Chapter 7
Mapping of Organisations Involved in Energy Research Activities in the Pacific Island Region, Their Research Projects, Budgets and Research Gaps

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Abstract This study was carried out within the framework of the Pacific Europe Network for Science and Technology (PACE-Net), a project funded by the European Commission (EC). The PACE-Net project seeks to improve regional and bi-regional collaboration and cooperation activities in science and technology (S&T) research within the Pacific and between Europe and the Pacific (ACP—African, Caribbean and Pacific; OCT—Overseas Countries and Territories). Its global aim is to develop networks between Pacific and European stakeholders from research entities, universities, and industries, and including policymakers, programme managers and civil society, in order to facilitate and establish balanced and multidisciplinary partnerships in priority areas of mutually beneficial research. Energy is the theme this study focuses on. Renewable research will be presented in comparison to other research themes in the Pacific. Furthermore, the renewable energy research institutions in the Pacific, their projects and the total cost of their research are discussed. It is seen that only 4 % of total research in the Pacific is on energy, and most collaboration is national. The percentage of energy research projects is compared to Pacific energy goals, and the funding/research/collaboration gap is discussed. The results are further divided into the categories ACP (Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Samoa and Vanuatu), OCT (French Polynesia, New Caledonia, Pitcairn

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Islands, Wallis and Futuna) and regional organisations (University of the South Pacific, Secretariat of Pacific Community, South Pacific, Secretariat of the Pacific Regional Environment Programme) in the Pacific for specific data.

Keywords ACP · OCT · Regional organisations · Research institutions · Pacific goals

Short Introduction

In Pacific Island Countries (PIC), a more active discussion on renewable energy (RE) technologies started in 2004 when the Pacific Islands Energy Policy was established. However, the regional plans are unclear and there are few specialists who really understand how the potential of RE can be properly used. Many regional and local RE research initiatives need to improve their dialogue and cooperation for better planning and implementation of energy research results, as well as proving to the public and politicians that RE technologies do work.

This paper describes the main projects and organisations involved in energy-research activities in PICs, and show the main gaps in cooperation schemes and active participation (e.g. lack of private organisations).

Introduction

This study was carried out within the framework of the Pacific Europe Network for Science and Technology (PACE-Net), a project funded by the European Commission (EC).

The PACE-Net project seeks to improve regional and bi-regional collaboration and cooperation activities in science and technology (S&T) research within the Pacific and between Europe and the Pacific. Its global aim is to develop networks between Pacific and European stakeholders from research entities, universities, and industries, and including policymakers, programme managers and civil society, in order to facilitate and establish balanced and multidisciplinary partnerships in priority areas of mutually beneficial research. To this end, PACE-Net pursues the following three objectives (Description of Work 2010):

- to reinforce existing S&T dialogues and networks and promote regional integration for those networks by seeking to increase cooperation between research organisations and universities in the region;
- to identify S&T international cooperation activities and programmes in the Pacific region by setting up a dialogue that will bring relevant S&T experts and stakeholders from the Pacific and Europe together to establish the priority areas for the EC's funding instrument, the 7th Framework Programme for Research and Technological Development (FP 7), and beyond;

- to strengthen the coordination of S&T cooperation and the complementarities with activities and programmes carried out by other European instruments; in particular, synergies with the European Development Fund (EDF) shall be found (Description of Work 2010).

The Pacific Islands Energy Policy was established in the 2004 Regional Energy Meeting in Papua New Guinea to come up with renewable energy technologies in Pacific Island Countries (Seán 2010). However, the obstacles to renewable energy include weak institutional planning and management structures, a lack of clear renewable-energy development policies, a lack of technical expertise and understanding of the potential of renewable energy, a lack of successful demonstration projects, a lack of public and political confidence in renewable energy technology, and an over-reliance on donor-funded projects (Seán 2010). A large number of regional organisations and local government ministries are the key actors in taking up initiatives, for example USP, SOPAC, SPREP, the Pacific Islands Energy for Sustainable Development (PIESD), the European Union Energy Initiative for Poverty Eradication for Sustainable Development (EUEI), the Renewable Energy and Energy Efficiency Partnership for Asia Pacific (REEEP), the the Global Environment Facility (GEF) and the UNDP (Seán 2010).

Methodology

Various organisations (research institutions, academic organisations, private institutions, development agencies and ministries) in 19 targeted South Pacific Island Countries and Territories (PICTs), as well as in Australia and New Zealand, were contacted for this survey, and in total three questionnaires were designed.

The first questionnaire targeted the South Pacific Island organisations undertaking S&T research for 2008, 2009 and 2010.

This included research institutions, academic institutions, intergovernmental agencies and private companies. The questionnaire was divided into two parts: part 1 contained questions exclusively for the administrative or corporate section of the organisations; and part 2 contained questions specific to the researchers or research teams working in these organisations. These two parts were sent to respondents either as two separate electronic word files or two separate hard-copy documents.

The second questionnaire targeted the New Zealand and Australian organisations undertaking S&T research in and with the South Pacific Island region for the years 2008, 2009 and 2010. Again, this included research organisations, academic institutions, intergovernmental agencies and private companies in Australia and New Zealand undertaking S&T research activities in the South Pacific Island region and/or with the South Pacific Island researchers.

The third questionnaire was designed for South Pacific Islands' government ministries.

Table 7.1 Organisations contacted with Questionnaires 1 and 2

Questionnaire (regardless of the part completed)	Organisations contacted with Questionnaires 1 and 2				
	ACP-based	OCT-based	Regional organisations	Based in Australia and New Zealand	Total
Sent	47	43	6	28	123
Received	19	19	3	9	50
% response rate per region	40.4	44	50	32	40.1
Overall % response rate					

Analysis for Research in the Pacific

Table 7.1 presents the total number of organisations in the Pacific that were asked to participate in the survey by filling out questionnaires 1 and 2, and the number of organisations that actually participated. The response percentage was 40.1 %.

From these survey responses, the majority of the research in the Pacific Island region appears to be carried out by the public sector (74 %); more precisely, by the public universities (23 %) and research institutions (26 %), followed by governmental departments and ministries (25 %). In the OCT region, the majority of organisations undertaking research activities appear to be public research institutes (60 %), while in the ACP and in Australia and New Zealand these are primarily public education-provider institutions (respectively, 50 and 57 %). The low survey-sending and response rates in these countries do however, mean that this is a partial picture and more research is required (Fig. 7.1).

From the responses, the predominant area in which S&T research is undertaken in and for the Pacific island region appears to be biology and medicine (28 %). Environment, including climate change (24 %), and agriculture and food supply (17 %) are also R&D sectors in which considerable numbers of research teams in the Pacific are working, while a few research teams appear to be working in the areas of industry and industrial technology, and information and communication technology (5 and 6 % respectively), as well as energy (3 %) (Azid et al. 2011a, b).

There are four institutions on the ACP side that have research groups in energy. They are the University of the South Pacific's Faculty of Science Technology and Environment Renewable Energy Group (USP), the Scientific Research Organisation of Samoa (SROS), the Ministry of Natural Resources and Environment, Samoa (MERE), and the Ministry of Environment and Climate Change, Tonga (MECC). The Institute of Research and Development is carrying out a project on renewable energy, but does not have specific research team on energy.

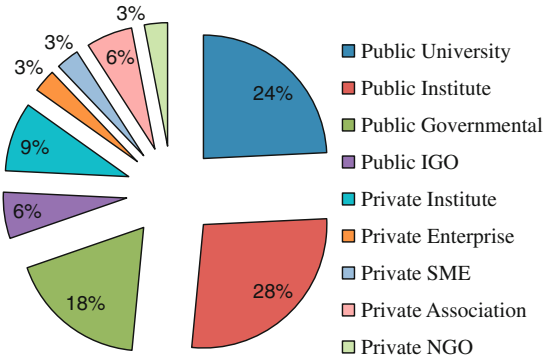

Fig. 7.1 Distribution of types of organisation in the Pacific ACP and OCT group, Australia and New Zealand, as well as regional organisations involved in S&T research for the Pacific Island region

Research Projects in the Pacific

Figure 7.2 shows that the predominant area in which S&T research is undertaken in and for the Pacific Island region is environment, including climate change (39 %). Biology and medicine (25 %), and agriculture and food supply (13 %) are also R&D sectors in which a large proportion of research is undertaken. A few projects address the areas of industry and industrial technology (7 %), social and economic concerns (7 %), energy (4 %) and information and communication technology (3 %). It is worth noting, that the results in Fig. 7.2 correspond to those obtained for the R&D sectors of the research teams in Fig. 7.3 (Azid et al. 2011a).

Energy Projects

A total of 22 projects out of 524 were energy-research projects. Based on the data, the ACP side has the most projects (18), compared to OCT with one research project, and Australia and New Zealand with three projects. Among the renewable energy groups, the University of the South Pacific has the greatest number of projects (73 %), followed by Ministry of Environment and Climate Change, Tonga

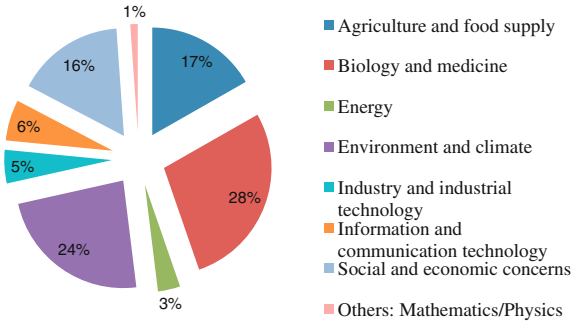

Fig. 7.2 Distribution of the research and development sector, in which all respondent research teams undertake S&T research activities

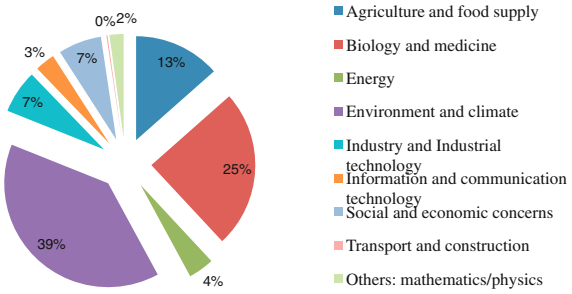

Fig. 7.3 Overall distribution of the research and development sector in research projects

(13 %), the Scientific Research Organisation of Samoa (9 %), and Ministry of Natural Resources and Environment, Samoa.

Table 7.2 demonstrates that the largest proportion of collaboration activities in relation to Pacific island energy research is happening within the region. Surprisingly, despite the geographical proximity of Pacific ACP and OCT, there is no collaboration between these two areas. Similarly, the collaboration between Pacific ACP research institutions and teams in Europe and Asia is minimal. This gap has been identified and there is a need to increase collaborative research activities between the regions.

Nonetheless, the analysis shows the research in Pacific islands' energy projects is funded from several sources, including institutional, private sector, civil sector bilateral and multilateral donors. This shows that stakeholders from different sectors of society more or less support renewable energy research on Pacific islands. Local and regional organisations, European countries, Asian countries and international organisations all fund projects in renewable-energy research. It is also interesting to see that the University of the South Pacific's Faculty of Science Technology and Environment funds 64 % of these projects (Table 7.3).

Major research work is being carried out in wind energy, mostly on blade design, power control of wind hybrid systems and frequency control techniques using "fuzzy logic".

Aside from the concerns associated with biofuels, stakeholder consultations also raised a range of specific needs regarding the energy sector, including the

Table 7.2 Percentage of collaborations with research organisations located in different regions of the world or with regional and international organisations

Respondent research teams based in:	Percentage of collaborations with research organisations located in different regions of the world or with regional and international organisations						
	ACP (%)	OCT	Regional organisations (%)	Australia and New Zealand (%)	Asian countries (%)	Europe (%)	International organisations (%)
USP	25	0	0	6.3	18.8	0	0
SROS	0	0	0	100	0	0	0
MNRE	50	0	50	0	0	0	0
MECC	14.3	0	14.3	0	14.3	28.6	28.6

Table 7.3 Funding agencies with research organisations in different regions of the world, or with regional and international organisations

Respondent research teams based in:	Funding agencies with research organisations in different regions of the world, or with regional and international organisations						
	ACP (%)	OCT (%)	Regional organisations (%)	Australia and New Zealand (%)	Asian countries (%)	Europe (%)	International organisations (%)
USP	88	0	0	0	12	14	0
SROS	50	0	50	0	0	0	0
MNRE	33.3	0	0	0	0	33.3	33.3
MECC	14.3	0	14.3	0	14.3	28.6	28.6
Total							

need for capacity building, on top of direct support for research projects themselves. Some related research projects are: ethanol production from selected cassava varieties, engine performance of coconut oil, and coconut and bioethanol production projects. Less work is being carried out on solar and ocean energy; solar research is mostly on data collection and ocean projects are mostly on turbine design and data collection. Hybrid renewable-energy research, particularly in solar/wind/diesel systems, has seen some success on the Pacific islands due to the high efficiency, reliability and comparatively low cost of these systems (Fig. 7.4).

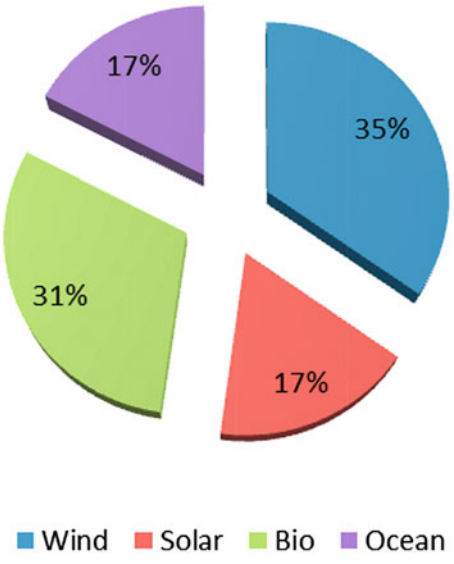

Fig. 7.4 Percentage of renewable energy research projects in the Pacific region

Conclusion

It can be observed that energy research teams work on many projects—four research teams are working on a total of 22 projects. Most of the projects in the Pacific receive public funding. There is a gap for private organisations, such as the respective electric companies of the island countries, to fund some research projects and apply the research data to infrastructure and capacity building. It can also be seen that there is a collaboration gap between the regions, which should be filled in order to boost research, especially since the OCT and ACP sides have similar climatic conditions. Although survey responses are very good on the whole, some institutions engaged in ongoing research did not respond. This means the data presented could change.

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