impacts of climate change through improved coastal and marine resource management and enhanced livelihoods in Nissan District"***

The project linked the achievement of this objective to the following outcomes:

**Outcome 1:** Increasingly sustainable management of marine resources by women and men through development of community-based marine resource management plans

**Outcome 2:** Enhancement of climate resilient livelihoods towards reducing pressure on marine resources

**Outcome 3:** Nissan District coastal and marine resource management plans used to inform development of policy and planning at district (NDA) and regional (ABG) level.

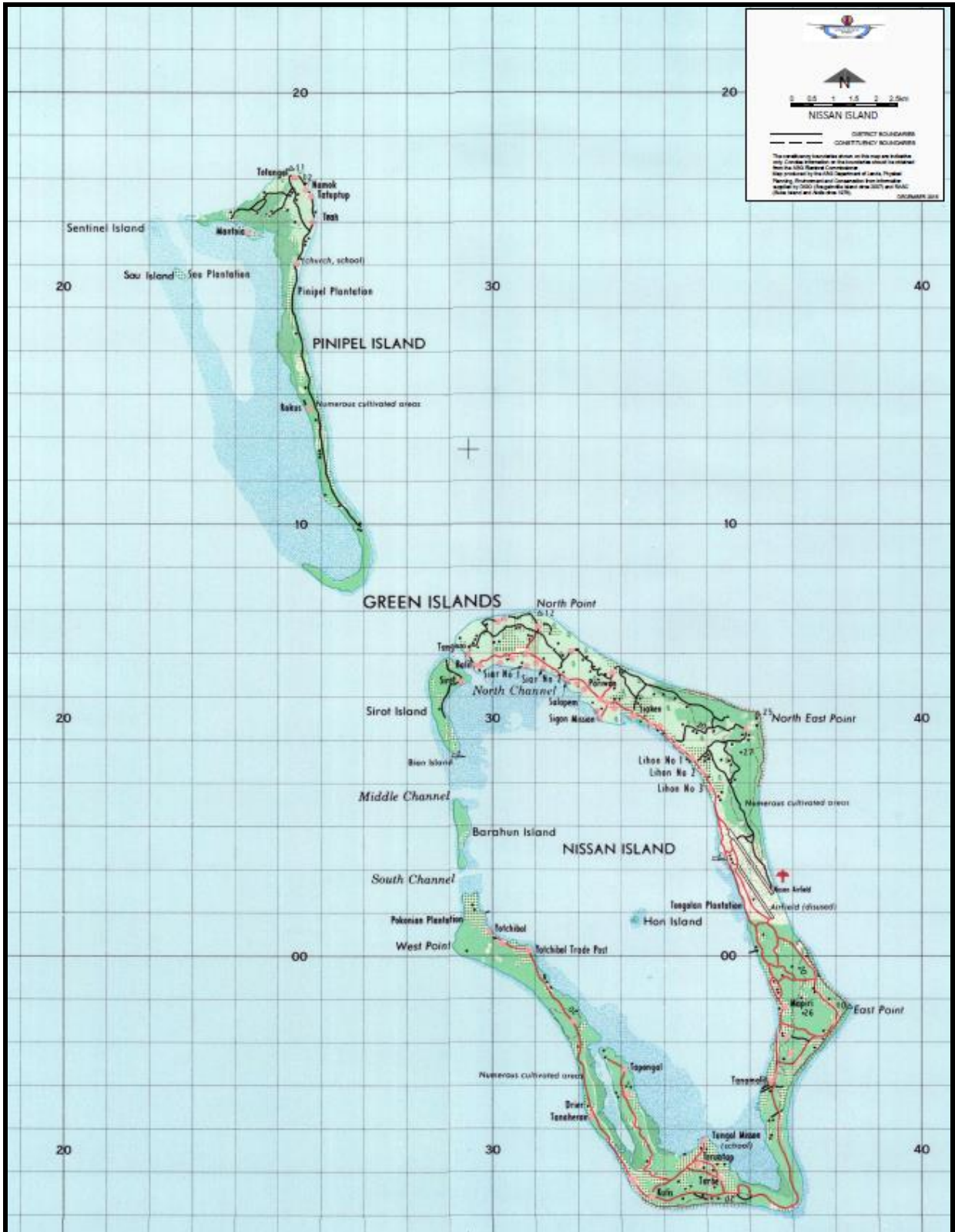


Figure 1: Map of Nissan District (Formerly Green Islands). There are variations in place names between this figure and those used in this report, which reflect current government boundaries. Map: Department of Lands, Physical Planning, Environment and Conservation, Autonomous Bougainville Government.

Most households in Nissan district are dependent on subsistence food production and fisheries, as well as remittances from family members working elsewhere. Subsistence “garden food” production on Nissan and Pinepel often struggles to meet demand – particularly during droughts and following bad storms. Shipping and market linkages to the islands is limited. While some villages do generate income from copra production, the lack of

air transport and reliable coastal shipping means that income generating opportunities (that would facilitate the purchase of food) are limited.

Atolls like Nissan and Pinepel are particularly vulnerable to the negative effects of climate change. While the islands have long been subject to significant weather variability and consequent episodic shortages of crop foods (Bourke and Betitis, 2003), community members have identified a trend towards increasingly extreme weather. The increased frequency and duration of dry periods (which are worst during El Niño years) pose the most serious threat to food security. Storms have also increased in frequency, resulting in serious flooding events that damage food gardens. Predicted increases in sea level, ocean acidity and temperature will add to the long-term challenge of securing adequate food, as reefs are bleached and land is affected by sea spray.

Climate resilient agricultural practices had been introduced as part of CARE's previous CBA project. The final evaluation from this prior work (CARE, 2015) indicated that and as a result, there were increases in the quantity and diversity of staple food and vegetable crops.

CARE's previous experience in Nissan also indicated that marine resources were an important part of people's livelihoods, but there was a lack of knowledge to inform the sustainable management of coastal and marine resources. The ongoing depletion of mangrove forests in some areas, and the planned re-opening of the bêche-de-mer fisheries, were seen to provide both a practical focus and an economic incentive for communities to establish marine resource management plans. These plans would address the focus on both resilience to climate change related food insecurity and sustainable marine-based livelihoods.

Throughout the project, CARE has closely engaged with the government structures in the district: the Nissan District Administration (NDA) and the Nehan Community Government (NCG – formerly Council of Elders, COE and Village Assembly, VA).

The project was informed by the CARE Women's Empowerment Framework (WEF)<sup>1</sup> and a project-level gender strategy. The project developed gender sensitive approaches to coastal and marine resource management, engaging women and men in dialogue on access to and control over marine and terrestrial resources. Project staff worked to facilitate women's participation and leadership in project activities, and engagement in community-level decision making

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<sup>1</sup> *The WEF starts with the understanding that it takes much more than simply including women in projects to make progress towards gender equality. CARE defines women's empowerment as the combined effect of changes in a woman's own knowledge, skills and ability (agency); the power of relationships through which she negotiates her path (relations); and the surrounding environment of norms, institutions and policies that shape her choices in life (structures). Progress across all three dimensions of empowerment is needed to achieve sustainable results.*



## 2. Evaluation Purpose and Approach

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### Evaluation Purpose

A final evaluation of the PACAM-funded “Improving Resilience to Climate Change in Nissan” project was commissioned by CARE International in PNG as a tool for *accountability* and *learning*.

Firstly, the evaluation is designed to provide **accountability** by assessing project achievements against the OECD Development Assistance Committee (DAC) criteria. In reviewing project relevance, effectiveness, efficiency, impact and sustainability, it addresses the USAID standards for a **performance evaluation**<sup>2</sup>. Following the recommendations of the project mid-term review (PGRD, 2016) the evaluation paid particular attention to the impact of the project on **gender equality and women’s empowerment** among women and men in participating communities.

The evaluation is also intended to **support evidence-based learning** about how small atoll communities in Papua New Guinea can adapt to a changing climate. CARE has been implementing community-based adaptation (CBA) programming in Nissan District since 2012. Building on the evaluation of CARE’s previous work (CARE, 2015), this final evaluation identifies successes and how and why these have occurred. It also identifies obstacles and shortcomings.

**It is hoped that this evaluation can inform CARE’s on-going and future work, as well as the ABG, Nissan District Administration and other development stakeholders working with coastal and atoll communities in the Pacific.**

### Methodology and Approach

In discussion with CARE, the evaluation team selected a qualitative evaluation methodology (see also Evaluation Terms of Reference, Annex 1). Qualitative methodologies are appropriate for investigating what a project has achieved, as well as *how* and *why* changes have occurred, and for whom benefits are occurring (Prowse, 2007). We acknowledge that it would have been optimal to undertake a mixed-method evaluation design, including a household survey to follow-on to the previous CBA project evaluation (CARE 2015). However, the lack of a rigorous baseline, and limited time and resources meant that additional research components were not possible.

The evaluation was guided by a detailed evaluation plan, including a matrix of evaluation questions (Annex 2)

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<sup>2</sup> *Performance evaluations encompass a broad range of evaluation methods. They often incorporate before-after comparisons, but generally lack a rigorously defined counterfactual. Performance evaluations may address descriptive, normative, and/or cause-and-effect questions: what a particular project or program has achieved (at any point during or after implementation); how it is being implemented; how it is perceived and valued; whether expected results are occurring; and other questions that are pertinent to design, management, and operational decision-making.*

USAID, 2016, ‘Evaluation - Learning From Experience: USAID Evaluation Policy’. Washington DC: USAID. Available online: <https://www.usaid.gov/evaluation/policy> (accessed 27/1/2016).

Following a desk review of available project documents, we carried out field research from the 11<sup>th</sup> to the 24<sup>th</sup> February 2017 in Nissan District as well as Buka, Autonomous Region of Bougainville. The gender-balanced fieldwork team (3F|2M) was led by Edward Boydell (M, Independent Consultant) and comprised 3 CARE Staff - Chris Binabat (M) Rebecca Jinro (F) Naomi Basika (F), as well as Loretta Titus (F), a Nissan District Administration staff member.

Data collection methods included focus group discussions (incorporating participatory exercises), key informant interviews, transect walks and site visits and a final workshop.

### Focus Group Discussions

Half-day community focus group discussions were held in five villages, with a total of 121 participants (47% F). The focus groups were co-facilitated by the Independent Consultant, CARE and NDA staff. We structured the process to elicit reflections through questions, participatory exercises (including repeating exercises from the 2015 evaluation – Figure 2), and open discussion. Many of the discussions and activities were conducted in separate men's and women's groups, to facilitate women's voice and participation.



*Figure 2: Women in Tuhus rank the relative importance of different livelihood resource for food and income over time*

### Visit to project activity sites

The fieldwork team conducted transect walks around one village in each cluster to view livelihood activities related to the project - nurseries, pig and chicken enclosures, kitchen gardens as well as larger traditional gardens. This supported independent verification of the uptake of project activities, including the agricultural, livestock management and coastal

protection activities reported in routine project monitoring. A standard checklist was developed to ensure consistency in approach across villages.

### Key informant interviews

Key informant interviews (7F|5M) were carried out with:

- ABG Partners (Bureau of Environment and Conservation, Disaster Management Office)
- Nissan Government Partners (NDA and NCG Representatives)
- CBO and implementation Partners (Kirapim Laip, Balel Environment, WCS)
- Community Representatives and stakeholders (1-2 per cluster as well as the Principal of St John Primary School, and a teacher and Balil Primary School,

The interviews were carried out by the Team leader, and were intended to triangulate focus group findings and ensure participant and stakeholder voices were included in this report.

### Site and Participant Selection

The evaluation scope allowed for half-day focus groups to be carried out in 5 of 6 “clusters” (each comprising 3-5 villages – see list Annex 3). Due to the differences between the islands, it was important to visit both Pinapel and Nissan. The remaining 4 clusters were selected at random, and within each cluster a village was selected at random. Advance notice was sent to each village, who were asked to select 5 female and 5 male representatives to participate (though in most focus groups significantly larger numbers showed up. The other villages in the cluster were also notified, and invited to send 2 male and 2 female participants to participate in the focus group. Key informants were selected based on initial consultation with CARE staff, and subsequent snowball sampling.

### Data Recording and Analysis

Detailed notes were taken by the fieldwork leader, and a male and female team member. Each evening, the team met to discuss and verify results, check translation, and type notes. Raw data stored in an excel spread sheet was mapped against the evaluation questions and coded. Emphasis was placed on:

**Rigour:** Looking for triangulation (i.e. multiple lines of evidence from different sources) as well as relevant points of difference from different data sources

**Quasi-quantitative analysis:** The results of some participatory exercises will be quantified and analysed of trends that can provide evidence of progress towards project outcomes (or not).

## Risks & Limitations

A number of limitations to the research were considered, and mitigation strategies identified. These are addressed in Table 3.

Table 2: Limitations and mitigating strategies

Risks and Limitations	Mitigating strategy
<p>A quantitative baseline was unavailable, and insufficient time and resources to conduct a household-level survey during the final evaluation.</p> <p>Project monitoring data was incomplete at the time of the evaluation.</p>	<p>Emphasis was placed on the collection of robust qualitative data during focus group discussions and The evaluation conducted participatory exercises that generated quantitative data. This was compared to similar group exercises that were conducted as part of the 2015 CBA evaluation (CARE, 2015). This data was useful in analysing changes in resource use over time and other factors.</p>
<p>Confirmation bias through use of project staff to facilitate evaluation processes</p>	<p>Data was crosschecked and analysed by two external consultants with no involvement in project evaluation. Assumptions made by the team were tested during daily reflections after village-level fieldwork. Key informant interviews were also conducted with third parties who were engaged in the project as partners and experts, and used to triangulate findings</p>
<p>Shortcomings in some participatory tools were not addressed ahead of the evaluation. The tools did not account for the importance of tree foods (nuts, fruit), which people consider a separate category, and purchased food staples.</p>	<p>Based on discussions with the team, an “other” category was added to the livelihood ranking exercise. This allowed a level of consistency with the 2015 exercise (see above), but allowed for other possibilities. The breakdown of the “other” category was captured in discussions following the activity.</p>



### 3. Findings and analysis

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This section presents the findings of the final project evaluation. The findings and analysis of the evaluation are presented here against the OECD DAC evaluation criteria of Relevance, Effectiveness, Efficiency, Sustainability and Impact

#### 3.1 Relevance

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**The package of marine resource management, livestock management, and agriculture is highly relevant in Nissan. The majority of the population depend on rain-fed agriculture and fisheries for food and income. Healthy marine ecosystems are particularly important for coping with food shortages during droughts and other extreme weather events.**

The coral reef and turquoise lagoons that fringe Nissan and Pinepel provide plentiful marine resources. Food gardens are cultivated in forested areas, and along with trees provide fruits, nuts, root crops and other vegetables, forming the core of the diet on Nissan. Food crops and fishing are the main subsistence activities, and also provide a source of cash income (CARE, 2017).

Climate change is affecting communities throughout PNG, and those living on small islands like Nissan and Pinapel are particularly vulnerable. Climate change impacts, such as ocean acidification, changing temperature ranges, less reliable rainfall, and shifting storm patterns, are already affecting these sources of food and income. Combined with sea level rise, these impacts increasingly impact terrestrial and marine ecosystems, human health, infrastructure, and water resources.

Climate change impacts will affect all of Nissan, but are of particular concern for people living in the 3 villages on Pinepel. In a comprehensive study of agriculture in Bougainville, Bourke and Betitis (2003) found that the level of food stress on Pinepel is second only to the Cataret Islands. People in Pinepel are also known throughout Bougainville for eating mangrove seeds: formerly an emergency food, they have become a staple (Bourke and Betitis, 2003 – Figure 3). Along with the villages on Pinepel, low-lying villages of Sirot, Tapongal and Yotchibol are also particularly affected by storm surge – *“even when it seems like things are OK on the rest of Nissan, we can’t forget about those villages”* explained a representative from the NDA. *“They are always hit hardest”*.



Figure 3: Mangrove seeds cooking in Rogos Village. Photo: E Boydell/CARE



The project's approach was relevant in this changing context, focussing on terrestrial and marine livelihood security. It supported marine resource management planning and awareness raising, informed by ecological and fisheries research (activities under **Outcome 1**). It promoted further uptake of resilient horticultural practices and improved livestock management (**Outcome 2**). It also set out to strengthen the capacity of government in Nissan District to manage marine resources in the face of climate change in Nissan District (**Outcome 3**), and scope the potential of using the approach from Nissan District for other island and coastal communities in the ARB.

**Project participants value project activities.** The 2014-'15 El Niño resulted in below-average rainfall on Nissan and Pinepel. During evaluation focus groups, participants said that the agricultural techniques and kitchen gardens introduced during the previous CBA project sustained diversity of food, including drought resistant cassava and African yam, eggplant, capsicum and greens). However, they explained that the drought, people depended on the sea for food. As one focus group participant explained:

*“Marine management is important. During droughts, when our gardens fail, we depend on marine resources as our food store, our canteen”.*

Male focus group participant, Tapongal



**Figure 4: The Inangai population on Nissan has collapsed in the months leading up to the establishment of the marine resource management plans. Photo: E Boydell**

Reliance on the marine ecosystem is constant. People explained that the drought was a “wake up call” to the importance to coastal and marine resources for food security, particularly in the face of climate change. Another “wake up call” came when the population of *inangai* (a bivalve mollusc – Figure 4) collapsed in late 2016. *Inangai* are gleaned by women and children in shallow water, and are an important and previously reliable local food source. Both the drought and the loss of *inangai* underscore the importance of measures to protect the coastal and marine ecosystems.

Climate resilient agriculture built on CARE's previous projects that introduced techniques for food crop production, including kitchen gardens, composting and soil management, and the planting of more resilient crop varieties. In this phase, CARE introduced a livestock management component through this project in response to community concerns about free roaming livestock. Livestock (particularly Pigs) cause extensive damage to food crops. According to a number of female and male key informants, Nissan communities have been talking about the need to enclose pigs in pens since the Second World War.

**The project aligns with relevant ABG and PNG policies on climate change, conservation and marine resource management.** The third project outcome envisaged the

local level marine resource management plans informing the development of policy and planning for the NDA and ABG. Throughout the project, CARE closely engaged with the Bougainville Bureau of Environment and Conservation, and the Fisheries Office in the Department of Primary Industry:

*“The project very much supports our objectives and work especially in terms of conservation – it is teaching people how to manage marine resources to improve their lives now and conserve resources for future generations.... getting involved with CARE is allowing us to do our work by getting out into the communities. So in working with CARE, we are able to achieve some of our own goals.”*

## **KII, Bougainville Bureau for Environment and Conservation**

The coastal and marine resource management planning process was aligned with the provisions for establishing Locally Managed Marine Areas (LMMAs) under the PNG Policy on Protected Areas (Conservation & Environment Protection Authority, 2014).

The project is also aligned with the *National Climate Compatible Development Management Policy* (Office of Climate Change, 2014). In working with the NDA and Community Government, the project addresses Specific Policies (SP) emphasising the importance of Local Level Government: *“in Papua New Guinea, it is at the Local Level of Government where most climate impacts occur”*. The project supports gender balance and community participation in decision-making (SP 15) – an area where CARE’s expertise in Gender and the application of the Women’s Empowerment Framework has played a particularly important role. The research carried out by the project aligns with the policy goal of supporting research into areas where communities can act proactively to adapt to climate change impacts. It also supports Policy 3: Local food and Energy Production (Protecting agricultural land, natural resource climate change adaptation). The project is directly aligned with the objectives of the recently “Building Resilience to Climate Change” programme, funded by ADB and implemented by the Government of PNG and Civil Society partners (ADB, 2017).

## 3.2 Effectiveness

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During the evaluation, it was evident that the project achieved results against all outcomes. Effectiveness varied between outcomes and activities. There is evidence of strong achievement for work with communities in Nissan, but more modest influence on government capacity for marine resource management and climate change adaptation.

### Outcome one

#### **The development of management plans for coastal and marine resource management was underway, but incomplete, at the time of evaluation**

At the time of the evaluation, community-based marine management plans were close to completion. CARE staff had led substantial preparatory work, including workshops on marine threats and management opportunities, and whole of village planning meetings. These activities laid strong foundations for the development of the plans. The evaluation was unable to assess outcomes of marine management planning for ecosystems and communities. There was, however, evidence of community demand for the plans to enter into force.

*“The management will be effective – because we know what is at stake and how important our marine resources are to us.”*

Female Focus Group Participant, Rogos

*“The marine management plan will change our focus from harvesting to management”*

Male Focus Group Participant, Tanamalit

Since the evaluation fieldwork, the NDA and NGC have endorsed 16 marine management plans. The plans cover coastal and lagoon areas adjacent to all 21 villages on Nissan and Pinepel. The plans establish Locally Managed Marine Areas, with regulations enforced through village by-laws.

#### **Knowledge and Understanding of Coastal and Marine Ecosystems has increased**

The project conducted two pieces of research related to the management of coastal and marine ecosystems.

The first was a **fisheries survey** (CARE, 2017a), carried out between November 2015 and March 2016. The survey provides a baseline of local marine species diversity, fishery health and fishing practices. Using an approach recommended by the Fisheries Office in the Department of Primary Industries, CARE trained 30 (13F | 17M) community members to intercept fishers returning from trips, and record the composition of their catch.

The second, a **marine ecosystems rapid assessment** (Maniwavie and Augustine, 2016), was completed in 2016, led by two experienced marine ecologists. It examined key coral, mangrove and sea grass ecosystems, as well as the abundance of key food fish. It was carried out by a team of 27 community data collectors and was designed to accommodate the skills of these community participants.

Findings from both pieces of work were validated through workshops that involved data collectors, the NDA and community government and ABG officials.

This research – particularly the rapid ecosystem assessment - has increased community and District Government understanding of the marine and coastal environment. As Loretta Titus at the NDA said during a KII - *“I’ve been going around asking everyone ‘did you know Nissan has 12 species of Mangrove?’”*. Community participation in data collection means that a core group of women and men are trained in marine and coastal ecology, as well as data collection methods. The surveys are a baseline for marine and coastal resource management measures, and long-term ecosystem change. However, the NDA and community members would need external support to replicate the data collection and interpret the data.

The data collection was complemented by a broader **community-level training in basic marine ecology**, and reinforced in community workshops to **identify marine threats and management opportunities**. The project team also led training on marine ecology and resource management in 6 Primary Schools, and at Holy Cross High School.

The project also developed information, education and communication (IEC) materials including fish identification charts and posters related to project messaging, including protecting coral and awareness raising on destructive fishing practices. These were displayed on notice boards (one per village) provided by the project, displaying project information and USAID branding (Figure 5). The noticeboards are also being used to display other community information. At the time of the evaluation all



*Figure 5: A signboard in Sigon village constructed adjacent to a water collection skillion that is also used as a community meeting space. Photo: C Hershey*

but two notice boards had been constructed and were in use, however in some cases people had taken posters and thumb tacks to use elsewhere. The project planned a redistribution of IEC materials during the final field trip. Community members have also been provided with hard copies of resources and materials from trainings.

During focus group discussions and key informant interviews, participants gave multiple, unprompted examples improved knowledge (Table 3). These included being able to clearly explain aspects of basic marine ecology and potential management measures.

Table 3: Improvements in community-level knowledge and understanding referred to during the evaluation

Examples mentioned in all locations	Examples mentioned in multiple locations	Isolated Examples
<ul style="list-style-type: none"> <li>• Breeding cycle of fish</li> <li>• Marine food chains</li> <li>• Management measures to reduce pressure on marine ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>• The importance mangrove, sea grass and mangrove as habitat for important food fish</li> <li>• Identification of different fish species present in coastal fisheries</li> <li>• The impact of destructive practices (using poison rope, breaking coral, cutting mangroves and dumping rubbish in the lagoon)</li> </ul>	<ul style="list-style-type: none"> <li>• Data collection and survey methods</li> </ul>

The project closely monitored policy developments related to *bêche-de-mer* (sea cucumber) fisheries in PNG. A harvest moratorium was still in place in ARB at the time of the evaluation. However, indications from the Fisheries Department suggested this will be lifted in April 2017. The project team socialised sustainable use guidance from the *PNG National Bêche-De-Mer Fishery Management Plan* (National Fisheries Authority, 2013). Individuals in villages were aware of general restrictions (bag limits, restrictions on use of scuba gear and bans on diving for *bêche-de-mer* at night). This guidance was also integrated into village-level management plans. All villages were considering approaches for equitable sharing of income from their *bêche-de-mer* fisheries, and were prepared to update this once guidance on quotas and buyers was available from the fisheries office.

Despite these achievements, there were significant shortcomings in the implementation and use of the fisheries survey (CARE, 2017a), and a complementary socioeconomic survey (CARE 2017b). A huge amount of data was collected for the fish catch and effort survey (over 7,000 individual fish were measured) and preliminary analysis and a data-sharing workshop were completed. However, comprehensive analysis and reporting was not completed until March 2017, after the evaluation fieldwork was complete. Although the completed fisheries report has the potential to contribute to understanding of marine ecology in the ARB, it was completed too late for meaningful use for awareness raising or to inform management.

### Marine management practices are changing

In focus groups discussions and key informant interviews, all communities referred to changes in coastal and marine management that have occurred during the project. These include enforcing bans on destructive fishing practices such as the use of mosquito nets for



fishing, using toxic “poison rope” (*Derris elliptica* root), breaking coral to collect shellfish, night-time spear gun fishing, and ring barking of mangroves (see Table 4).

Table 4: Changes in marine management practices

Examples mentioned in all locations	Examples mentioned in multiple locations	Isolated Examples
<ul style="list-style-type: none"> <li>Banning use of mosquito nets for fishing</li> </ul>	<ul style="list-style-type: none"> <li>Banning "poison rope" (Rogos, Tapongal, Balil/Sirot, Tuhus)</li> <li>Organising beach and coastal clean up (Balil, Tuhus)</li> <li>Banning breaking of coral (Tapongal, Rogos)</li> <li>Mangrove replanting (Tuhus, Tapongal)</li> </ul>	<ul style="list-style-type: none"> <li>Ban on spear gun fishing at night (Tanaheran)</li> <li>Ban on ring barking mangrove trees (Tuhus)</li> <li>Total ban on the use of nets (Balil/Sirot)</li> </ul>

In some cases these changes were brought about through a re-invigoration of existing regulations (*tambu*) specified in village by-laws, for instance banning the use of poison rope. Community members attributed these changes to increased knowledge within communities as a result of participating in the research and trainings described above. This created the impetus for community level conversations about management practices. The universal ban on mosquito nets was also attributed to a mosquito net distribution carried out by the Department of Health in November 2016. During the distribution, health officials provided warnings about the human health risks of ingesting pyrethrum, and the damage that it causes to marine ecosystems.

Focus group participants felt that these measures were generally effective in their own villages. However, they were quick to point out examples of individuals in other villages were still carrying out destructive practices. The evaluation team witnessed occurrences of this – for instance Balil villages had banned the use of all fishing nets, however individuals in Sirot (across a small channel from Balil) were still using nets. Participants felt that the marine resource management plans are essential for more systematic protection of marine resources.

During the evaluation, we saw examples of proactive actions intended to protect marine habitat and coastal ecosystems. These included small scale mangrove replanting by youth groups in Tuhus and Tapongal, which were instigated by increased awareness and enthusiasm following project trainings, and participation in data collection activities. *"Before, we just ring barked mangroves in this area, but now we've really seen the importance of mangroves in protecting us from storms, and we are already doing some replanting"*, explained a male key Informant in Tuhus Village.

The project also supported village-level coastal clean-ups (rubbish collection on land and shallow waters), which were intended coastal to be a tangible coastal protection activity and raise awareness about rubbish disposal. This activity has continued independently of project

support in Balil (as a volunteer activity by school children each week, and an annual village-wide “blue day”– see Box 1). Participants in the female focus group in Balil said that a cleaner coastline is a significant outcome of the project.

#### Box 1: Coastal Clean Up in Balil



*Women stand in the Balil channel, following coastal clean up activities. Photo: E Boydell*

One of the significant changes that the project has brought about has been changing attitudes toward waste management. “Before, rubbish, old clothes and garden waste all ended up in the ocean”, explained Eugenia. Eugenia (who was also a community data collector during the fisheries and marine ecosystem assessment) worked with other women in Balil to organise a coastal clean up, involving the whole community.

The coastal clean up and marine awareness sparked other big changes. “People have stopped dumping rubbish – they don’t dump rubbish any more because they realise it damages the coral and sea grass”. It also inspired the VA chairman and school principal to organise a monthly clean up involving school children, and the village now plans to organise a “blue day” coastal clean up and awareness raising event each year.

Due to the late development of the marine management plans, the effectiveness of these plans will depend primarily on behaviour change without material support for activities that improve social and ecological outcomes. This material support could have been used as an incentive for the implementation of project plans. Following their support visit in October 2016, WCS Fisheries Experts provided a number of recommendations including the establishment of a ‘net-swapping’ program to enable fishers to trade in their small-mesh gillnets (i.e. <2.5 inch mesh) with larger mesh gillnets (i.e. >2.5 inch). These recommendations were not followed up by the project team.

## Outcome 2

### Climate resilient agricultural practices have continued to spread, with strong uptake of Kitchen Gardens and Composting

Data collected during routine project monitoring, and verified during this evaluation, indicates that resilient agricultural practices promoted by CARE have expanded during the project implementation period. Most noticeable is the use of homestead kitchen gardens: these were introduced by the previous CBA project and over 200 households on Nissan and Pinepel are now using kitchen gardens (see Table 5). People explained major reason for this was the convenience of having gardens close to houses, and they are highly productive.

Table 5: Uptake of Kitchen Gardens in Nissan District

Island	# Households with Kitchen Gardens	Total # HH (2011 Census)
<b>Nissan</b>	153	1,074
<b>Pinepel</b>	56	154
<b>Total</b>	209	1228



Figure 6: a couple in Balil in their extensive kitchen garden – at least 7 edible crops are visible.

In addition, practices of crop rotation and the “big hill” composting & mulching techniques are now being applied in traditional food gardens, particularly on Pinepel. A female focus group participant explained:



*“The big hill is the perfect size for our plots, and we can now grow two additional crops in the same space. Our taro and yams are much larger now that we are using the technique”*

- Female focus group participant, Rogos

Many of the people who were applying kitchen gardens and other climate resilient agricultural techniques explained that they had not received CARE trainings. Instead, they had learnt or copied these techniques from others who had been more closely involved with CARE’s work. This is a good indication that the project extension approach - training a core of women and men from each village, and providing small material support (tools, seeds, fencing equipment) - is an effective method for diffusing agricultural techniques.

Participants are self-reporting higher yields as a result of using the promoted practices, and are also planting with risk management in mind. In Balil, people are now planting “emergency foods” of Banana and Cassava in their kitchen gardens as food reserve. Previously, it was unusual to plant these crops within villages, but have the potential to be sustained during periods of drought when they are kept close to houses and can be kept alive using waste water.

One shortcoming of the project was that it did not provide a component focussed on weather and climate information. Such information could be used to plan livelihoods and be an important source of early warning. Limited communication on Nissan poses an understandable challenge. However, future projects should seek to understand what forecast information is available (including from traditional and meteorological forecasting); potential channels of communication to Nissan (VHF Radio and Mobile Phone) and for local interpretation and dissemination of the forecasts.

**Women and men are now using livestock management practices promoted by the project, including enclosing pigs and chickens. Uptake of improved pig management is particularly high in Pinepel**

Livestock management was a major focus of the PACAM project. At the start of the project no pigs were penned – they roamed freely and foraged. However, pigs were also the largest cause of destruction to food gardens and kitchen gardens. The project supported CBO Kirapim Laip to provide a series of village-by-village and school-based trainings on livestock and poultry management, accompanied by a set of training manuals to support replication. Kirapim Laip also worked with community members to establish a demonstration chicken enclosure and deep-litter piggery in each village, using locally available materials.

*Table 6: Project monitoring data on pig and livestock enclosures. Source: project monitoring data*

Island	# Pig enclosures	# Poultry enclosures	# HH with a livestock enclosure	Total # HH (2011 Census)
<b>Nissan</b>	85	40	111	1,074
<b>Pinepel</b>	66	33	90	154
<b>Total</b>			201	1228

By the end of the project, at least 201 households are enclosing livestock (Table 6). This exceeded the project goal. Notably, there is almost a universal uptake of pig management in

Pinepel with most pigs now enclosed, and changes to village bylaws to sanction pig owners. This is discussed in more detail in Box 2.

Given the cultural change this pig management entails, this is a significant achievement within the project timeframe. Construction of animal housing (especially deep-litter piggeries) is labour intensive. Soils on Nissan and Pinepel are shallow, so construction of piggeries requires the challenging manual excavation of limestone bedrock. Bush material collection for construction is also labour intensive. The limited cash economy on Nissan means there is limited capital to invest in alternatives such as commercial pig and chicken wire. During the evaluation, we observed a number of additional piggeries that are partially constructed but not yet in use. This is an indication that the uptake of pig management is likely to continue beyond the project

### Box 2: Pig management in Pinepel



*A row of deep litter piggeries in Rogos village. Photo: E Boydell/CARE*

In all three villages in Pinepel, there is a significantly higher uptake of climate resilient livestock management practices than on Nissan. On Pinepel, the majority of pigs are now enclosed and an increasing number of poultry owners are using chicken coops. Factors that contribute to the uptake of practices promoted by the project include:

- greater food insecurity and less arable land on Pinepel – if pigs destroy food gardens the implications are greater than on Nissan
- stricter enforcement of village level laws about compensation owed if pigs destroy gardens. In Rogos, a village member took a case against a customary Chief to the village court. Having a Chief in court is highly unusual in itself and has since driven change – the has now come on board, and village bylaws have been amended to include higher penalties for people whose pigs destroy gardens. Similar measures are being considered in other villages in Pinepel, and also in Nissan.

The project delivered nutrition training delivered to 48 people in December 2016. The training was led by a nutrition specialist VSO working with the ABG Department of Health, and focussed on locally available non-marine sources of protein. This complemented the other outcome 2 activities promoted the project, and the goal of reducing pressure on marine resources. Participants were encouraged to repeat condensed version training in their own villages using the materials provided during the training. This happened in Balil 1 Village in January 2017, and during the evaluation focus group, women from Balil indicated that over 60 attended the training. Follow up training was also planned in Tanamalit and Rogos.



## Outcome 3

Activities under this outcome intended to strengthen the capacity of the Nissan District Administration and the Nehan Community Government (NCG, formerly the Council of Elders – consisting of traditional chiefs and elected representatives) to undertake marine resource management.

The intended end point was for the NDA and NCG to use community level marine resource management plans to inform a whole-of-District coastal and marine management strategy. A second sub-outcome was to support ABG regional policy and planning for gender sensitive adaptation, coastal and marine resource management, strengthening bottom-up planning and supporting budget proposals made by the NDA to the ABG. The final sub-outcome was to draw on CARE's 8 years of experience working on Nissan to demonstrate a scalable model for community based adaptation, bringing ABG officials to Nissan to observe local CBA activities and then continue on a scoping visit to other Atolls (possibly Fead/Nuguria, a more remote atoll group to the north of Nissan).

Performance against this outcome was affected by the extended absence of a project manager to lead strategic engagement with the NDA and the ABG. It was also constrained by the limited capacity of the NDA – during the project, the NDA downsized from 5 permanent staff to 2. Part of the design for Outcome 3 anticipated that the project would strengthen the NDA's capacity to lead evidence-based planning for coastal and marine resource management. Given the capacity constraints of the government, this was probably over ambitious.

The PACAM mid-term review recommended that the CARE team focus on activities to achieve outcome one and two, and less on outcome three. This was sound advice, given the level of ambition in Outcome 3 and the capacity constraints for both CARE and the NDA. Nonetheless, having a clear whole-of-district marine resource management plan would allow for more coherent oversight of the village level plans, particularly in relation to cross-border issues. A clearer focus on Outcome 3 could have would have ensured that learning from climate change adaptation on Nissan was shared more broadly in the ARB and PNG.

### **Research on marine and coastal ecosystems and fisheries involved community members, and shared results with district and local level government to varying degrees of effectiveness**

The Fisheries Survey and Coastal and Marine Ecosystem Assessment involved members of the original CBA core groups, and other interested community members. Women and Men – predominantly youth – were trained in the data collection approaches and supported to carry out the activities. Through data Interpretation workshops, the project engaged members of the NDA, NCG and Village chiefs. These workshops catalysed discussion of how findings could inform marine resource management. The workshop for the rapid coastal and marine ecosystem assessment, in particular, left a significant impression on the NDA.

### **A policy forum brought together stakeholders from Nissan, the ABG and the National Climate Change and Development Authority, however engagement with the ABG was inconsistent**

As part of the no-cost extension, the project organised a Bougainville Climate Change Policy Forum in February 2016. The forum was effective in bringing together representatives from

Nissan and Pinepel (including the District Administration, local CBOs, Community Government and core group members) with the ABG, the National Climate Change and Development Authority and other NGOs. The forum gave the chance for people from Nissan to showcase project to other levels of government. The presence of the ABG DMO and the National Climate Change and Development Authority opened space for dialogue between different levels of government. The Climate Change and Development Authority has commenced implementation of the “Building Resilience to Climate Change in Papua New Guinea” project funded by ADB, and lessons from PACAM may be able to inform this initiative.

The project provided support to Lawrence Smith, a member of Kulis village to establish a community-based organisation called Balel Environment, including creating links with the Bougainville Bureau for Environment and Conservation. It also provided support and mentoring to Kirapim Laip as Directors Chris Avena and Frank Lackdy registered the organisation as an NGO in PNG. They were contracted by the project to provide livestock management training. This has built their capacity to replicate this training in other locations.

The project has also engaged the ABG Bureau of Environment and Conservation, and the Fisheries Office in the Department of Primary industries in Outcome 1 activities. The Senior Policy Officer from the BBEC has accompanied CARE on a number of field trips and provided a critical role in data interpretation and analysis. However, engagement with other stakeholders in Buka has been inconsistent. Although the changing policy and institutional arrangements for climate change within the ABG have created challenges, a consistent project manager could have facilitated regular engagement with elected officials and ABG/Government of Papua New Guinea, and the media.

### 3.3 Efficiency

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Costs of working in small remote atolls are high and create implementation challenges. However, the project took measures to ensure cost-efficient implementation of activities and manage logistical challenges including supporting the establishment of local CBOs, and creating efficiencies through links to other funding sources.

The PACAM project is currently a major source of non-government support to Nissan and Pinepel. For the majority of the implementation period, staff worked remotely from Buka, visiting Nissan and Pinepel for up to a month a time to provide specific inputs. Working in isolated group of islands, accessible only by small boat over open sea, creates logistical challenges and high operating costs. Other challenging contextual factors include the failure of the Digicel phone network on Nissan in late 2015, creating communication challenges with communities and the NDA from Buka. Marine weather creates significant delays and added costs for field visits, and fuel shortages in Bougainville also resulted in field inputs being postponed or cancelled. It is also difficult to recruit and retain staff to work in such a difficult and remote location – staffing was a major factor affecting implementation and is discussed in more detail below.

The foundation laid by CARE's previous work supported efficient implementation of this project. These included the relationships and the existing knowledge and capacity the within communities and with the NDA and NCG. CARE's ownership of boat created significant savings – no scheduled shipping is available, and boat charter is PGK 3500 (USD 1100) in addition to PGK 2500 (USD 790) for fuel for per return journey.

The simultaneous implementation with a project funded by the Australian Humanitarian Partnership Agreement (HPA) contributed to the advancing gender equality and women's empowerment. The funding allowed for technical support for the implementation of the project Gender Strategy, including participatory gender analysis conducted in early 2016. Lessons from Nissan were also shared in a CARE regional research report on "Advancing Resilience through Gender Equality" (Sterrett, 2016).

The project also created efficiencies through collaboration and partnership with other agencies to support project outputs. This included

- Basic Marine Ecosystem Training (WCS)
- Rapid marine ecosystem assessment (University of PNG)
- Nutrition training (ABG Department of Health/VSO)
- Climate resilient livestock management (Kirapim Laip).

This external expertise ensured high-quality inputs, and avoided "reinventing the wheel". The marine ecosystem training provided by WCS helped to set the course for subsequent outcome one activities including fisheries catch and effort assessment, and the marine management planning. However, a long-term partnership with WCS for ongoing technical

support could have improved the delivery Outcome 1, and supported the sharing of lessons under Outcome 3. Longer-term partnership did occur in Outcome 2, where the project supported the establishment of new CBO Kirapim Laip. Kirapim Laip provided continuity to the delivery of outcome 2 activities during staff turnover. Engagement of other ABG and NDA staff to participate in project activities, including marine ecosystem assessments and training, played an important role in contributing to Outcome 3.

### **Staff absence and turnover created implementation delays**

Staff absence and turnover affected project implementation. This included a 6-month absence and subsequent resignation of the international project manager following an injury, and the resignation of a national senior project officer who was acting in the role in her absence. CARE managed this by promoting a senior field officer to a management position, with the Bougainville programme manager taking greater involvement in day-to-day management. However, the project essentially operated with only 1 field staff member, a skipper and an administration officer for 6 months of its implementation. This resulted in delays to a number of activities, as noted during the mid-term review (PACAM, 2016). Payments of PACAM grants are based on the completion of milestones, which were also delayed. The remaining staff members did not have the time to analyse community-collected data from the fisheries catch and effort survey in a timely manner. As section 3.2 explained, this is a significant shortcoming given community-level time and effort involved in collecting data.

In line with the mid-term review recommendations, project staffing was significantly augmented during the six-month no-cost extension period, with the recruitment of a national project manager, two junior field officers, and 5 casual staff. Both the junior field officers and casual staff are based on Nissan. This was critical to completing key project activities, including marine management plans, and on-going support to livestock and agricultural management. At the time of the final evaluation, we noted the significant progress that had been made as a result of this augmentation.

### **The project shifted from "cluster-based" organising approach using core groups, to a "village-based" organising approach open to the whole community.**

In the initial design submitted to PACAM, the project intended to support existing "core groups" of individuals trained in climate resilient agriculture and disaster risk reduction to manage the impacts of climate change. These gender-balanced groups were formed around "clusters" of three to five villages (see Annex 3 for a list of the clusters). The evaluation of the previous CBA project found these core groups and clusters were a highly efficient organising approach (CARE 2015).

The approach suggested by the design was to re-orient these core groups to carry out data collection and awareness-raising on marine resource management. These groups would also support the development of marine resource management plans at cluster level, resulting in the development of 6 plans.

At some stage early in project implementation, the project team made the decision to change the approach taken, placing less emphasis on training core groups as voluntary extension agents, instead providing support to a broader range of extension agents. In a KII, a former project manager explained that the core groups "were not working well", with members not

repeating training in the broader community. In focus groups in Tuhus and Tapongal, male community members explained that core group members (who were predominantly female) did not have the influence or organising skills needed to carry out their role. People who were, and in many cases still identified, as core group members disputed this, saying that they were ready to provide support but were not called on by their communities. The other challenges for core group members is that clusters cover large geographic areas, and they may have to walk for up to an hour to attend trainings and core group meetings for their cluster.

In addition, at some point during discussions with villages, the project agreed to change from completing one marine resource management plan per cluster (a total of 6) to one per village, with the exception of Balil 1, 2 and 3, Sirot, and Siar which are preparing a joint plan (a total of 17). This was communicated with PGRD and reflected in the project performance milestones. This occurred in response to village level feedback. Villages wanted to prepare their own plans, which could be enforced by village level by-laws – avoiding the need for more complex enforcement mechanisms across villages. A village level approach has also led to stronger engagement of chiefs and However, the change to village level training and planning represents an intensification of project inputs required for planning activities.

This shift in approach also influenced the implementation of Outcome 2. During the MTR, the reviewers were concerned that climate-resilient agriculture and livestock management practices were not widely evident. Since that review, partner Kirapim Laip has conducted extensive livestock management training at village level. The project also employed one casual staff member per cluster to support the construction of demonstration pig and chicken enclosures, as well as the rejuvenation of village nurseries. These casual staff had all been part of previous core groups. During the final evaluation, the team observed that this had been effective given the time available – seedlings from the nurseries were growing in kitchen gardens in adjacent villages and in some cases had spread further.

The project has ended up with a hybrid between a cluster-based approach led by core groups and a village-based approach with some paid casual staff. Given project delays a shift to this more intensive village level deliveries ensured that outcomes were reached, however it has left a lack of clarity for core groups who were part of project activities. This will be discussed further alongside findings on Sustainability, in Section 3.4.

### 3.4 Sustainability

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When focus group members were asked what is most likely to be continued after the project funding ends, all groups responded “kitchen gardens”. A number also said “pig pens” and “big hills”. The ongoing, accelerating uptake of agriculture and livestock management practices promoted by the project suggests that this will be sustained beyond the grant pe. Community members and village governments are now copying practices and institutional arrangements from one another.

As discussed in section 3.2, there has been strong uptake of household kitchen gardens. During the transect walks, we asked members of households with kitchen gardens where they learnt the agricultural practices they were applying. Although a small number were part of core groups or had attended a project-led training, the majority explained that they had learnt from or copied their neighbours after seeing the yields that they were achieving. This effect was particularly noticeable in food insecure villages (Rogos, Tanamalit), as well as villages where good market access (Balil, Lihon) allows women and men to sell vegetables as a source of income.

The uptake of livestock management practices, particularly enclosing pigs, is also likely to continue beyond the end of the project. Other villages have heard about the changes to village by-laws in Rogos, which enforce stronger sanctions against the owners of wayward pigs. The chiefs and community government representatives in Balil 1 & 2 are planning to introduce similar measures in 2017. Women and Men in Balil 1 have also agreed on a plan where village members make a financial contribution to a central fund over a 6-month period, which will be used to purchase fencing materials. Village members hope that this, combined with the sanctions, will subsequently increase pressure and incentive for neighbouring villages to take similar measures.

CARE and the project partner, *Kirapim Laip*, have consistently promoted approaches to agriculture and livestock management that can be applied with locally available materials. However, their training and IEC resources also provide advice on the appropriate use of imported materials (such as the use of pig and chicken wire, fertilisers). This approach means that the approaches can be sustained without significant inputs, but people will understand how they can make judicious use materials purchased elsewhere.



Figure 6: Seedlings are shaded in a project-supported nursery in Tanamalit. Completed in November 2016.



Following recommendations in the mid-term review, the project provided support to revitalise and re-establish 6 nurseries. The casual field staff led construction. A few core community members had made remarkable progress since November 2016, with all nurseries fully constructed, and all but one having carried out at least one seed distribution. As one of the paid field assistant explained *“the payment has really helped me... but I plan to continue the work after the project is gone”*. One shortcoming to the sustainability of nurseries, however, is that the project had not provided refresher training on seed collection and storage (although this was provided in a previous phase of the project) and had not established a business plan to see how the nurseries may be able to generate revenue to pay for more seeds in the future. Education has not been provided on identifying open pollinating seeds. Therefore, despite the enthusiasm of those involved, the long-term viability of the nurseries is uncertain.

***It is too early to determine the sustainability of marine resource management planning and the locally managed marine areas***

As discussed in the section on effectiveness, it is too early to determine the sustainability of the suite of marine management activities under Outcome 1. The project raised awareness and commitment to action, but the marine management plans only came into force late in the project. Participants in interviews and focus group discussions repeatedly said that strong enforcement is key to the effectiveness of the plans. However, the project team did not have time to support implementation and monitor effectiveness.

A number of focus groups explained, however, that awareness raising has changed behaviour and will have a sustained impact. Women in Balil explained that the village has sustained efforts to prevent the dumping of rubbish in the lagoon. School groups are leading a monthly coastal clean-up, and an annual clean up “blue day” is already being planned for World Oceans Day in late 2017.

***Sustainability is strengthened by engagement with village-level institutions, youth and school engagement, and the establishment of formal community-based organisations. However, in some cases this came at the expense of work with core groups established by the previous CBA project.***

The project emphasised engagement with community government structures at district and village level. This ensured influence and may support sustainability: *“The activities will continue, because chiefs are taking ultimate responsibility for the implementation of the marine resource management plans”*, explained members of the men’s focus group in Rogos. In Tuhus, women’s and men’s focus groups felt that it was important to have influential people involved in the project, to ensure that the activities continue after the project completion. The project appears to have managed the risks of working with customary government, including the possibly of entrenching existing gender norms. In the focus groups, women explained that the inclusive planning process meant that they were happy with engagement in marine resource management planning, and did not feel that the livestock or marine resource management created additional burden for women.

The project also benefitted from the engagement of youth in project activities. *“It is really important that the youth are involved”*, explained a focus group member in Tapongal. *“They*

*will be the ones that will truly adapt to the plan and we need to have them on board to make sure it works for future generations*". The project also engaged with schools – providing training on marine ecology and agriculture and livestock management. This is the first time school children have been actively targeted in CARE's work on Nissan. A project staff member devised this component for the PACAM project following the success of CARE Vanuatu's programs that engage schools as part of whole-of-community approaches to climate change adaptation and disaster risk reduction. A School teacher and Principal from St. John of God Primary School provided positive feedback on programme engagement with schools, though recommended that *Kirapim Laip* and CARE staff work with teachers beforehand to review lesson plans and ensure that the delivery is appropriate for students.

The establishment of community-based organisations *Kirapim Laip* and Balel Environment is a major achievement both for CARE and the individuals involved in these organisations. *Kirapim Laip* has been approached by other NGOs to replicate livestock management training in other areas of Bougainville, and the fact that one staff member is from Balil means that a level of ongoing support on Nissan is likely. One criticism levelled at both organisations is that the key individuals of the project are all men. While CARE needs to respect the autonomy of these local CBOs, future support could include development of gender strategies, and similar support and mentoring to female-led organisations. Future projects could also link such organisations to small grants programs, mentoring them as they develop funding applications.

The shift away from a focus on core groups, explained previously, leaves communities without a clear strategy for how these groups might continue into the future. Furthermore, the project has not left structures in place for marine resource management. However, all focus groups did see a role for the core groups in supporting the implementation of marine resource management plans. The focus groups identified that the core groups still had latent capacity. *"We can revive the core groups without CARE's support"*, explained a focus group participant in Tanamalit. *"The core group has gone quiet. But if we ask them to get together again, they will. The VA [community government] can ask them kindly to provide refresher trainings to the whole community"*. In the remaining weeks and final weeks of the project, the project should engage core groups and communities in conversations about how they will carry the plans forward.

## 3.5 Impact

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*“We are protecting our marine resources, and growing more food in our kitchen gardens. We don’t know what the future will bring, but we know we are better prepared”*

Female Focus Group Participant, Rogos Village

**In considering the impact of the project, the evaluation takes a step back to reflect on the contribution of activities to the goal increasing community resilience to the impacts of climate change. The project has had a demonstrable positive impact on building community resilience to the impacts of changing climate, and broader environmental and socioeconomic changes. This varies across the project. Impact is considered against the outcome goals, local capacity, and women’s empowerment. A key factor for achieving impact are the strong relationships that CARE has built with local communities after 8 years of work in the District.**

***Outcome 1: planning, assessment and awareness raising has laid the foundation for sustainable management of marine ecosystems, which are an important safety net during drought***

The healthier a coastal and marine ecosystem is, and the more that human pressures are managed, the more able an ecosystem is able to cope with the increased pressure of climate change impacts. This is a central principle of ecosystem-based adaptation (IIED 2016) and this principle informed the design of this project. Whilst we cannot yet measure the impact of the village level marine resource management plans, we can see the impact of the trainings and participatory processes on community members’ knowledge and attitudes.

The level of interest that FGD participants showed in the developing community-based marine resource management plans was high. Communities already had a level of awareness and understanding of marine management during project design. The more scientific approach to marine resource management – through the Fisheries survey (which allowed for greater understanding of fisheries help, stock composition and fishing practices), as well as the rapid ecosystem assessment of sea grass, mangrove and coral - was enthusiastically received. Both included a participatory approach, which involved community members in the data collection process, and the findings were shared at data sharing workshops with the Nissan District Administration and community government. The science-based participatory approach allowed community members to improve their ecological understanding in practical ways.

These sentiments were expressed often in FGDs and provide a strong foundation for the development of marine resource management plans and more importantly adherence and enforcement of ecologically-based restrictions in the plans.

Healthy marine ecosystems are an important safety net in times of food insecurity. As trade connections improve, they also have the potential to be a more significant source of income. Marine management plans have draft provisions for regulation of bêche-de-mer harvest, and communities are prepared to update them based on guidance from the Department of Primary Industries. However, an assessment of bêche-de-mer was not part of the marine ecosystem assessment, so local sustainable harvest levels are unclear. If well managed, with equitable benefit sharing, the fisheries in Nissan could provide an important source of income. To enhance the impact of fisheries management on community resilience, future

initiatives could look at cooperative models and savings and loans measures that spread risk and mean that increased cash income can be saved as a safety net.

**Outcome 2: improved agricultural practices are contributing to reduced pressure on marine resources. Significant improvements in livestock management is reducing risks**

The second objective of the project was to enhance climate resilient livelihoods, in order to reduce harvest pressure on marine resources, and improve resilience. There is some indication that this objective is being achieved. Participatory exercises with participants of 5 focus groups indicated that staple food crops (sweet potato, cassava etc.) are of greater importance than they were at the beginning of the project<sup>3</sup> (see Figure below). There is also a decline in the relative importance of fishing, indicating that the increase in staple food production is having the desired result – decreasing pressure on marine resources. The importance of kitchen gardens has increased slightly – and it is important to note that prior to 2014 no kitchen gardens existed on Nissan, so CARE’s work has unlocked an additional food source.

While fishing remains important, women in Balil said that over the last year *“Fishing was not really practiced to the same extent... because there was enough food from our gardens and trees”*.

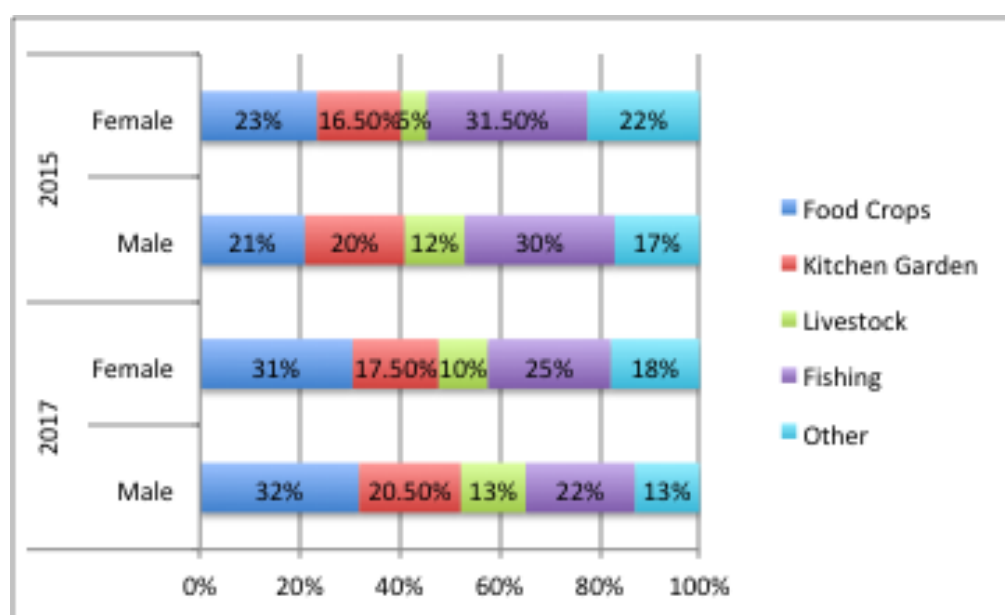


Figure 7: Relative importance of food sources

Transect walks through the village confirmed the findings of the focus group discussions. The climate resilient agricultural practices that were being promoted by the project were being widely practiced.

Changes in the importance of livestock for food were minimal, apart from on Pinepel (Rogos) where the relative importance of livestock almost doubled (see Figure below). People explained that this was due to attention placed on livestock management in Rogos over the

<sup>3</sup> It should be noted that baseline information was collected during a time of drought so impacted on food availability at the time.

past few months. On Pinepel, pigs are now universally enclosed, which is a significant achievement. There has been generally higher uptake of practices promoted by the project, including kitchen gardens and the “big hill” livestock management technique on Pinepel, quite possibly due to the higher levels of food insecurity. Women in Rogos explained that destruction of gardens by pigs has markedly decreased. The enforcement of local by-laws, combined with the techniques learnt during the project, were important factors that contributed to this impact. The story of Rogos is spreading in Pinepel and Nissan, and Ward Assemblies in other villages are considering taking similar measures.

The enclosure pigs is a significant behavioural and cultural shift in a place where pigs were ritually hunted ahead of feasts. We pressed both the focus groups and members of the community government what would happen to the penned pigs in the event of a food shortage – particularly if they were unable to make the feed encouraged during projected training. Their response was unanimous “*we’ll probably eat them*”, they said.

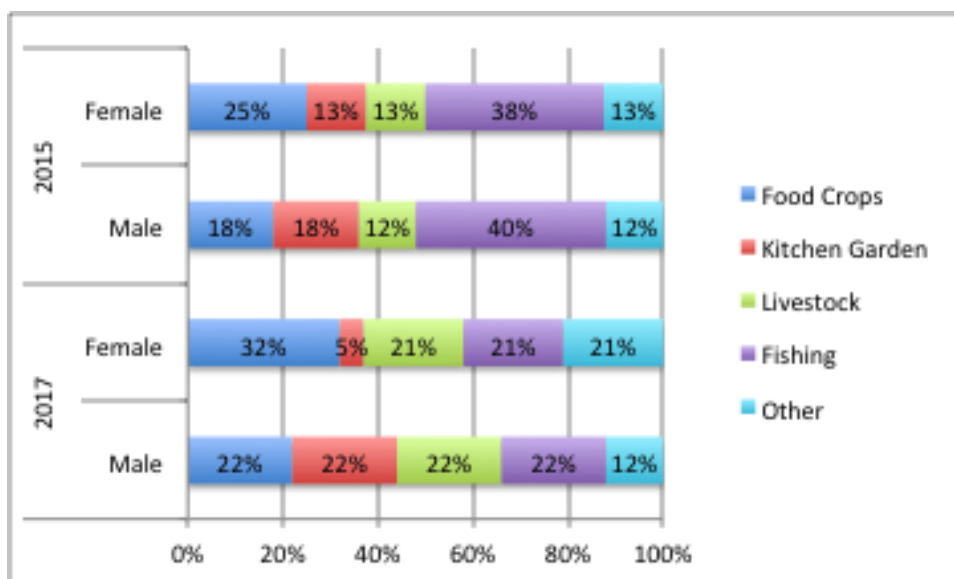


Figure 8: Relative importance of food sources (Pinepel)

The relative importance of copra production has changed over time, with more regular exports allowing the market for this cash crop to expand to a greater number of areas. The project has not directly targeted cash crops, as market opportunities were very limited at project inception. However this appears to be shifting – resulting in interactions with intended project outcomes. Communities that had existing access to a market (e.g. Balil, Lihon) focussed heavily on copra production during the drought, using the coconuts both for food and water, as well as selling copra to buy rice. Since that drought, Villages which previously had limited access to copra markets (e.g. Tuhus) are now able to sell a greater proportion of copra than in the previous decade. Along with marine management activities in Outcome 2, there is potential to support value chain development and benefits sharing in the face of a growing, albeit fragile market.



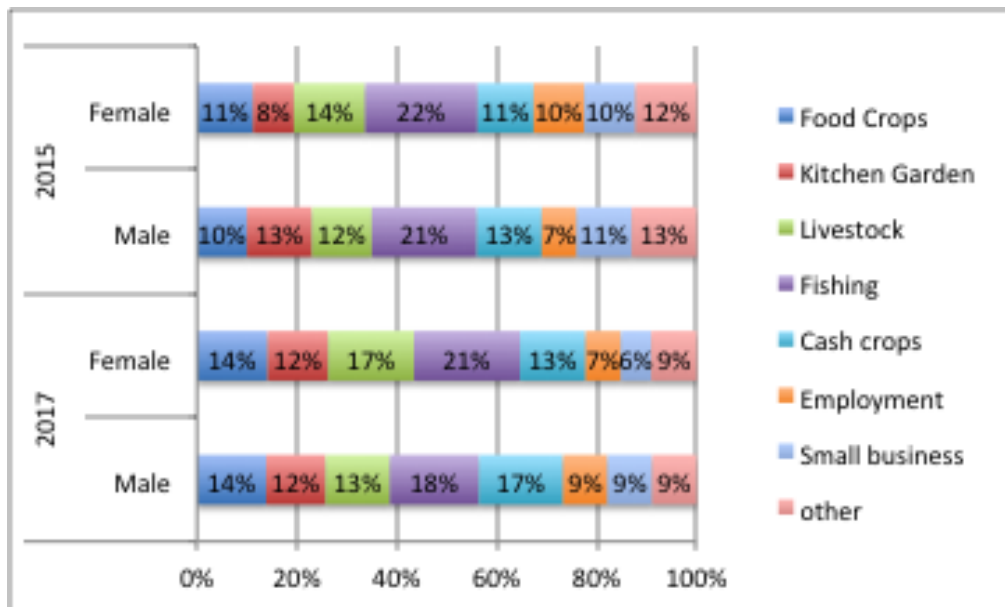


Figure9: Relative importance of income sources

However, this nascent market is under threat. In late 2016, villages close to the southern end of Nissan noticed that an invasive disease was stopping coconut production and killing trees. CARE staff members think that this could be Borgia Syndrome, a fatal phytoplasma disease affecting coconut trees. This is of serious concern – coconut trees are a source of food, water and important for construction materials at all times of year. They are critically important for the people of Nissan and Pinipel to survive during droughts, in some cases being the only source of emergency water. CARE and the NDA informed the DPI and the National Agricultural and Quarantine Inspection Authority (NAQIA), and provided samples to the NAQIA chief entomologist in late 2016. CARE has also provided information about minimising the transport of coconut palm materials and betelnut from Nissan to Pinepel. They are yet to receive a conclusive response. Following up on results, and developing a response strategy should be an immediate priority.

**Changes in institutional capacity for marine resource management and climate change adaptation are modest, but the support provided to two CBOs: Kirapim Laip and Balel Environment supports sustained impact**

As discussed in previous sections, although climate change is a matter of serious concern for both the ABG and NDA, limited resourcing in both the project and different levels of government limited engagement. As a staff member at the ABG explained “We went to as many trainings as we could, but with so few staff and travel to Buka, there’s often only one of us in the office which makes it hard to leave”. The mid-term review presented concerns that the project was not coordinating well with the NDA, and the project team have responded by conducting courtesy visits on every trip and organising quarterly meetings with the NDA and NCG.

## 3.6 Gender

**PACAM, and CARE’s ongoing engagement with Nissan and Pinepel have had a significant impact on Women’s Empowerment and Voice.** The project was designed to demonstrate an approach to community-based adaptation that advanced gender equality. A Gender Analysis and Action Plan was developed for the project, and an Australian-government funded Gender and Resilience research project ran in parallel with the PACAM project. This provided training to staff and communities, and contributed to the project’s gender-responsive implementation approach. Both the PACAM design and action plan and the gender and resilience work were based on CARE’s Women’s Empowerment Framework (WEF – Figure 10). The WEF defines Women’s Empowerment as the combined effect of changes in a woman’s own knowledge, skills and ability (agency); the power relationships through which she negotiates her path (relations); and the surrounding environment of norms, institutions and policies that shape her choices in life (structures).

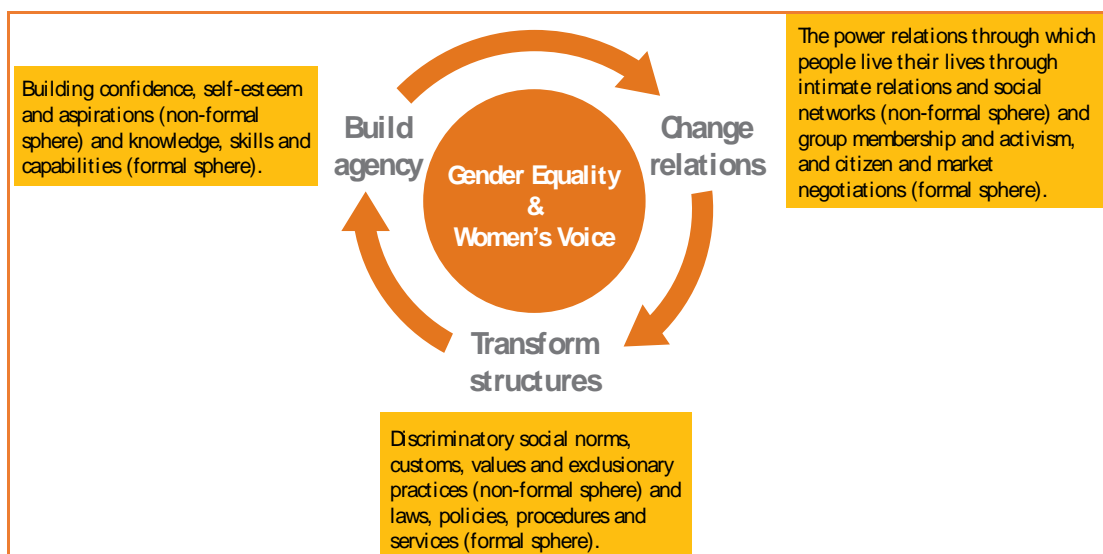


Figure 10: CARE Women’s Empowerment Framework

Progress has been made across all three domains, and was noted consistently across all focus groups carried out during the evaluation, and a number of key informant interviews. Participation in project trainings has been a major factor in influencing women’s skills, confidence and feeling of self-empowerment. The project has actively encouraged women to participate in trainings, including through measures such as setting quotas and discussing the importance of women’s participation in the project. The PACAM-funded project also built on previous phases of work, which actively sought to involve women who faced marginalisation within their own communities – including single mothers (see Box 5)

As Loretta Titus from the NDA explained “Women are participating much more. During the evaluation, I talked to one woman who I’ve known for a number of years. She was really speaking up for the group, was confident to organise the logistics for project activities. I know her – a few years ago she wasn’t like this. I asked her if it was from being involved with CARE and the project trainings – she said yes”. Men also commented that women are more confident in community settings and more involved in village affairs, and a member of the Men’s focus group in Tapongal explained “Because women attended workshops, they have the confidence to talk in front of the community. They are less scared to lead events in the village”.

### Box 5: Young Tanamalit women look to the future

“Its not us who will be carrying the practices of the projects forward into the future, it’s the young mothers” - noted an older woman in the woman’s focus group in Tanamalit.

Domitila (23) and Debra (29) are both from Tanamalit Village. Debra has one child and Domitila has two. “*We are both single mothers*”, explained Domitila. As part of its work on Nissan and Pinepel, CARE has made a conscious effort to engage single mothers as a group vulnerable to climate change and engage them in project opportunities.



Domitila (L) and Debra (R). Photo: E Boydell/CARE

“*I was interested in the work that CARE was doing*”, said Domitila. “*I got involved in the PACAM project, and attended agriculture training*”. She has since been part of training on marine resource management and the marine planning. She has a kitchen garden at home, and with encouragement from Domitila, her brother has built a pig enclosure near the village, and is managing pigs using the approaches promoted by the project.

Debra hasn’t been as closely involved in the project – she is a teacher for the early childhood education program and doesn’t have as much time. However, she is helping her father with his kitchen garden and learns as much as she can from the other women involved in the project.

Domitila recently attended the nutrition training that the PACAM project facilitated with the ABG department of health, and based on what she learnt will be leading nutrition training in Tanamalit. I asked her if she is confident to present the training. “*Yes, its no problem*” she said.

In the women’s focus group in Tanamalit, an older woman said “*it won’t be us leading this work in 5 years time – it will be the young mothers*” she said pointing at Domitila and Debra. “*They will be the leaders then*”.

Women also explained that the greater variety of food crops have improved nutrition within their households, and women in some villages were able to generate income through sale of vegetables. This small-scale local income generation was an unintended but important outcome of the project for

women. Women explained over the long term, however, it is the water tanks provided by the CARE-EU and Australian Aid projects that have created the biggest difference in their lives. They have significantly reduced time taken for collecting water and wood for boiling it, and reduced the incidence of waterborne disease.

These changes in women's agency and voice are supported by changes to **relationships** at household and community level. *"Before,"* explained women in Balil *"when we had done a training, and we tried something new at home, men were sceptical and didn't listen. There has been a big change – now men are supporting women when they have new ideas"*. When men were asked why this was, they cited the training provided by a previous CARE project on Women's rights, and the subsequent discussions that the project has facilitated. The focus of CARE on women's inclusion and voice has sent a strong signal to men, including community leaders, about the importance of including women in the project. According to Martin Rimen, a community leader in Tanamalit *"Before, men made the decisions and women had to follow. Now the women are making decisions and the men follow. There's more two-way communication."*

The facilitation approach has also supported women to build collective power and voice. Women, men and youth tend to work in separate groups during workshops and planning sessions, then come back together to discuss and share ideas. For young people, working in mixed gender groups in project activities including training and marine data collection activities is supporting generational change. *"A big part of the change has been youth coming together in project activities, working in groups in trainings, supporting one another and listening to another and sharing ideas"*, explained a woman in the Rogos focus group. *"They are building a lot of respect for each other, and they are more confident too"*.

This respect and change is extending to relationships at household level. Men in Rogos gave some examples: *"Before women just worked in the house, Now men are involved in washing kids, scrubbing the floor – you even see men chopping firewood now"*. Women independently confirmed these changes. In Balil, the changes go further, in large part because of the agricultural training and work together on implementing some of the approaches supported by the project. They were also helping women more in gardens. *"Before men only did the digging, cutting wood and making walls. Now they are involved in planting and harvesting. They are also helping to collect and carry firewood"*, a female focus group participant explained. Before it was considered "tambu" (against customary rules) for men to carry harvested food and firewood but this been relaxed. Men are doing more cooking – the women in Balil described cooking responsibilities as "equal" – and some men are also doing laundry.

In multiple villages women and men said that men have taken on these responsibilities so that women can attend project trainings, including the residential trainings that have been offered. Unprompted, women in Balil said that there has been a drop in domestic violence – they described incidence before as high, but explained that it had stopped as a result of increased dialogue within the community about domestic violence. While this is positive, it should be taken with caution, as gender-based violence was not discussed with other focus groups, and incidents did occur in 2016 (Sterrett, pers. communication).

This raises the question of whether these changes to gender equality and women's voice, which have had a significant impact on women's lives, are structural and can be sustained. Men in Tanamalit said that they see the emphasis on Women's empowerment and voice in CARE's programming as significant. Men noted that women are taking the lead on a lot of the programme activities. They see this in two ways – perceiving CARE's work as men see it as a "women's program", but also part of a bigger trend. Women in Balil see things in a similar light – *"Most projects that have come are for women, are recognising women – and now men are doing the same"*. Women gave the example, multiple times, of the marine management planning process as a model for how they can be involved

in village affairs. The presence of Female project managers has been an inspiration for women, as well as the female field officer since October 2016. She has been described as role model for young women in Nissan and Pinepel communities as an example of what young women can achieve with education.

### **Box 5: Leadership and women's voice in Yotchibol**

**Frida** is from Yotchibol village at the southernmost tip of Nissan Island. She was one of the early adopters of the climate resilient agricultural practices promoted by the program, including building her own kitchen garden, composting and rotating vegetables, legumes and root crops.



*Photo: E Boydell/CARE*

She has been able to sell food from her garden, locally, providing important cash income. Since November 2016, she has also coordinated the rejuvenation of the nursery in her cluster as a CARE field assistant.

One of the biggest things she has noticed is the change in relationships with men. In the core groups and now in the other village activities she leads, her male counterparts listen to her now and work together with women on the gardens. This has spread more broadly in the community, where women are making decisions.

She feels like the training provided by the program has given her knowledge and confidence to talk to community members – this is the biggest change for her.

She feels like women are now taking the lead on most of the projects in the community. She enjoys helping youths to take part in trainings and work on their own gardens, and has noticed the positive changes that have come from young women and men working together on project activities.

However, challenges remain. Although the evaluation did not visit Holy Cross high school, project and NDA staff talked about how girls are not achieving the same educational attainment as boys – something that was confirmed by the two male high school teachers interviewed as part of the evaluation. The reasons for this were not explored. Older male community members were critical of the way that women are having reserved spots in upcoming local level elections. Older men in Rogos felt that family leadership still belongs to the man, and also felt that women are getting a “free ride” in



politics. *“Women and men compete all through school”* said one member of the focus group in Rogos, *“but when it comes to politics they have spots reserved for them”*. A notable example of how things can revert back to traditional approaches has occurred in the joint marine management plan development in Siaken 2 cluster. Women in Balil and Sirot were happy with initial engagement of women in Marine Management Plan development, but once negotiations between villages needed to occur the discussion reverted back to negotiations between male community leaders, excluding women.

## 4. Conclusion and Recommendations

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The “Improving Community Resilience in Nissan” project has supported advances in marine resource management, livestock management and food security for women and men in Nissan District. The project has built on CARE’s 8 years of work with the women and men of Nissan District, aiming to increase food and water security and increase resilience to the impacts of climate extremes and climate change. Because of dependence on subsistence agriculture and the lagoon and other fisheries for food security, a focus on marine resource management, livestock and resilient agriculture can play an important role in building adaptive capacity. Likewise, CARE’s focus on gender equality and women’s voice has brought about significant, long-term change.

However, adapting to climate change, along with other forms of social, environmental and economic change, will be an ongoing process for women and men in Nissan District. The following recommendations are designed for CARE and other actors working on small atolls to build on some of the strengths of the project and learn from the shortcomings.

### A. Consolidate and complete: priorities for project completion and follow up

When the evaluation fieldwork was complete in February, project staff were planning an additional 2 trips to Nissan before the end of the project the following month. While no funding is currently available for project activities, CARE staff in the Buka office have indicated that they are in a position to provide a level of remote follow up beyond March, and maintain relationships with the NDA and Nissan Island communities. The following recommendations are intended for CARE and partners during this project completion and follow up using existing resources.

#### **A1. Ensure community-based marine resource management plans are completed in each village, validated with the Nissan District Administration and Nehan Community Government, and lodged with the ABG.**

At the time of the evaluation, community-based marine resource management plans were still incomplete. 16 plans were subsequently validated by the NDA and NCG. CARE should work with the NDA to ensure that these plans are lodged Bougainville Bureau of Environment and Conservation, along with Fishery and Rapid Marine Ecosystem assessments. This will ensure that the areas under the plans are registered as Locally Managed Marine Areas under the PNG Policy on Protected Areas (2014).

#### **A2. Look for mechanisms to sustain achievement under Outcomes 1 and 3, including developing an island-wide management plan, and link ABG, NDA and CBOs to small grant providers.**

The aggregation of village marine resource management plans level plans into a District-wide marine resource management plan would contribute to the achievement of outcome 3. A district-wide plan could be supported by a district coastal and marine management committee, linked to existing government structures, in order to address cross-boundary management issues. The fishery and ecosystem assessments indicate that Nissan is highly biodiverse with relatively intact ecosystems. The strengthened capacity for marine resource management, and the presence of CBOs, means that Nissan could be well positioned for

small grant funding to continue coastal and marine management work. In future projects, CARE could provide administrative support and mentoring to groups implementing grant funding.

### **A3. Continue to monitor the spread of a fatal disease affecting coconut palms, and identify response options**

Coconuts are important for day-to-day food and water security on Nissan, and are critical in times of drought when people depend heavily on coconuts and fish. CARE and the NDA reported a fatal infection that was affecting coconut trees in Nissan in late 2016, and sent samples of leaves to the National Agriculture Quarantine and Inspection Authority (NAQIA) senior entomologist to determine the cause of the infection. At the time of project evaluation, no response had been received. If Bogia syndrome has reached Nissan, this is a matter of serious concern. CARE and the NDA should follow up with NAQIA and the National Agriculture Research Authority (NARI) in Madang, and the Department of Primary Industry in Buka, and facilitate links between the NDA, ABG and National Government to develop a response.

### **A4. Support ABG to establish a coordination mechanism for sharing information about climate change adaptation activities in Bougainville.**

CARE facilitated a climate change workshop in Buka as part of the project. However, coordination with other agencies working on climate change adaptation (for instance, with IOM on their work on other atolls) has not been consistent. The lack of a mechanism for sharing information means that lessons and resources cannot be readily shared, and inputs to policy and strategy formulation are uncoordinated. This is not CARE's responsibility alone, but the ABG could be supported to coordinate actors working on climate change adaptation, marine resource management and disaster risk reduction. This could build on and strengthen Disaster Risk Management cluster activities.

## **B. Learn and expand: recommendations for future programming**

Although the project has had a significant impact for women and men on Nissan and Pinepel, vulnerability of subsistence farmers living on Nissan and Pinepel to the impacts of climate change remains. The marine resource management practices used in Nissan and Pinepel are relevant to other island and coastal contexts in ARB and PNG. Climate change adaptation projects need to link to strategies that strengthen resilient livelihoods, promote equality, and protect ecosystems in the face of environmental, social and economic change. The following recommendations are intended for CARE, and other agencies and donors intending to strengthen resilience.

### **B1. Develop clear, people-centred theories of change with staff and partners, grounded in a clear analysis of the resilience challenge the projects are seeking to address, and linked to clear strategies to promote women's empowerment and voice.**

The project mid-term review noted that the project team struggled to articulate a clear model for community-based adaptation. By the time of the final evaluation, however, staff and communities were able to explain how project components fit together – but were not always able to make the link between activities and particular climate hazards they were seeking to address. Resources such as CARE's Theoretical Guidance Note on Resilience (CARE, 2017) propose useful conceptual frameworks for articulating how and why project activities contribute to resilience. Likewise, the project team, over time, began to differentiate key

impact groups (i.e. women, and young women and men). However, these were not identified at the outset. A clear theory of change and a strong M&E framework, and could have supported more targeted project implementation, and stronger evidence of outcomes and impact.

**B2. Develop and share models for climate resilient agriculture in small islands in Bougainville, exploring links with agri-climate information and improved use of seasonal forecasts.**

CARE has significant experience and evidence of effective strategies for community-based adaptation to climate change in Nissan. These should be drawn on to inform the development of a more robust theory of change to inform future programming. Some uncertainty remains within communities about potential impacts of climate change, and when such impacts may be experienced. There is also very limited access to short term weather information, seasonal forecasts and other early warning information.

In the short term, the project could address this by linking to the ADB-funded *Building Resilience to Climate Change in PNG* project, which has a mandate to support the rehabilitation of VHF radio networks. It could also be supported in other CARE projects (i.e. the Cocoa Project) through SMS-based forecasting and early warning information. Such information could reduce crop losses related to extreme rainfall and slower-onset hazards at could be applicable on other resource constrained atolls and islands.

**B3. Future Projects should support equitable access to emerging markets, as well promoting village savings and financial management as a safety net**

The economic situation in Bougainville has reached a point where markets are developing, and there are a greater number of income generating opportunities including bêche-de-mer, copra, sale of livestock, and the potential of commercial flights bringing tourism and opportunities for trade. There is a high level of demand from communities for such initiatives, to generate cash income. Using expertise from projects in PNG and globally, CARE is in a strong position to support equitable access to these opportunities – including supporting business and financial literacy, and strengthening existing savings and loans schemes. These would have the added benefit of building resilience by spreading risk and benefits. The failure of a number of income generating opportunities on Nissan indicates the need to take a cautious approach. Nonetheless there are emerging opportunities to support the equitable development of the cash economy

**B4. Undertake further consideration of extension and community organising approaches.**

In a remote location such as Nissan, it is necessary for any project to consider its strategy for community organising. This could include working with core farmers or women's groups, existing customary, government or church structures. However, the project design, team and community need a clear strategy for participation and training, and an approach that supports equity in opportunity and any financial incentives.

## C. Partnerships for wider impact

**C1: Establish formal partnership with WCS for future marine resource management work, to ensure ongoing technical support and rigour. Establish Memoranda of Understanding with the relevant government staff, and work to engage elected officials and senior advisors to strengthen the impact of the work.**

The project was CARE's first experience moving into Marine Resource Management activities. Working closely with both WCS and the Fisheries Office ensured that CARE was able to harness the technical expertise and experience of those organisations to provide marine resource training and fisheries inventory. CARE also had positive engagement from the Bureau of Environment and Conservation. However, WCS was subcontracted to provide specific inputs, when the project would have benefitted from ongoing technical advisory support from WCS. CARE missed the opportunity to draw on their experience in supporting. Likewise engagement with Government was positive but at times ad-hoc, without a clear strategy for managing staff turnover in both CARE and Government agencies such as the Disaster Management Office. Project specific MOU would support stronger, ongoing engagement

**C2: Continue to support the establishment of community-based organisations such as Balel Environment and *Kirapim Laip*. Provide gender training to partner organisations, and support local organisations develop gender strategies and action plans.**

The establishment of *Kirapim Laip* and Balel Environment are the result of initiative of Nissan Communities, but the project provided support and engagement with these groups. These groups, particularly *Kirapim Laip*, are now well positioned to access other small grant funding to implement local initiatives. All are currently headed by men, so CARE should continue work to include them in gender equality training, and to develop gender action plans. CARE should also seek to support women-led organisations in a similar manner.

**Recommendation C3: Build stronger linkages between CARE PNG's work on Bougainville Atolls and CARE Vanuatu's work in Tafea province, including building links between subnational governments**

CARE is undertaking similar resilience building work in Bougainville and Tafea province in Vanuatu – including work on food security, disaster risk reduction, and building the capacity of local government. While islands in Tafea have greater connectivity than Nissan and Atolls district in Bougainville, there are similar logistical challenges. Through their respective PACAM projects, CARE moved into marine and natural resource management in both Bougainville and Tafea, and informally shared at a PACAM regional meeting in Fiji. This resulted in successful school-based activities from Vanuatu being replicated in Nissan.

CARE should look to formalise relationships between its Vanuatu and Bougainville resilience activities. Opportunities include sharing resource, as well as staff secondment and exchange between Vanuatu and Bougainville. There could also be opportunities to build relationships between officials responsible for Climate Change, Disaster Risk Reduction the Provincial Government in Tafea and the ABG, through mechanisms such as study tours and knowledge exchanges.



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# Annexes

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## Annex 1: Terms of Reference

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## Annex 2: Evaluation Matrix

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## Annex 3: List of clusters and villages

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