The Efficacy of Climate Change Projects in Samoa

Evaluating Community-Based Adaptation Initiatives

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Abstract

This study examines the efficacy of community-based climate change adaptation projects in Samoa, comparing evaluations conducted by agencies responsible for the projects to the opinions of the community involved. Specific projects with community-centered missions and methods are compared across different environmental agencies in Samoa, including the Ministry of Natural Resources and Environment (MNRE), Secretariat of the Pacific Regional Environment Programme (SPREP) and United Nations Development Programme (UNDP). The research examines how closely the implementation of each project matches its initial goals, how the success of implementation and community involvement is measured by the agency and whether evaluative tools were used on the project upon completion. Primary research was conducted at project sites through surveys and interviews to conduct an external assessment of the community's education from, involvement in and satisfaction with the project. Review of materials and opinions from each agency are compared to the primary research to show the overall success of the project. Discrepancies between evaluations by the agencies and community feedback following project completion reveal areas for improvement in evaluating and maintaining projects post-implementation, including opportunities for long-term monitoring. The information produced by this study seeks to improve evaluative tools for future community-based climate change projects in Samoa.

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Introduction

Effects of Climate Change in Samoa

As a small island nation and Least Developed Country by United Nations assessment, Samoa faces high vulnerability to the effects of climate change on all sectors of industry, economy and livelihood. Shifts and changes in the global climate in the coming century and even decades will have a major impact on the regional climates of the Pacific and local communities in Samoa. Samoan culture and existence, like those of other Pacific Island countries, is dependent upon limited natural resources, making Samoa increasingly susceptible to the negative impacts of natural disasters, including cyclones, storm surges, drought and flooding.[1] Projections for climatic changes in the Pacific resulting from global warming and anthropogenic causes include increased frequency and severity of extreme events, such as cyclones, reduced rainfall, an increase in temperature and sea level rise of up to 5 mm per year.[2] These alterations of biophysical cycles will produce a significant impact on all sectors of Samoan society, mainly effecting agriculture, coastal resources, water resources and human health. Changes in weather patterns will greatly alter the physical conditions of agricultural production, which may cause a severe decline in the ability to grow both industrial and sustenance crops. For coastal resources, rapid sea level rise will quickly consume Samoa's coastline, resulting in reduced habitable areas near the coast and the relocation of many coastal communities. Reduced rainfall and potential drought will greatly reduce potable freshwater resources available, necessitating adaptations in disaster risk reduction and preparation for extreme events throughout Samoa in securing water availability for each village. Biophysical effects will result in several threats to human

[1] World Wildlife Fund South Pacific Programme, 'Climate Change in the Pacific' (Suva, Fiji: WWF South Pacific Programme, 2003) 10.

[2] WWF 11

health, including reduced sanitation due to water shortages and decreased nutritional value of foods due to changing growth conditions on Samoa's farms and plantations.[3]

The Need for Adaptation

Given the adverse biophysical and socioeconomic effects of climate change in the Pacific as a region, national governments throughout the Pacific need to take action in generating climate change policies and legislature that will facilitate adaptive measures at the community level. Without action at the national and international level, "entire communities might have to abandon their traditional lands, homes and possibly their nations if climate change cannot be addressed."[4] For developed nations, this manifests itself in behavioral changes and mitigation of anthropogenic causes of climate change, such as greenhouse gas emissions. For developing countries, and especially Pacific Island countries, however, the effects of climate change may threaten the existence of communities and nations.[5] Countries with few natural, institutional and social resources are left with the least capacity to adapt to climate change, leaving them susceptible to its negative impacts. Pacific Island countries produce 0.01% of global greenhouse gas emissions, but they are host to fragile ecosystems and developing economies that are most vulnerable to the effects of climate change.[6]

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[3] Dean I. Solofa and Anne Rasmussen, 'Vulnerability and Adaptation' Presentation (Second National Communication Workshop, Samoa Meteorology Division, Ministry of Natural Resources, the Environment and Meteorology, 20 Sep 2005.

[4] Naheed Haque, 'Message to accompany the film *A Grim Reality: Climate Change in the Pacific Islands*' (Alofi, Niue: Pacific Islands Forum Meeting, 21 Aug 2008) 1.

[5] Haque 2.

[6] WWF 22.

Community-Based Approach to Adaptation

In climate change adaptation efforts in the Pacific, a community-centered or community-based model has prevailed at the local level of international and national program implementation. In societies where the community is the dominant governing institution, this makes for an effective and culturally appropriate approach to adaptation. According to researcher David Addison, community-based models take a bottom-up approach that involves grassroots education and resource mobilization instead of a traditional top-down approach. As a result, evaluative indicators of success include an increase in community knowledge and behavioral change that positively contribute to the project's goal. Community-based adaptation models directly involve coastal communities, who will be most affected by global climate change, in the planning and implementation of the project, making an effective and efficient use of development funds. A drawback of community-based projects, however, is that they often require national or international action for implementation, and while communities can influence government authorities, they are unable to control decisions at higher levels.[7]

Evaluation Tools for Community-Based Adaptation Projects

Because community-based projects focus on the importance of human interactions in achieving an end goal, evaluation and monitoring of these projects must respond accordingly in assessing the quality of communication and interaction between community members and the agencies responsible for the project. With climate change adaptation projects, this type of evaluation of community involvement typically complements conventional assessments that use statistical or economic analysis.

[7] David Addison, Research Archaeologist, American Samoa Community College, Email Interview, 5 May 2009.

One evaluation tool developed by UNDP is the Vulnerability Risk Assessment (VRA), which uses four indicative questions to determine locally-relevant climate change vulnerability issues in a community. The questions assess the current vulnerability of a community, assess future climate risks, formulate an adaption strategy and evaluate the ability to continue the adaptation process after project completion. Questions are asked in three to four 'community-level' meetings throughout the planning and implementation processes, and responses are given a numerical score, which undergoes a calculation process that incorporates qualitative answers before arriving at a final average score for the project's overall success. The VRA conducts "repeated evaluations of project effectiveness and climate change risks"[8] to track changes in VRA scores or variation from baseline values determined before implementation. A change in scores indicates a change in the vulnerability of the site and the community. Following implementation, the VRA uses a perception-based approach that directly asks the community if the project was targeted toward a relevant goal, holding the project accountable to the community and allowing for adaptive management based on community feedback.[9]

Other less extensive tools are also used to conduct internal and external assessments following a project's completion. Quarterly Progress Reports (QPRs) and Mid-Term Review documents are published within MNRE to report on the status of all ongoing projects within the division. In assessing projects, the QPRs compare expected outcomes and actual outputs based on pre-determined indicators and also include cost-benefit and economic analyses.[10] They inquire about challenges and issues encountered

[8]Andrew Crane Droesch, Nickey et al, 'A Guide to the Vulnerability Reduction Assessment' (UNDP Working Paper, UNDP Community-Based Adaptation Programme, December 2008) 2.

[9] Droesch, Nickey et al 3.

[10] Peniamina D. Leavai. Climate Change Programme Officer, Environment & Energy Unit, United Nations Development Programme. UNDP Office, Matautu. 6 May 2009.

during implementation, the solutions used to address these issues and recommendations for future action beyond the current scope of the project.[11] Assessments of community-based projects at MNRE are conducted during the initial phases, halfway through implementation and after project completion, ensuring thorough tracking of the project's progress. Once conducted, these assessments are sent to UNDP where the progress and development of project goals are tracked.[12] External assessments are also conducted, often by independent consultants hired by MNRE to avoid the agency's bias in assessing the success of a project.[13]

Community-Based Adaptation Projects in Samoa

Interviews with partners, officials and climate change officers at the Ministry of Natural Resources and the Environment (MNRE), Secretariat of the Pacific Regional Environment Programme (SPREP), United Nations Development Programme (UNDP) and Pacific Environment Consultants Ltd. (PECL) revealed two major community-based initiatives in climate change adaptation programs in Samoa.

Community-Based Adaptation (CBA) Programme, UNDP

Community-based climate projects that are currently in place in Samoa are those included in the Community-Based Adaptation (CBA) Programme under Small Grants Programme (SGP) of UNDP. Although a global program with ten pilot countries, Samoa is the only CBA country in the Pacific. CBA projects target two main goals: building community resilience and building ecosystem resilience to the effects of climate change. By achieving these goals, the CBA program seeks to ensure sustainable

[11] Anne Rasmussen. Climate Change Officer, Ministry of Natural Resources and Environment. MNRE Office, Apia. 29 Apr 2009.

[12] Leavai 6 May 2009.

[13] Rasmussen 29 Apr 2009.

environmental benefits by creating a strong adaptive capacity at the community level. Funding for CBA projects is provided by the Global Environment Facility (GEF) and AusAID in the form of planning grants of $2000 USD and full project grants of $50,000 USD. The criteria for projects eligible for CBA funding are threefold: 1) projects must feature a community-based organization; 2) projects must secure global environmental benefits as defined by GEF , specifically with a biodiversity conservation or land degradation focus for adaptation projects; 3) projects must address a climate change-induced stressor and not a human-caused source. CBA projects in Samoa use the National Action Plan for Adaptation to Climate Change (NAPA), published by MNRE, in addition to an on-site technical team to establish focal areas for assessment. In Samoa, one CBA project in Vaovai, Upolu is currently undergoing implementation and eight projects have just been approved to receive $3000-$4000 USD each for local adaptation projects. One upcoming project is located on Upolu while the remaining seven will be implemented on Savai'i in the Gagaemauga III district, allowing for autonomy within villages as well as cooperation within the district. To evaluate successful outputs, CBA projects use the VRA tool as well as the Impact Assessment System (IAS) developed by GEF.[14] [15]

CBDAMPIC Program, MNRE and SPREP

The Capacity Building for Development of Adaptation Measures in the Pacific Island Countries (CBDAMPIC) program funded by the Canadian International Development Agency (CIDA) was implemented in Samoa between 2002 and 2005. Directed by MNRE and SPREP, the agencies selected two communities based on their

[14] Kevin Petrini. Consultant, Climate Change Adaptation, United Nations Small Grants Programme. UNDP Office, Matautu. 30 Apr 2009.

[15] 'Climate Change in Samoa.' Samoa Small Grants Programme, UNDP.

vulnerability to the effects of climate change. CBDAMPIC projects were carried out in Saoluafata on the island of Upolu and in Lano on Savai'i. Vulnerability at these sites was determined using both qualitative consultations and interviews with village residents as well as quantitative data on climatic changes.[16] SPREP consulted on the project and presented each village with a number of adaptive options based on the vulnerability data gathered. The suggested adaptation measures were 'soft options,' or less intrusive projects, such as mangrove protection and coastal reforestation. After meeting with the *matai*, or chiefs, of the village, local fishermen and the women's group, SPREP presented an appropriate set of adaptation measures. The community in Saoluafata, however, requested the building of a seawall, which became part of the final project approved by MNRE, along with the protection of coastal springs.[17] Village justification for the seawall included the protection of the *malae*, village green, and burial grounds located near the coast. The project in Saoluafata involved 674 people in 88 households with the intention of protecting against flooding from sea level rise and extreme events. In Lano, the CBDAMPIC project focused on harvesting freshwater resources and coastal spring protection. Implementation included coastal spring cleanup and protection as well as the introduction of a community water tank. The project in Lano involved 720 people in 98 households to protect freshwater resources and adapt to decreased rainfall and salt intrusion from sea level rise.[18] Both projects also included village workshops on basic climate change education and awareness and were left to be maintained by the village following project completion.

[16] Rasmussen 29 Apr 2009.

[17] Espen Ronneberg. Climate Change Advisor, Secretariat of the Pacific Regional Environment Programme. SPREP Office, Vailima. 4 May 2009.

[18] Peter Konmenhoven, 'CBDAMPIC Economic Assessment of Pilots,' (International Global Change Institute. Hamilton, NZ: University of Waikato, Feb 2006)18-25.

To measure community satisfaction with project implementation, MNRE and SPREP conducted an internal assessment asking each village to give their opinions on how successfully the project was carried out and how happy the community is with the project. According to climate change officers at MNRE and SPREP formerly involved in the project, it was difficult to obtain an objective evaluation of the CBDAMPIC program from these pilot sites, and the agencies ultimately received a collection of subjective views from the village communities.[19] To avoid any bias generated by the agencies responsible and evaluate the success of the program, SPREP also hired an independent consultant from New Zealand. This external, economic analysis of the CBDAMPIC program in Samoa concluded that the country benefitted from SPREP's presence in the projects and their work in community consultations and participation as well as their focus on the two pilot communities.

Reasons for Study

This study examines community-based projects related to climate change adaptation in Samoa. The scope of the research includes projects involving MNRE, SPREP and UNDP. The research conducted investigates the initial purpose of the project, incorporation of community members into the planning and implementation process, and tools developed to evaluate the success or effectiveness of the project. Primary research was conducted to determine whether any evaluation was completed by the agency or agencies responsible for the project as well as to create an external assessment of the project's efficacy and relevance to the community. A comparison of evaluation tools developed by the agencies to the external assessment seeks to produce a set of general guidelines and/or focal areas to be used in evaluating the success of future climate change adaptation projects in Samoa, community-based or otherwise.

[19] Ronneberg 4 May 2009.

Methodology

The objective of this study is to evaluate current methods of measuring efficacy in community-based climate change projects in Samoa. These evaluations are intended to help provide recommendations for evaluative tools for future projects based on agencies' current methods of evaluation and on-site field research that assesses actual community involvement in and satisfaction with the project from the external perspective of the researcher. Specifically, the research addresses the following questions:

- What tools are currently in place to evaluate the success of community-based climate change projects (i.e. achieving initial objectives, relevance to the community)?
- How often are these tools used? How often is project completion sufficient to use evaluative measures?
- How does the community view the success of the project (i.e. implementation, effectiveness, relevance, sustainability)?
- How can evaluative tools for community-based climate change projects be improved for the future?

Existing literature on effects of climate change in the Pacific, climate-based adaptation policy in Pacific Island countries and global conferences, and community-based adaptation initiatives in the Pacific were initially reviewed for a site-specific history of climate change in the Pacific. Published sources of information for this study include a variety of primary materials, including project proposals, site-specific management plans, evaluation tools, reports, articles, pamphlets, concept notes, communications and brochures developed by MNRE, SPREP, UNDP and PECL, as well as relevant ISPs of former SIT students. Materials such as brochures and pamphlets published by the agencies conducting community-based adaptation initiatives provided

perspective on how these organizations promote and advertised community-based projects to the general population. Other multimedia sources on climate change in Samoa and the Pacific were also consulted, including an in-person lecture, a digital presentation and a documentary film.

The primary research conducted for this study consists of two major components. One source is interviews with representatives from MNRE, SPREP, UNDP and PECL who work in the climate change divisions of these agencies and either currently work or have worked with communities directly in site-specific adaptation projects. These contacts were referred by the ISP advisor and the interview subjects themselves.

The other major primary source consists of brief interviews and surveys. Brief, five-question interviews were conducted in Safa'i, Savai'i during an educational workshop for the launch of a CBA project site. Ten subjects were selected from the workshop attendees. The interview asked five questions about subjects' knowledge of climate change and observations of climate change characteristics preceding the implementation of the CBA program as well as their current involvement in community-based environmental initiatives (See Appendix A). In addition to brief interviews for the CBA project, surveys were distributed in Saoluafata, Upolu and Lano, Savai'i, sites where the CBDAMPIC program was implemented from 2002 to 2005 (See Appendix B). The survey consisted of thirteen questions inquiring about awareness of the program, involvement of community members in the planning and implementation of the program, continued monitoring of the program by the agency or agencies responsible, and overall impressions of the agency and the program. An additional question asking about the subjects' understanding of the concept of climate change was added upon the request of a former officer involved in facilitating the program. The survey was administered to ten randomly selected subjects in each village.

Major constraints of conducting research through both methods include limited time available in each village, limited language abilities of the researcher, lack of contact or cooperation with the *pulenu'u* or any member of either village as an informant and guide for the CBDAMPIC surveys, and the literacy of the subjects in either understanding the survey questions, familiarity with taking surveys or both.

CBA Brief Interview Results

Interview subjects in Safa'i were selected from villagers who attended the climate change education workshop given by a small team representing the CBA program, which was largely attended by the men of the village, which, according to Cedric Schuster who conducted the workshop, is typical because women remain at home during these initial meetings.[20] The sample, as a result, reflects a specific subgroup of the larger population. Eighty percent of voluntary participants were male with 30% age 35 or older. All interviews were conducted entirely in Samoan. A summary of the results can be found in Appendix A.

Observations of Climate Change Characteristics – All participants had noticed significant changes in the weather or environment in recent years. In commenting on their answers, many subjects mentioned increased heat intensity from the sun and less rainfall. When asked if these climatic changes had affected their house, food/agriculture, fishing and health as listed options, 70% chose all options with 100% including food/agriculture and 90% including human health in their answers.

Climate Change Knowledge and Community Participation – Ninety percent of subjects answered that they heard of the term 'climate change' before the workshop. When asked to define the term, most answers referred to changes in the weather with

[20] Schuster, Cedric. UNDP Community-Based Adaptation Programme Workshop. Safa'i, Savai'i. Observations. 13 May 2009.

descriptions of alternation between sun and rain. Participants were also asked whether they are currently involved in any environmental protection groups in their village and 70% answered yes.

CBDAMPIC Survey Results

The ten randomly selected individuals in both Saoluafata and Lano gave varied opinions of the planning and implementation processes of the CBDAMPIC projects. A summary of the quantitative survey results can be found in Appendix C.

Saoluafata

Survey participants in Saoluafata represented varied subsections of the village population. Fifty percent of subjects were 35 years or older with one individual's age not listed, and 60% were male. Only 70% of listed their village as Saoluafata with the remaining 30% listing, Foaluga, Salelesi and Fusi for this item. When noting their level of education, 40% listed some secondary, 30% completed secondary school and 10% received some tertiary education or higher with 20% not listed.

Efficacy and Awareness – Basic knowledge of the CBDAMPIC project or '*Polokalame o le Fesuiaiga o le Tau*' ('Climate Change Program') in Saoluafata was high with 90% of subjects recognizing the program and 90% recognizing MNRE or SPREP three years after project completion. When asked what they thought the purpose of the program was, 70% of individuals gave answers mentioning either the village's education about or preparation for significant changes in weather patterns in the future. Sixty percent of subjects did not believe the program had achieved its purpose in Saoluafata, reasoning that many people were still not educated about the weather. When asked if any part of the Climate Change Program was currently in place, 60% answered yes.

Community Involvement – To assess the level of community involvement in the CBDAMPIC project, participants were asked to tick all listed members of the community who were involved in both the planning and current maintenance of the program. Forty percent ticked all options, 70% included the *ali'i taua* (high chief) or *pulenu'u* (mayor) and 80% included the *matai* (chiefs) of the village. Sixty percent of subjects listed MNRE as a participant in the planning process, and 50% included SPREP in their answers. Additional community members involved in the planning of the program also included the Assembly of God youth group and strong people. When identifying community members who currently maintain the project, 30% of subjects ticked all options with 70% listing MNRE and 50% listing SPREP in their answers. Other community members listed as maintaining the project also included the Assembly of God youth group and the untitled men of the village.

Continued Monitoring and Overall Impressions – Any current presence of MNRE or SPREP and continued monitoring of the project was generally positive with 40% of subjects answering 'yes' when asked if MNRE or SPREP ever come to Saoluafata and 60% saying that MNRE or SPREP provide support to the village with 30% of answers not listed for both questions. When asked what type of support was provided by the agencies from listed options, 70% listed maintenance or repairs and 40% listed funding of the project. Participants were then asked to give their overall impressions of the agencies, the success of the project and the project itself based on a listed scale, and all questions generated a 100% return rate. Responses regarding overall impressions of MNRE or SPREP were positive with 60% listing their impressions as 'very good' and 40% listing 'good.' Participants' opinions of the success of the project were also positive with 70% responding that the project was very successful, 20% saying it was 'somewhat successful' and 10% listing it as 'not successful. Reasons for success mostly commented on the increase preparedness of Saoluafata for natural disasters and climatic changes.

Overall impressions of the project, however, were generally positive but more varied with 40% of subjects perceiving the program as 'very good,' 40% listing 'good' and 20% responding that they thought it was 'poor.'

Lano

Survey participants in Lano also represented a variety of subsections of the village population with 60% of participants 35 years or older and 70% female subjects. All participants listed their village as Lano. The education levels of participants in Lano were varied but generally higher than those of Saoluafata with 30% listing some secondary education, 40% completing secondary school and 30% receiving tertiary education or higher.

Efficacy and Awareness – Basic awareness of the Climate Change Program was generally good with 80% of participants listing that they had heard of the program and 100% of participants responding that they had heard of MNRE or SPREP. Eighty percent of individuals listed the purpose of the program as involving education about preservation of or changes in the environment and resources in Lano while 20% said they didn't know the purpose of the program. When addressing the achievement of the program's purpose, 40% answered positively that the purpose had been achieved. A favorable comment listed awareness of proper waste management practices as the reason for successful achievement. Reasons for lack of achievement attributed villagers' lack of understanding to negative responses. When asked if any part of the Climate Change Program is currently in place in Lano, 70% answered 'yes,' with some answers including the seawall, road bridge, mangroves and lack of rubbish as evidence of the program.

Community Involvement – In responding to the level of community involvement in the planning of the project, 40% ticked all options, 90% included the

matai of the village and 30% included the *faifeaau* (village pastor). Ninety percent of responses included MNRE as a participant in the planning process and 60% included SPREP. Other community members involved in planning the program include the Roman Catholic youth group, the Red Cross and tourism businesses in Lano, which, according to Richard Ah Chong, owner of Lauiula Beach Fales, is because climate change will affect the business of the tourism industry in Lano.[21] When asked to identify members currently involved in project maintenance, 30% ticked all options, 80% included the *matai* and 70% included the *ali'i taua* or the *pulenu'u*. Ninety percent of answers included MNRE as involved in maintaining the project and 70% included SPREP. Other community members mentioned that contribute to project maintenance include the Roman Catholic youth group and the Red Cross.

Continued Monitoring and Overall Impressions – The current presence of MNRE or SPREP in Lano was positive with 70% of subjects responding that MNRE or SPREP come to Lano for reasons including education and the checking of sea level rise, and 80% responding positively when asked if the village receives any support from MNRE or SPREP. Sixty percent of answers listed funding as a form of support from the agencies and 60% listed maintenance or repairs. Overall impressions of MNRE or SPREP were positive across participants with 50% saying their impressions were 'very good' and 50% answering with 'good' impressions. Opinions of the success of the project were similar with 60% evaluating the Climate Change Program as 'very successful' and 40% judging it as 'somewhat successful.' Reasons for highly positive answers include village awareness of how to prepare for and protect themselves from future climate changes. One reason for lack of success listed a lack of follow-up or continued monitoring from MNRE or SPREP to maintain the efficacy of the project. In

[21] Richard Ah Chong. Owner, Lauiula Beach Fales. Lauiula Beach Fales, Lano, Savai'i. 10 May 2009

assessing the project overall, subjects had positive impressions of the program with 40% answering they had 'very good' opinions and the remaining 60% with 'good' opinions.

In a conversation with Richard Ah Chong, he attributed these 'good,' or less than excellent impressions of the project to the lack of continued monitoring by MNRE and SPREP. He noted that the village needs consistent follow-up from the agencies to maintain the project and keep some *matai* from selling sand as a profitable venture. The lack of monitoring, he claimed, contributes to the splitting of *matai* in Lano into those who sell sand for business and those who protect the environment. According to Ah Chong, Lano needs an 'outside force' to help settle internal affairs and maintain the positive effects of the Climate Change Program.[22]

Analysis of Data

CBA Brief Interviews, Safa'i

Observations of Climate Change Characteristics – As a representative sample of village knowledge preceding implementation of adaptation programs, general observations of changes in weather, climate and local ecosystems demonstrate an existing awareness of the effects of climate change in the Safa'i, even if subjects did not associate these changes with the concept of 'climate change.' All participants were also able to connect changes in weather and climate to negative impacts on their basic needs, with widespread effects observed on the quality of their food sources and agriculture as well as human health and expected lifespan. These results indicate that the adverse effects of climate change have been noticeable across the population in various areas of village life and will continue to impact the entire community if adaptive issues are not addressed.

[22] Ah Chong 10 May 2009.

Climate Change Knowledge and Community Participation – Existing awareness of climate change appears to be high in Safa'i based on recognition of the term, but qualitative definitions of 'climate change' that describe changes between sun and rain indicate a limited understanding of the concepts behind climate change. These basic definitions may also indicate the constraints of translation, as *fesuiaiga o le tau*, the Samoan term for climate change essentially means changes in the weather. Recognition of the term as describing significant climatic changes due to anthropogenic sources would require participants to have received some amount of climate change education previously, such as the workshop that was being conducted at the time of the interviews. A high percentage of people already involved in environmental protection efforts in the village present both positive and negative potential for future projects. Because many village residents are already involved in local conservation projects, introducing a community-based adaptation program may fit into the existing model. Their existing involvement in other efforts, however, may limit villagers' ability volunteer responsibility for an additional project in climate change, compromising the quality of both efforts, unless the existing programs are incorporated into the adaptation project.

The observations and basic understanding of climatic changes of participants in Safa'i with their lack of knowledge about climate change as a concept or scientific process demonstrate a challenge mentioned by multiple climate change program directors. Communities, especially fishermen often understand climate change concepts and changes in their environment through their own personal experiences, but they lack knowledge of climate change science to explain these effects. In consequence, project coordinators, such as those of the CBA sites, are necessary for establishing basic

awareness and education about climate change, and they must explain these concepts in a way that is relevant to the community.[23]

CBDAMPIC Surveys, Saoluafata and Lano

Efficacy and Awareness – In both Saoluafata and Lano, basic recognition of the project and agencies responsible three years following project completion was fairly high, showing the lasting impact the CBDAMPIC project has had on the villages. As far as understanding the purpose of the project, the 70% of participants in Saoluafata and 80% in Lano who were able to identify a purpose related to education and/or preparation for climate change represent a majority of the population, but not the entirety. The 20-30% of village residents on average who are unable list a purpose demonstrates some lack of effective communication or insufficient community participation in initial workshops and project planning meetings where the purpose would be explained. Although most participants have heard of the Climate Change Program, a smaller percentage of the representative sample is able to identify the program's purpose in the village and an even smaller 40% in both villages believe that the purpose of the project has been achieved, indicating either a lack of successful implementation or some amount of deviation from the program's initial purpose. With 60% of responses in Saoluafata and 70% in Lano confirming that some aspect of the program is still in place, this data shows that continued sustainability of the projects as a result of successful implementation. Some aspect of the projects must have been executed properly for 60-70% of subjects to successfully identify some part of it as still functioning at both sites.

Community Involvement – The community members involved in planning the projects varied between the two sites. The *matai* of the village were a highly ranked

[23] Ronneberg 4 May 2009 & Petrini 30 Apr 2009.

option included in 80-90% of answers, followed closely by the *ali'i taua* or, more likely, the *pulenu'u* in Saoluafata and less closely by the *faifeau* in Lano. Comments from participants in both villages noted the *pulenu'u* as a key figure in both project planning and implementation. The involvement of *matai* in the planning of the project corresponds to similar information from an interview with Espen Ronneberg at SPREP who noted that at initial on-site meetings, the *matai* would speak on behalf of the village and its interests.[24] Agency involvement in the planning process also demonstrated a trend across sites with MNRE included in 10-30% more responses than SPREP. This implies a heavier presence and possibly greater involvement of MNRE in planning the project than that of SPREP representatives. This trend is consistent in agency involvement in project maintenance with MNRE included in 20% more responses than SPREP across both villages. This data indicates that MNRE had either a real or perceived presence in project implementation overall that exceeded that of SPREP, possibly due to the role of SPREP as a consultant in a nationally-based project headed by MNRE.[25] In Lano, the *matai* and *ali'i taua* or *pulenu'u* also ranked highly in project maintenance, implying that the *pulenu'u* had a greater presence in project implementation in Lano while the *pulenu'u* in Saoluafata was more involved in project planning.

Continued Monitoring and Overall Impressions – Continued monitoring by the agencies showed mixed results with some Saoluafata participants reporting visits from MNRE or SPREP while Lano participants gave mostly positive answers regarding visits from the agencies. Majorities in both villages indicated that MNRE or SPREP provide continued support, mostly through maintenance or repairs of project sites with some continued funding. These results differ from interviews with officers formerly involved

[24] Ronneberg 4 May 2009.

[25] Ronneberg 4 May 2009.

in the project who said the project is currently self-monitored by the villagers and that MNRE only occasionally visits the sites to conduct field studies.[26] Overall impressions of the agencies were very positive, although participants' perception of success and impressions of the project itself were mixed. Forty percent of total answers of both villages ranked the project as 'somewhat' or 'not successful' due to insufficient climate change education in all parts of the village, indicating that the scope of the workshops and recruitment for workshop attendance by the agencies did not reach enough community members. Overall impressions of the project were also mixed with 40% of total responses ranking their opinions as 'very good,' 50% marking 'good' and 10% marking 'poor.' Fewer explanations were given for these answers, but the mixed reviews show that not all village residents are happy with the project's implementation or outcome. Contrary to survey data, MNRE offered post-project evaluations for the community to comment on the program following completion,[27] from which both officials at MNRE and SPREP received successful feedback and satisfaction with the project.[28] [29]

Recommendations

Challenges of the Community-Based Model

The community-based approach to adaptation presents several challenges in implementation. Issues of existing community knowledge base, such as village observations of changes in weather and sea patterns and their daily effects on basic needs, and its connection to formal concepts of climate change science raise issues of how agencies communicate these ideas in initial workshops and throughout project

[26] Rasmussen 29 Apr 2009.

[27] Leavai 6 May 2009.

[28] Rasmussen 29 Apr 2009.

[29] Ronneberg 4 May 2009.

implementation in terms relevant to the community. Another difficulty of community-based adaptation is finding a relevant solution that overcomes social and cultural barriers preventing action while still remaining respectful and relevant to community needs.[30] The capacity of existing adaptation projects is also a challenge in that current projects tend to provide solutions for individual issues without addressing the connections between individual projects or integrating the interdependence of ecosystems into the solution model.[31] Funding continues to be an issue for community-based projects, as funds are typically provided on a small-scale basis for pilot communities. Additional costs unique to community-based projects and especially those in islands like Samoa, such as coordinating transport across Upolu or between islands, are often questioned by funding organizations, leaving projects with insufficient monetary resources to complete implementation.[32]

Focal Areas for Evaluation

To address the challenges of community-based models, future projects and evaluations should focus on the following issues as areas for improvement.

Increased Knowledge and Behavioral Changes – A basic evaluation should assess 1) whether community knowledge of climate change effects has increased, and 2) whether community behavior has changed toward adaptation practices and preparation for adverse effects.

Community Involvement – Participation of community members should be included in every phase of the project to ensure maximum relevance and success of adaptation projects. A wide range of community members should be involved in both

[30] Ronneberg 4 May 2009.

[31] Petrini 30 Apr 2009.

[32] Ronneberg 4 May 2009.

the planning and implementation processes. This includes village leaders, such as the *pulenu'u* and *matai* as well as women's organizations, church-related youth groups and untitled men.

Communication and Relevance – Communication of climate change concepts that are already observable in the community needs to be presented in a relevant format. Educational workshops can connect the community's observations to formal climate change science by generating a collection of observable changes from village meetings and using these observations as examples of climate change concepts, such as sea level rise and increases in extreme events and weather intensity. Relevance to community needs and values is key not only in communication but also in determining climate change vulnerability and should be prioritized in all phases of the project.

Project Scope – To combat the individual nature of current projects community-based adaptation should place emphasis on conducting holistic programs that address multiple aspects of ecosystem and resource degradation. The CBA program attempts this by improving forest health and biodiversity, which contributes to the capacity of mangroves, which, in turn, contributes to the protection of coral reefs that are resistant to the effects of climate change.[33]

Long-Term Monitoring – Based on the discrepancies of the CBDAMPIC survey results and interviews with involved agencies, thorough and continued monitoring should be integrated into future community-based adaptation projects. Agencies typically abandon monitoring practices after project completion, but, as evidenced by some discontent in Saoluafata and Lano, project coordinators should take responsibility for continuing visits and assisting the community in maintaining project management. A combination of short-term and long-term monitoring systems will provide data for successful project planning as well as for tracking future climatic changes. By

[33] Petrini 30 Apr 2009.

continuing to monitor projects beyond the scope of their implementation, agencies will be able to legitimately report on long-term project efficacy and use successful projects as pilots for future programs with similar models. Limited funding and capacity within agencies may prevent effective long-term monitoring but are not major constraints in the execution of monitoring post-implementation. Institutional structure and attitudes, which shape frameworks for climate change programs, must accommodate the pressing need for long-term monitoring in improving community-based adaptation projects.[34]

Conclusions

The role of community-based adaptation projects in Samoa is significant in the country's efforts to prevent adverse effects of climate change. In a nation that is community-oriented, these types of initiatives are highly effective and may become the dominant model for adaptation efforts in the future, making evaluation and efficacy of pilot projects essential for developing future community-based adaptation efforts. Success and shortcomings of the CBDAMPIC program in Saoluafata and Lano carry important implications for the implementation of upcoming CBA projects. Areas for improvement must be incorporated into the execution and evaluation of community-based projects to improve their effectiveness and, in turn, ensure the safety and future of Samoa against the rapidly approaching effects of climate change.

[34] Leavai 6 May 2009.

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Glossary & Acronyms

ali'i taua	high chief of a village
faife'au	village pastor
fesuiaiga o le tau	climate change
malae	village green or open space
matai	village chief or chiefs elected by individual families
Polokalame o le Fesuiaiga o le Tau	Climate Change Program (ref. CBDAMPIC projects)
pulenu'u	village mayor

CBA	Community-Based Adaptation Programme (UN SGP)
CBDAMPIC	Capacity Building for Development of Adaptation Measures in the Pacific Island Countries (CIDA)
CIDA	Canadian International Development Agency
GEF	Global Environment Facility
IAS	Impact Assessment System (GEF)
ISP	Independent Study Project (SIT)
MNRE	Ministry of Natural Resources and the Environment
NAPA	National Action Plan for Adaptation to Climate Change (MNRE)
PECL	Pacific Environment Consultants Ltd.
QPR	Quarterly Progress Reports (MNRE)
SGP	Small Grants Programme (UN)
SIT	School for International Training (SIT)
SPREP	Secretariat of the Pacific Regional Environment Programme
UNDP	United Nations Development Programme
VRA	Vulnerability Risk Assessment (UNDP)

Appendix A: CBA Brief Interview Questions and Results

Brief Interview Questions

1. Have you noticed any significant changes in the weather or environment in recent years? / *Sa e maitaua ni suiga taua i le tau ma le si'osi'omaga i ni tausaga lata mai?*

2. Have these changes affected your: / *Sa iai ni afiaga ia te 'oe i*:
    a. House / *Fale*
    b. Food/Agriculture/Plantation / *Mea'ai / Fai fa'atoaga*
    c. Fishing / *Fagota*
    d. Health / *Soifua o tagata*

3. Have you heard the term 'climate change' before? / *Ua e fa'alogo muamua i le upu po'o le fa'aupua lea 'fesuiaiga o le tau?*

4. What does the term 'climate change' mean? / *O le a le uiga o le upu 'fesuiaiga o le tau'?*

5. Do you participate in any environmental protection groups in your village? *O e auai i se fa'alapotopotoga e puipuia ai le si'osi'omaga i totonu o lo tou afioaga?*

Fig. Brief Interview Results

Participant	**Age**	**Gender**	**#1**	**#2**	**#3**	**#4**	**#5**
A	20	F	Y	house, food, fishing, health	N	Sun, rain, sun, rain	N
B	21	F	Y	food	Y	The weather appears different; one day it rains and is also sunny	N
C	43	M	Y	house, food, fishing, health	y	Changes in the weather	N
D	57	M	Y	house, food, fishing, health	Y	It affects life very much	Y
E	20	M	Y	house, food, fishing, health	Y	A lot of changes	Y
F	31	M	Y	house, food, fishing, health	Y	Hot, cold	Y
G	40	M	Y	house, food, fishing, health	Y	Differences here	Y
H	31	M	Y	food, health	Y	Rain, breezes	Y
I	20	M	Y	food, health	Y	Good times	Y
J	21	M	Y	house, food, fishing, health	Y	Rain, sun, rain, sun	Y

Appendix B: CBDAMPIC Survey

Age / *Tausaga*: Gender / *Ituaiga*: Male/*Ali'i* / Female/*Tama'ita'i*

Village / *Nu'u*:

Education level/*Maualuga o a'oa'oga*:

☐ Some Primary E le'i uma a'oga tulaga lua ☐ Completed Primary Uma a'oga tulaga lua ☐ Some Secondary E le'i uma a'oga maualuga ☐ Completed Secondary Uma a'oga maualuga ☐ Tertiary or Higher Kolisi ma a'oga maualuga atu

1. Have you heard of the Climate Change Program? / Ua *e fa'alogo muamua i lenei Polokalame O Le Fesuiaiga O Le Tau?*
   ☐ Yes / *Ioe* ☐ No / *Leai*

2. Have you heard of the Ministry of Natural Resources and Environment (MNRE) or *Secretariat of the Pacific Regional Environment* Program? / *Ua e fa'alogo muamua i lenei Ofisa o le Si'osi'ogamaga ma mea fa'alenatura (MNRE) po'o Polokalame o le Si'osi'omaga a le Pacific (SPREP)?*
   ☐ Yes / *Ioe* ☐ No / *Leai*

3. What is the purpose of the Climate Change Program? / *O le a le autu moni o lenei Polokalame O Le Fesuiaiga O Le Tau?*

4. Do you think this has been achieved? / Fa'amata *ua ausia tulaga o lenei fa'amoemoe, o lona uiga, ua malamalama tagata?*
   ☐ Yes / *Ioe* ☐ No / *Leai*
   Why? Please explain. / *Aisea? Fa'amolemole fa'amatala mai lou manatu.*

5. Is any part of the Climate Change Program currently in place? / *E iai se vaega o lenei Polokalame O Le Fesuiaiga O Le Tau ua fa'ataunu'u poo ua faia i le taimi nei?*
   ☐ Yes / *Ioe* ☐ No / *Leai*
   Comments */ Fa'amatalaga e fa'amanino mai ai lau tali*:

6. Were any of the following community members involved in planning the Climate Change Program? Please tick all that apply. / *O ai o le lisi o loo ta'ua i lalo o le nu'u o lo'o aofia i fuafuaga fai o lenei Polokalame O Le Fesuiaiga O Le Tau? Tu'u le fa'ailoga fa'asa'o i tali uma e talafeagai.*
   ☐ High Chief or Mayor / *Alii taua poo le pulenu'u*
   ☐ Council of Chiefs / *Matai o le nu'u*
   ☐ Village Pastor / *Faife'au o le nu'u*
   ☐ Women's Organization / *Mafutaga a tina*
   ☐ Youth Group (please specify) / *Autalavou (fa'ailoa mai):* _____
   ☐ Ministry of Natural Resources & Environment / *Ofisa o le Si'osi'ogamaga ma mea fa'alenatura (MNRE)*
   ☐ Secretariat of the Pacific Regional Environment Programme / *Polokalame o le Si'osi'omaga a le Pacific (SPREP)*
   ☐ Other (please specify) / *Isi (fa'ailoa mai)*: _____

7. Who is responsible for maintaining the project now? Please tick all that apply. / *O ai o loo nafa ma le fa'aauauina o lenei poloketi i le taimi nei? Tu'u le fa'ailoga fa'asa'o i tali uma e talafeagai.*

☐ High Chief or Mayor / *Alii taua poo le pulenu'u*
☐ Council of Chiefs / *Matai o le nu'u*
☐ Village Pastor / *Faife'au o le nu'u*
☐ Women's Organization / *Mafutaga a tina*
☐ Youth Group (please specify) / *Autalavou (fa'ailoa mai):* _____
☐ Ministry of Natural Resources & Environment / *Ofisa o le Si'osi'ogamaga ma mea fa'alenatura (MNRE)*
☐ Secretariat of the Pacific Regional Environment Programme / *Polokalame o le Si'osi'omaga a le Pacific (SPREP)*
☐ Other (please specify) / *Isi (fa'ailoa mai)*: _____

8. Do MNRE or SPREP ever come here? / *E omai le Ofisa o le Si'osi'ogamaga ma mea fa'alenatura poo Polokalame o le Si'osi'omaga a le Pacific i lo outou nu'u?*

☐ Yes / *Ioe* ☐ No / *Leai*

Why? Please explain. / *Aisea? Fa'amatala mai fa'amolemole.*

9. Do you receive any support from MNRE or SPREP? / *E fesoasoani ma lagolagosua mai le Ofisa o le Si'osi'ogamaga ma mea fa'alenatura poo Polokalame o le Si'osi'omaga a le Pacific e tusa ai ma lenei poloketi?*

☐ Yes / *Ioe* ☐ No / *Leai*

If yes, please tick all that apply / *Afai e Ioe lau tali fa'amomole tu'u se fa'ailoga fa'asa'o i tali e tusa ma feasosoani poo vaega o loo aumai ai la latou lagolago:*

☐ Funding/Money / *Fa'atupeina o le poloketi*
☐ Maintenance/Repairs / *Tausia le solosolo lelei/Toe fa'aleleia*
☐ Other (please specify*) / Isi (fa'ailoa mai):*

10. What is your overall impression of MNRE or SPREP? / *O le a sou manatu fa'aalia i lenei Ofisa o le Si'osi'ogamaga ma mea fa'alenatura poo Polokalame o le Si'osi'omaga a le Pacific*

☐ Very Good *Lelei tele* ☐ Good *Lelei* ☐ Poor *Leaga* ☐ Very Poor *Matua ova le leaga*

Comments / Nisi manatu fa'aopoopo:

11. How successful do you think the Climate Change Program was overall? *O le a se fa'amanuiaina o lenei Polokalame O Le Fesuiaiga O Le Tau i sau silasila iai?*

☐ Very Successful *Matua fa'amanuiaina lava* ☐ Somewhat Successful *Lelei lava* ☐ Not Successful *Leai ma se lelei o iai*

Why? Please explain / *Aisea? Manatu fa'aopoopo e lagolago ai lau tali:*

12. What is your overall impression of the Climate Change Program? / *O le a sou manatu lautele i Polokalame O Le Fesuiaiga O Le Tau?*

☐ Very Good *Lelei tele* ☐ Good *Lelei* ☐ Poor *Leaga* ☐ Very Poor *Matua ova le leaga*

Comments */ Nisi ou manatu fa'aopoopo:*

13. Define the term 'climate change' / *Se'i fa'amatala le uiga o le upu 'fesuiaiga o le tau'*:

Appendix C: CBDAMPIC Quantitative Results

Results: Questions 1-6

Saoluafata | Lano | N - narrative comments; * - answer given

Participant	Age	Gender	Village	Educ. Level	#1	#2	#3	#4	#4N	#5	#5N	#6
A	49	F	Saoluafata	Completed 2nd	Y	Y	*	Y	*	N	*	Matai, MNRE
B	54	M	Foaluga	Some 2nd	Y	Y	*	N	*	N		All
C	55	F	Saoluafata	Some 2nd	Y	Y	*	Y	*	Y		All
D	18	M	Saoluafata	3rd+	N	N		N		Y		
E	29	M	Salelesi		Y	Y		Y		Y		HC/M, YG
F	40	M	Saoluafata	Some 2nd	Y	Y	*	N		N		Matai
G		F	Saoluafata	Some 2nd	Y	Y	*	N	*	Y	*	All, strong people
H	35	M	Saoluafata		Y	Y		Y	*	Y	*	All, everyone
I	32	M	Fusi	Completed 2nd	Y	Y	*	N	*	Y	*	HC/M, YG (AOG), Matai
J	18	F	Saoluafata	Complete 2nd	Y	Y	*	N	*	N	*	HC/M, Matai, MNRE, SPREP
AA	45	F	Lano	Completed 2nd	Y	Y	*	Y	*	Y		HC/M, Matai, Pastor, YG, MNRE, SPREP
BB	57	F	Lano	3rd+	Y	Y	*	N	*	Y	*	All
CC	19	F	Lano	Completed 2nd	Y	Y	*	Y	*	N		HC/M, Matai, Pastor, WO
DD	16	F	Lano	Some 2nd	Y	Y	*	Y	*	Y	*	MNRE
EE	59	M	Lano	Some 2nd	Y	Y	*	N	*	Y		HC/M, Matai, Pastor, WO, MNRE, SPREP
FF	42	M	Lano	3rd+	Y	Y	*	N	*	Y	*	All, Red Cross; YG (Roman Catholic)
GG	38	F	Lano	Completed 2nd	N	Y	*	N	*	Y		All
HH	16	F	Lano	Some 2nd	Y	Y	*	N		N		Matai
II	29	F	Lano	Completed 2nd	N	Y	*	N	*	N		Matai
JJ	50	M	Lano	3rd+	Y	Y	*	Y	*	Y	*	All, tourism business in Lano

Appendix C: CBDAMPIC Quantitative Results Cont'd

Results: Questions 7-12

	Saoluafata		Lano		N - narrative comments; * - answer given					
Participant	**#7**	**#8**	**#8N**	**#9**	**#9N**	**#10**	**#10N**	**#11**	**#11N**	**#12**	**#12N**
A	MNRE	Y	*	Y	F	VG		VS	*	P	*
B	All	Y		Y	All	VG		VS		P	
C	All	Y		Y	F, M	G		SS	*	G	
D		Y		Y	M	VG		VS		VG	
E				N	M	G		VS		G	
F	MNRE	N	*	Y	M	VG		VS		VG	
G	HC/M, YG, MNRE, Untitled men					VG		VS	*	VG	
H	All	N			M	G	*	NS	*	G	
I	YG (AOG), SPREP	N	*		F	VG	*	VS	*	VG	
J	Matai, MNRE, SPREP			Y	M	G		SS	*	G	
AA	HC/M, Matai, Pastor, YG, MNRE, SPREP	Y		Y	F, M	G		SS		G	
BB	All	Y	*	Y	M	G		VS	*	VG	
CC	HC/M, Matai, MNRE, SPREP	N		Y	F	VG	*	VS	*	VG	*
DD	MNRE	N	*	Y	M	VG	*	VS	*	G	*
EE	HC/M, Matai, Pastor, WO, MNRE	Y	*	Y	F, M	VG		VS	*	G	
FF	All, Red Cross; YG (Roman Catholic)	Y	*	Y	F, M	VG		VS		VG	
GG	All	Y	*	Y	F, M	VG		VS		VG	
HH	MNRE, SPREP	N	*	N		G		SS		G	
II	Matai, MNRE, SPREP	Y	*	Y	F	G	*	SS	*	G	*
JJ	HC/M, Matai, WO, YG, MNRE	Y	*	N		G		SS	*	G	