Review of formal science policy in the Pacific Islands:

A project for the UNESCO Apia programme on science policy development in the Pacific Islands

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A project for the UNESCO Apia's programme on science policy development in the Pacific Islands

Contents

[1] The Pacific Islands refer to the collection of the following small island states: Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu.

Foreword

A provisional audit of science and technology policy literature at the national and regional level in the Pacific Region was first commissioned by UNESCO Apia's science programme in 2006. The review found that small island developing states (SIDS) in the Pacific Region encounter unique challenges in terms of the geo-climatic distribution and socio-economy, and that their perceived scientific and technological outcomes (required to deal with those issues) are broadly homogenous throughout the Pacific Island Nations, yet distinct to that Region. In the decade leading up to 2006, the review noted a visible shift towards regional-focused problem solving in the Pacific.

The natural environment in the Pacific Region is an important factor affecting livelihoods and national economies, while the rising sea levels, attributed to global warming, threaten the future existence of many SIDS in the Pacific. Limited access to natural resources mandates that regional agricultural and harvesting of marine resource need to employ sustainable means to manage the nutrition needs as well as the health requirements of the people living in the Pacific Region.

There have been, consequently, numerous efforts aimed at addressing issues of climate change, natural disasters, sustainable sources of energy, and means of effective agriculture. An important feature among these initiatives has been the promotion of science and technology awareness, often in the form of formal science education. Findings identified four main categories of policies that relate to science and technology in the Pacific Region – agricultural policies, policies on public health, environmental policies, and educational policies.

A subsequent update of the 2006 review was commissioned in 2011.

Science, technology and policy

Development processes of scientific thought are strongly influenced by the geographic environment and socio-economic climate, which in turn distinguish the perception of 'science', among different groups of people[2] [3]. As a result science and

[2] Usher, A. P. A. (1954). *A history of mechanical inventions*. Massachusetts: Harvard University Press.

technology bear the hallmarks of human activity of a given geographic location. Nevertheless, scientific traditions universally have almost always been driven by utilitarian efforts to best employ natural resources to benefit human welfare[4]. As H.E. Tuiloma Neroni Slade (Secretary General of the Pacific Islands Forum Secretariat) pointed out,

> We should see science as providing an essential component in the search for feasible pathways towards the management of the environment and towards sustainable development. [5]

With food production and poverty alleviation being the main focuses of political agendas in the developing world, governments in these countries continue to invest in science and technology in order to facilitate socio-economic development. Breakthroughs in agriculture such as the introduction of improved crop varieties that are resistant to pests and diseases have empowered countries with a competitive advantage when addressing national development agendas, and enhanced the well-being of their people.

There is controversy about whether national scientific policies that govern the progress of scientific practice within a country clearly reflect the cumulative interests of a country's people. It is not a simple matter of policy makers wanting definitive results, but more so the fundamental problems of differences in values and attitudes. Differing viewpoints argue the potential risks involved in adopting new techniques in agriculture and human health, and are urging governments to take necessary legislative measures to ensure the interests of its people are safeguarded in these development outcomes. As a result, governments have found the need to develop scientific polices to safeguard their national scientific interests in a climate of scientific institutionalization and global change[6].

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[3] Randall, J. H. J. (1976). *The making of the modern mind: A survey of the intellectual background of the present age*. New York: Columbia University Press.
[4] Gordon Childe, V. V. (1951). *Man makes himself*. Nottingham: Spokesman Books.
[5] Slande, T.E. (2000). Overview Address by H.E. Ambassador Tuiloma Neroni Slade, Permanent Representative of Samoa to the United Nations, Chairman of the Alliance of Small Island States (AOSIS). Pacific Islands Climate Change Conference Rarotonga, Cook Islands, 3-7 April 2000.
[6] Krige, J. & Pestre, D. (Eds) (1997). *Science in the twentieth century*. Amsterdam: Overseas Publishers Association.

It is essential, therefore, that science and technology should be appreciated in their wider sense, in the interactive processes that exist between the sciences and decision-making, if governments are to reap full benefits from scientific policy. There has been, in recent years, the emergence of science and technology polices at national and regional levels, focussed more specifically on different scientific issues.

> A policy proposes an intervention to alter some existing circumstance or mode of conduct. If well formulated, it will contain a description of the desired state condition and the set of means which promise to realize that condition (i.e. to attain its goals). It should be clear, thus, that policy proposals engage the future tense: they fall into that tense. The object of any policy proposal is to control and direct future course of action – which is the only action that is subject to control.[7] (p.425)

Policy, in the context of political science, is generally defined as "a broad strategic statement of intent to accomplish aims"[8] (p.30). Other, more specific, definitions highlight the importance of *purpose*, for it is strongly believed that policy needs to be goal-oriented and actively driven: for instance, "a specific course of action designed to achieve a desired outcome"[9] (p.7); and "a purposive course of action taken or adopted by those in power in pursuit of certain goals or objectives"[10] (p.5).

The present review document of examples of science and technology policy in the Pacific Region has examined "policy" in the context of *purpose*, *objective* and *drive*.

[7] Laudau, M. (1977). The proper domain of policy analysis. In D. Bobraw, H.Eulau, M.Laudau, C.O.Jones, & R. Axelrod, R. (Eds.), The Place of Policy Analysis in Political Science: Five perspectives. *American Journal of Political Science*, 21: 415-433.
[8] Brewer, G. & deLeon, P. (1983). *The Foundations of Policy Analysis*. Homewood, Illinois: Dorsey Press.
[9] Clark, T.W., and Kellert, S.R. (1988). Toward a policy paradigm of the wildlife sciences. *Renewable Resources Journal*, 7: 7-16.
[10] Sapru, R.K. (2004). *Public Policy: Formulation, Implementation, and Evaluation* (2nd revised edition). New Delhi: Sterling Publishers Private Ltd.

Science and technology policies in the Pacific Islands

While the socio-economic status of SIDS in the Pacific vary remarkably, as a region they are confronted with more or less similar challenges. The 19th Special Session of the United Nations General Assembly (1997) acknowledged that SIDS in the Pacific are among the highest at risk due to global climate change, and that many of these SIDS are threatened by rise in sea-level and natural disasters. Moreover, many SIDS in the Pacific have limited natural resources, and commonly struggling economies[11]. As a result it was seen as imperative that long-term plans in response to these challenges be formulated with the support of the international community.

The overview of an Ocean Policy for the Pacific Islands acknowledges the above challenges, as well as those issues relating to maritime delimitation, fisheries, coastal degradation and the effects it would have on tourism in the Region[12]. Yet it also sees the vast oceans that are part of the region as a source of opportunity and economic development for the Pacific Islands, provided that the natural resources therein are harnessed through mechanisms of sustainable development. Hence, the overview of an Ocean Policy for the Pacific Islands could be seen as a further impetus to formulating science and technology policy for the Region.

Since it is believed that science and technology should be responsive to emerging social and environmental needs, governments in the Region believe that enhanced scientific understanding together with improved long-term scientific assessments would strengthen the scientific, and subsequently the economic, capacities of the SIDS in the Pacific. However, the governments in the region acknowledge that there has been limited progress in channelling science and technology towards sustainable development, and trust that well-informed and better-formulated policies to develop science and technology are essential to effectively overcome these challenges.

[11] Erdelen, W. (2004). Small islands, big agenda (Editorial). J. A World of Science. Vol. 2. No.2 Pp. 1. http://www.unesco.org/science/world_science_april04.pdf

[12] Tuqiri, S. (2001). Ocean Policy for the Pacific Islands. For the Council of Regional Organizations in eth Pacific, Marine Sector Working Group. June 2001.

The last decade has seen considerable external intervention in the Pacific Islands to help formulate science and technology policies for the region[13]. However, as pointed out at the Climate Change Conference in the Cook Islands in April 2000, most of the strategies that were proposed therein were either economically unfeasible or technologically inappropriate for the SIDS in the Pacific[14]. Thus, the scientific knowledge that was recommended to the region's policy-makers was necessarily that which was of interest to the developed world rather than the immediate stakeholders in the Pacific.

However, given the short research history of the region, there has been considerable and effective input from research initiated in the Pacific Islands. The Australian Commonwealth Scientific and Industrial Research Organisation's (CSIRO) work on coastal vulnerability and climate change for the South Pacific Regional Environment Program for instance, has allowed for better awareness of environmental issues when formulating policy in the Region[15]. Similar programs to examine technology for sustainable sources of energy and environmentally-friendly land-filling have also been undertaken in the region.

Another problem with linking science and policy is determining the exact constitution of 'policy'[16]. It is also evident from the literature reviewed in the present documents that there is a conflict of interest in certain policies and their expected outcomes. Thus there is an evident need for Pacific Island States to develop science and technology policy that fosters the interests of own national and regional agendas.

[13] Parthasarathy, D. (2003). Policy challenges for agricultural biotechnology in the Asia Pacific: developing a framework for analysis. Resource management in the Adia-Pacific working paper 45. Research School of Pacific and Asian Studies, The Australian national University, Canberra.
[14] Barnett, J. (2000). Science and policy in the South Pacific. Pacific Islands Conference on Climate Change, Climate Variability and Sea Level Rise. (03-07 April 2000). Flinders University, South Australia. Tiempo Issue 36/37. http://www.tiempocyberclimate.org/portal/archive/issue35/t35a4.htm
[15] Jones, R. (2000). Climate change in the South Pacific. Pacific Islands Conference on Climate Change, Climate Variability and Sea Level Rise. (03-07 April 2000). Flinders University, South Australia. Tiempo Issue 35. http://www.cru.uea.ac.uk/tiempo/floor0/recent/issue3637/t3637a2.htm
[16] Barnett, J. (2001). Adapting to climate change in Pacific Island countries: The problem of uncertainty. World Development. Vol. 29. Issue 6. Pp.977-993. Elsevier Science.

Method

Web-based searches of literature on science policy in the Pacific were undertaken. However, preliminary keyword searches yielded very poor results. Dr.Mary Taylor (Regional Germplasm Centre, in Suva, Fiji); Mr.Hans Thulstrup (UNESCO Office for the Asia Pacific); Mr.Anthony Palupe and Prof.Bill Aalbersberg (both from the University of the South Pacific) who were subsequently consulted for advice, informed that such a sparseness of information was not surprising and upon their recommendations searches for specific disciplines in science such as, biosafety and biotechnology as well as policies in related areas like environmental science, science education and health were conducted. Although these later searches yielded information on national government policy and initiatives in these specific areas, it was observed that the literature did not directly address 'science and technology policy' *per se*. However, it was possible to observe a correlation that linked a perceivable national agenda for science and technology with the utilitarian outcomes of the above efforts. From the results that immerged it was decided to construct a model to structure and thereby better understand the patterns that were found in the available literature, on science and technology policy in the Pacific Islands (see Figure 1 on p.17).

The following persons were consulted in 2011 to update information from the previous review: Ms Ashwini Prabha-Léopold and Ms Irene Isabel Prasad (UNDP Pacific Centre); Ms Laiakini Waqanisau (UNDP-Fiji environment unit); and Mr Brian Dawson (Secretariat of the Pacific Community).

Summary of findings

A) Agricultural Policies:

The Asian Rice (and Maize) Biotechnology Network, the Asia Pacific International Molecular Biology Network, the Sub-Group on Research, Development and Extension of Agricultural Biotechnology of the Agricultural Technical Cooperation Experts Group (ATCEG) of APEC, and the Sub-Committee on Biotechnology (SCB) of the ASEAN Committee on Science and Technology (COST), have all contributed immensely to promoting interest and research in agricultural biotechnology and genetic engineering in the Asia Pacific region[17].

Policy in agriculture is primarily focused on crop production for economic gain. The necessity to ensure food security against natural disasters like drought and pestilence, and declining natural resources has allowed for significant employment of biotechnology in crop development and propagation measures. Production of food crops such as sweet potato, banana and cassava continues to be an important area of research; while there have been biotechnological developments in vanilla and the conservation of germplasm of taro successions. There has been very little research in the area of subsistence crops (i.e. crops that can enhance food security) in the Region[18].

However, as is the case in developing countries worldwide, despite high levels of research investments in biotechnology and increasing demand for agricultural-biotech products, in the Pacific Islands too, there are few studies on these technologies. In addition, biotechnology usage in agriculture and safety regulations differs among countries in the Pacific Islands. Therefore, the vast usage of biotechnological applications in conservation, crop protection and better utilization of plant genetic resources, have necessitated the implementation of policies to regulate biotechnology within the Region[19].

[17] Ibid 13
[18] ACP Policy Brief. (2005). Approves and adopted by the Advisory Committee on Science and Technology for ACP Agricultural Development. CTA Headquarters Wageningen, The Netherlands (7-11, November 2005)
[19] Ibid 18

Although governments in the Pacific region regard environment sustainability and economic profitability as incentives to invest in biotechnological research and development, there is concern about the socio-economic impacts on rural farming poor and the environmental implications, such as impaired resilience to environmental change and loss of bio-diversity, that such policies would have on the long-term[20]. Therefore, for the development of sound science and technology policies for biotechnology, not only is it necessary to determine the adoptability and appropriateness of such polices to the existing agricultural framework and social structure of the Region, but it also requires a clear understanding of the long-term implications such technologies would have on both society and the environment.

B) Policies on Public Health:

Public health research in the Pacific Region had usually been directed towards social-health issues related to narcotic addiction and unsafe sexual practices. However, due to the emergence of many natural diseases in the Asia-Pacific region during the last decade such as avian influenza (2004-2005), SARS (2003) and nipah encephalitis in Malaysia and Singapore (1997), Hong Kong influenza (1997) and the plague epidemic in India (1994), there has been alarm about public health and well-being. Moreover, very few countries in the Region currently have laboratory facilities to immediately detect an epidemic disease. In addition, there is growing concern about the re-emergence of diseases like epidemic cholera, plague, malaria as well as significant consternation over HIV/AIDS cures and prevention methods.

The Conference on Biosecurity Threats in the Asia-Pacific Region[21] recognized the need for public health policies in the Pacific Region and urged governments to formulate effective public health policies as well as to improve existing epidemic surveillance networks in the Region. Due to the origin of many diseases being linked with animal

[20] Ibid 13

[21] Conference on Biosecurity Threats in the Asia-Pacific Region. (2005). Final Report. Co-hosted by The Center of Excellence in Disaster Management and Humanitarian Assistance (COE) and Asia-Pacific Center for Security Studies (APCSS). Waikiki, Hawaii, (8-11, August 2005).

husbandry practices, they stressed the need for surveillance of veterinary and agricultural communities as well.

Although a regional policy for public health does not exist in the Pacific Islands, there have been initiatives by national leaders and health officials to ensure well-being of people in some of the SIDS. Fiji for instance, in its preparatory attempt to adopt the Pacific Plan for sustainable development, has provided appropriate responses on how challenges such as to HIV/AIDS and other epidemics would be addressed in future:

> Maximizing benefits from regional health initiatives by development of a more Pacific-led harmonized approach to the health sector (similar to the Pacific Regional Initiative for Delivering Education), including in: (i) promoting national action consistent with the HIV/ AIDS and STI Strategy and improving access to anti-retroviral drugs (ARDs); and (ii) initiating a strategy for the surveillance, early warning and prevention of epidemics.[22]

The Pacific Regional Preparatory Meeting to review the Barbados Programme of Action (BPoA) for the Sustainable Development of Small Island Developing States[23] also addressed health related issues that would result due to climate change in the Region.

C) Environmental Policies:

The perception of environment and environmental issues in the Pacific Islands should be viewed from a dimension of rapid urbanization, subsequent rural-urban migration and high levels of poverty within the Region. As a result, the impact of poverty on the environment, and vice-versa, stands at the forefront of challenges facing the Pacific, and spread over a wide area of concerns.

[22] Fiji National Consultations on the Pacific Plan. (2005). Draft outcomes document. Southern Cross Hotel, Suva. (04, March 2005).
[23] Pacific Regional Preparatory Meeting to review the Barbados Programme of Action (BPoA) for the Sustainable Development of Small Island Developing States. (2003). Hotel Kitano Tusitala, Apia, Samoa. (4-8, August 2003)

Many of the Island States presently encounter threats due to the rise of sea level, unusual weather patterns due to climate change, destruction of marine habitats and depreciating forest cover. Given the limitation these Islands have with regard to natural resources, such as water and arable land, there is a strong focus to formulate regional as well as sub-regional environmental policy for sustainable development in the Pacific Region.

> Pacific island countries cannot prevent climate change occurring but through development policies they can increase their resilience to its impacts by reducing other environmental stresses.[24]

The literature cites individual government initiatives in the region to protect the interests of its people in terms of managing natural resources and combating climate change, nonetheless, there has been a strong impetus to develop a region environmental policy.

The Pacific Islands Climate Change Conference in April 2000 cited four main requirements that link global environmental issues and sustainable development for effective science policy in the Pacific Region:[25]

> 1. scientific understanding of the nature of the links among environmental issues, and their relationship to meeting human needs, to facilitate the balancing of competing needs and the identification of strategies that capture as many benefits as possible;
> 2. identification of innovative combinations of policies that are effective and cost-efficient and that encourage the public and private sectors to work together;
> 3. political will and public commitment (from Governments and all levels of society) to seriously address global environmental issues, including setting realistic goals and identifying creative paths for achieving them; and,
> 4. improved co-ordination among the national, regional and international institutions charged with developing and encouraging adoption of policies and

[24] McFadzien, D. (2004). *South Pacific Currents*. http://www.sidsnet.org/docshare/climate/20040203125707_WWF_South_Pacific_Climate_Change_January_2004.pdf
[25] Ibid 5

measures to meet human needs, without undermining the environmental foundation for development.

One of the major outcomes of the Conference was a draft for the Pacific Islands Framework for Action on Climate Change, Climate Variability and Sea Level Rise, which aims to address the following issues through greater solidarity in the Region:

1. understanding the climate system and sea-level rise,
2. understanding impacts and vulnerability,
3. response measures and policy, and
4. improving the linkages between science a policy.

At the Pacific Regional Preparatory Meeting to review the Barbados Programme of Action (BPoA) for the Sustainable Development of Small Island Developing States in Samoa 2003, representatives from the Pacific Island States identified the following key environmental areas of interest for the integrative implementation of BPoA, through a regional development plan[26]:

1. Climate change
2. Natural and environmental disasters
3. Management of waste
4. Coastal and marine resources
5. Freshwater resources
6. Biodiversity resources
7. Land resources

[26] Ibid 23.
A complete breakdown of the items discusses under the above has been included in Annex I. Adapted from: http://www.sidsnet.org/docshare/other/20030912184649_BPoA_review_country_presentation.doc

One of the issues discussed above was the ratified management of waste and the Development of Type II projects on waste recycling. Such a measure is opportune, given the discarded plastic pollutant content along shorelines and adjacent ocean waters in the Region. There is however, considerable debate as to the origin of this waste: whether its origin is of urban sources or whether it is arbitrarily disposed by vessels at sea. Nonetheless, there is urgent need to address the issue, both in terms of apparent environmental reasons and the adverse effects it may have on the Region's tourism[27].

Another area of focus that is gaining momentum in the region is environmental conservation. There are many national conservation efforts in force throughout the Region. The Biodiversity Strategy Action Plan (BDSAP) of the Fiji government in 2002 is one such initiative. This Plan would enable the government to work closely with other stakeholders such as scientists, NGOs and the private sector at national level. There is also literature being produced in the area of regional environmental law, for example *International Environmental Law in the Asia Pacific*, which addresses such issues as formulation of environmental policy and decision-making for sustainable development[28]. In addition there have also been educational efforts at tertiary institutes such as the University of the South Pacific, where courses in environmental policy are being taught.

Although not as prominent, there has been considerable impetus to develop policy in energy for the Pacific Islands. Energy policy in Kiribati is especially important due to its socio-economic, legislative and, importantly, technological aspects[29]. Sustainable energy with regard to climate change has also been highlighted as an important area in the BPoA for the Sustainable Development of SIDS.

[27] Gregory, M.R. (1999). Plastics and South Pacific Island shores: Environmental implications. *Ocean and Coastal Management.* Vol. 42. Issue 6. Pp.603-615. Elsevier Science.
[28] Boer, B., Ramsay, R. & Rothwell, D.R. (1998). *International Environmental Law in the Asia Pacific*. M. Chertow and D. Esty (eds). London: Kluwer law International.
[29] Yu, X. (1998). A framework for energy policy-making in the Pacific Islands. *Fuel and Energy Abstracts*. Vol. 39. Series.1. Pp.72. Elsevier Science

D) Education Policies:

Interestingly, education has been linked with many of the policies mentioned above. The need to create awareness has been stated as a priority in health, biosafety and environmental conservation. The BPoA for the Sustainable Development of Small Island Developing States (2003) recognizes the importance of education (or public awareness), even in areas such as natural and environmental disasters, energy resources and waste management. In addition the Sub-Regional Environmental Policy Dialogue (2004) suggested that there should be more emphasis on Education for Sustainable Development.

The Third Asia Pacific Economic Corporation (APEC) Education Ministerial Meeting[30] recognised the present technology boom in the Asia Pacific region, and stressed the need to integrate modern technology into classroom science teaching. There was considerable interest towards evidence-based learning approaches and cognitive research as well as enhancing the professional development of science teachers in the Region. The Meeting also emphasised that there should be policy in governance and reform in education for international benchmarking.

The Kiribati Education Policy (2003) recognises the limited number of qualified science teachers in the country and hopes to professionally develop teachers, especially in subjects such science and vocational-technical courses, including computer studies[31]. It also expects to increase the number of teachers, with advanced qualifications and skills in teaching science, through their Science Education in Secondary Schools (SEPS) project.

Pacific Mathematics and Science, which provides programs for education in the Region works through their many numerous programs to support and improve science teaching and learning. The Developmental Approaches in Science, Health and Technology (DASH) which has been developed by the Curriculum Research and Development Group

[30] 3rd Asia Pacific Economic Corporation (APEC) Education Ministerial Meeting. (2004). Santiago, Chilie. (April, 2004)
[31] Kiribati Education Policy. (2003). National Development Strategies 2000-2003. http://www.janeresture.com/kiribati_edupolicy/

of the University of Hawaii, aims at developing hands-on science teaching at school level[32].

There have also been other efforts internationally to develop science and technology education in the Pacific Islands. For instance UNESCO, in its Project 2000+: Scientific and technological literacy for all, includes the Pacific Region in its efforts to promote the popularisation of science and health education in non-formal settings through innovative teaching[33]. The Pacific Division of the American Association for the Advancement of Science aims at furthering scientific collaboration between the United States and the Pacific Islands by promoting the interests of science through definite and formal cooperation[34]. Interestingly, there have also been innovative areas of science that are currently been explored in the Pacific Region, one of which is Project Astro[35] which intends to improve the teaching of astronomy and physical science, both in informal and formal settings.

Trends

The Pacific Island Nations are confronted with challenges that are unique in terms of the geo-climatic distribution and socio-economy of the region. As a result, the perceived scientific and technological outcomes required to deal with these issues are more or less homogenous throughout the Pacific Islands, yet distinct to the Region. Therefore, there is strong impetus to develop technology and science that are appropriate and applicable to the socio-economic climate of the Region. The many conferences and fora alluded to in the above literature cite numerous efforts by the international community to address issues of climate change and natural disasters, as well as sustainable sources of energy and means for agriculture, for the Region. Nonetheless, it is also acknowledged that SIDS in the Pacific need to develop policy for science and technology, at regional and sub-regional level, that would address their specific national agendas. Thus, there has been a visible shift of interest during the last decade towards a

[32] http://www.pacificconsortium.org/rr.asp
[33] http://www.unescobkk.org/index.php?id=6
[34] http://www.sou.edu/aaaspd/Bylaws.html
[35] http://www.astrosociety.org/education/astro/project_astro.html

more regional focus of problem solving. Furthermore, since the SIDS in the Pacific experience similar environmental challenges, it would only be appropriate that an environmental policy at regional or sub-regional level be implemented to address these issues.

The environment, as discussed above, plays a crucial role in the livelihoods of the people and economy of these countries, and in a sense governs their future national existence as well. The rapid changes in climate and rise in sea levels more or less affects all the SIDS in the Pacific. Given their limited access to natural resources and the strong reliance placed on these resources for sustenance, it is vital that a regional agenda, with a strong focus on sustainable development, needs to be developed to address environmental issues in the Pacific Islands.

It has also been observed that education, or the promotion of awareness, is highly prioritized in almost all policies related to science and technology. This is a commendable approach towards addressing the many social and economic challenges that are accentuated as a result of natural disasters and climate change. It is opportune that governments in the Region recognise the benefits that could be gleaned through generating awareness among the public about these issues that are of national and more importantly regional significance. However, it is acknowledged that developing and implementing a common regional manifesto for education would prove to be a challenge.

Conclusion and recommendations

Clearly, there would be advantages to considering science policy at a regional level, at the very least for environmental and biosecurity matters. The nature and details of such policy development, however, would have to be informed by a longer, more in-depth review of existing policies than could be undertaken for this provisional report. What is also clear is that such policies cannot be realistically proposed, debated, and implemented without taking into account the political relationships both within and between Pacific Island Nations. While it might be possible to propose a theoretically 'perfect' regional science policy plan, there is not point in doing so if it could not be realistically and comprehensively implemented. Assuming sufficient political and economic will could be galvanised for the consideration of regional science policies, there ways we could move ahead. One caveat, however, is that any processes that move towards the development of regional Pacific science policy should do so within the context of the work that already exists as reviewed in this report.

In addition, education policies appear to be among the most broadly developed and overtly relevant to science policy in the region. It may be that the processes and systems used to consult, design and implement the more successful and broad-reaching of education policies may serve as inspiration for science policy development.

Without question a more thorough audit of the existing policies will be critical to any further Pacific science policy work. This will not be a trivial task. As can be seen in this report, there is hardly an abundance of easily accessible literature available on Pacific science policies. A thorough audit would be likely to require people visiting many Pacific Nations and interviewing government representatives about their actual, and/ or proposed, science policies. There would also need to be provisions made to consult as widely as possible with key stakeholders/ governments in the region to paint a clearer picture of the different *perceived needs and interests* each Pacific Island Nation has when considering science policy, whether that be that at the local or regional level. There is no point creating and proposing policies that do not represent the needs and interests of those the policies are intended to govern.

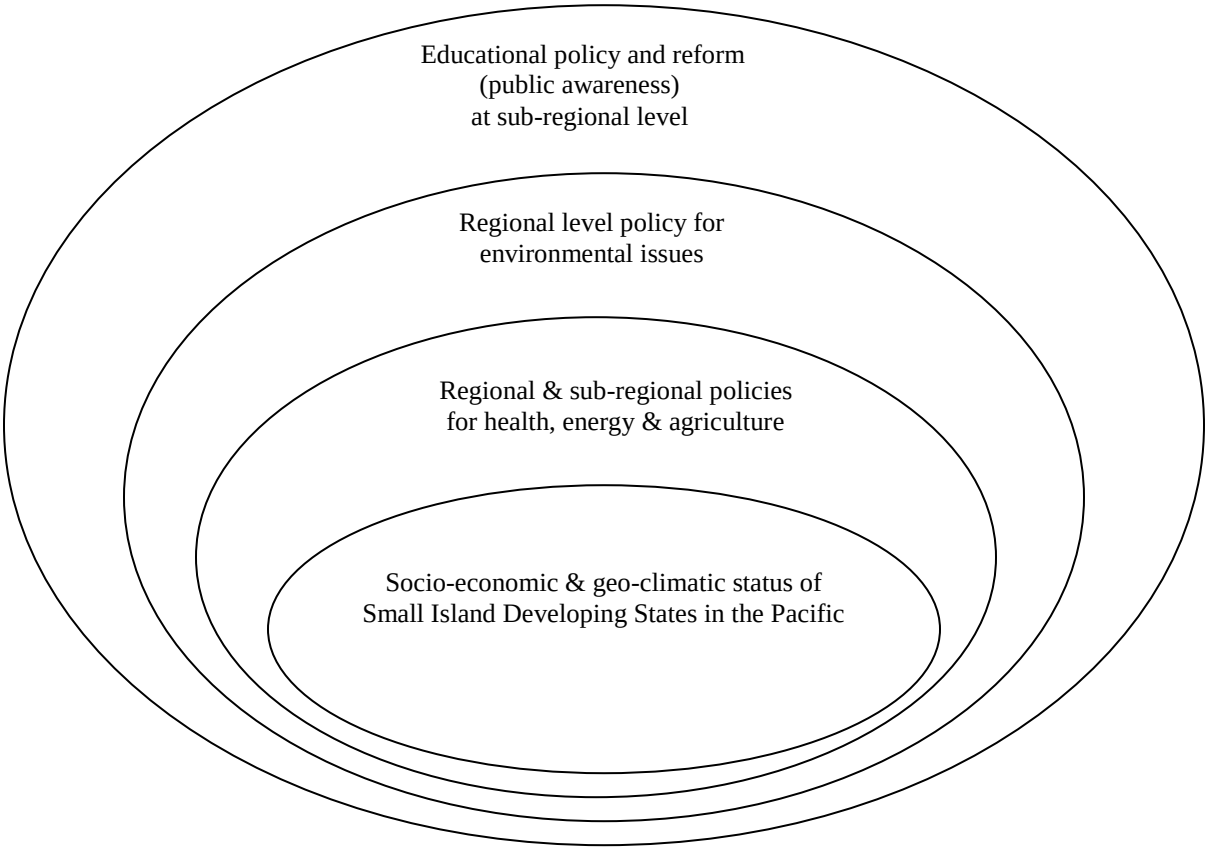

Figure 1: Representation of proposed regional and sub-regional policy strata for the Pacific Islands

2011 Update

The subsequent update of the 2006 review identified the following national and regional level interventions in the Pacific. An important feature of these interventions is that they focus predominantly on sustainable management of marine resources in the Pacific Region.

1. A review of aquaculture in the Pacific Islands 1998-2007: tracking a decade of progress through official and provisional statistics - Ponia B. 2010. A review of aquaculture in the Pacific Islands 1998-2007: tracking a decade of progress through official and provisional statistics. Noumea, New Caledonia: Secretariat of the Pacific Community (SPC).
2. Adaptation of Fiji's legislative framework for the trade in aquarium fish - Part 1 - Assessment of the framework - Manoa P. 2008. Adaptation of Fiji's legislative framework for the trade in aquarium fish - Part 1 - Assessment of the framework. Noumea, New Caledonia: Coral Reef Initiatives for the Pacific (CRISP).
3. Beurier J-P., Guilloux B., Zakovska K. 2009. Marine biodiversity law in Fiji, Solomon and Vanuatu Islands. Noumea, New Caledonia: Coral Reef Initiatives for the Pacific (CRISP).
4. Building Capacity and Cooperation for Sustainable Development of Pacific Coastal Resources Forum,Townsville-Australia, 3-7 September 2007 - Clua E. 2007. Building Capacity and Cooperation for Sustainable Development of Pacific Coastal Resources Forum,Townsville-Australia, 3-7 September 2007. Noumea, New Caledonia: Coral Reef Initiatives for the Pacific (CRISP).
5. Development of economically viable postlarval capture and culture (PCC) based activities in Bora Bora (French Polynesia) - Clua E. 2009. Development of economically viable postlarval capture and culture (PCC) based activities in Bora Bora (French Polynesia). Noumea, New Caledonia: Coral Reef Initiatives for the Pacific (CRISP).

6. Governance towards Integrated Coastal Management in Vanuatu - Vacelet V. 2008. Governance towards Integrated Coastal Management in Vanuatu. Noumea, New Caledonia: Coral Reef Initiatives for the Pacific (CRISP).

7. Pacific islands regional coastal fisheries management policy and strategic actions: (Apia policy) (2008-2013) - Anon. 2008. Pacific islands regional coastal fisheries management policy and strategic actions: (Apia policy) (2008-2013). Noumea, New Caledonia: Secretariat of the Pacific Community Headquarters.

8. Regional assessment report: Profiles and results from survey work at 63 sites across 17 Pacific Island Countries and Territories - Pinca S., Kronen M., Friedman K., Magron F., Chapman L., Tardy E., Pakoa K., Awira R., Boblin P., Lasi F. 2010. Regional assessment report: Profiles and results from survey work at 63 sites across 17 Pacific Island Countries and Territories. Pacific Regional Oceanic and Coastal Fisheries Development Programme (PROCFish/C/CoFish). Noumea, New Caledonia: Secretariat of the Pacific Community (SPC).

9. Report to the government of the Cook Islands - Hinds, V.T. 1970. Report ot the government of the Cook Islands, May 22nd - June 16th 1970. Noumea: SPC. South Pacific Commission.

10. Republic of the Marshall Islands national tuna development and management plan: Social and gender considerations - Vunisea A. c2006. Republic of the Marshall Islands national tuna development and management plan: Social and gender considerations. Noumea, New Caledonia: Secretariat of the Pacific Community.

11. SPC Aquaculture Action Plan 2007 - Anon. c2007. SPC Aquaculture Action Plan 2007. Noumea, New Caledonia: Secretariat of the Pacific Community.

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