26. Increased use of science and appropriate technology are essential for the sustainable development and well-being of Pacific Islands people

Drafted by SDWG

SUMMARY

Encourage greater efforts to improve science education in all phases of formal and informal education.

Support national needs assessments for capacity building in science and technology.

Promote strong linkages between universities/research institutions and national industries/private sector in order to ensure training/research programs meet industry needs.

Facilitate the recording, adaptation and application of indigenous/traditional knowledge and their use in participatory approaches to natural resource management and climate adaptation.

Consider the establishment of a Ministry of Science and Technology in pacific island countries and the designation of a CROP agency with specific responsibility for science and technology.

Note the absence of specific action on science and technology in the Pacific Plan and recommend that this be addressed during the current Pacific Plan review process .

Encourage incentives for venture capital and other financial and funding mechanisms to fund environmentally socio-cultural acceptable technology initiatives.

Encourage regional organizations to provide advice on best appropriate technology for challenges facing Pacific Island states.

Foster partnerships that transfer appropriate technology via international cooperation.

Consider socio-cultural, economic and environment aspects when deciding on whether to adopt a new technology; learn about and encourage the concept of green growth and sustainable development.

Consider the designation of a CROP agency with specific responsibility for science and technology.

Explore the use of a Human Sustainable Development Index to complement the commonly-used Gross Domestic Product.

KEY ISSUES

Science

- The level of education is generally high in Pacific island countries with science studied as a core subject
- In most PIC education systems, rote learning is still the norm in most cases stifling rather than encouraging the spirit of scientific enquiry and curiosity which exists in all of us.
- Long-term careers in science are not encouraged because of limited opportunities and the lack of a career path resulting in many to switch to management or government positions.
- There are limited funds for training in specialized fields of science
- There is significant brain drain; local scientists often emigrate to take advantage of greater opportunities overseas
- Given limited manpower, funding and infrastructure, focus should be on issues of priority to PICs, such as renewable energy, marine resources, telecommunications and IT, climate adaptation, waste management, natural disaster mitigation and sustainable land use
- Science education for the general population is central to be able to understand technological advances. Science education fosters the development of critical thinking skills.
- The collection, analysis and open sharing of data are critical to the advancement of science
- There is a lack of national or regional professional scientific networks or associations to promote interaction, exchange of ideas and cooperation between scientists and with other groups such as government officials and the private sector.
- Science and Technology Policy is generally not widely considered in the government structure

Technology

- Traditional knowledge is often a starting point to consider appropriate technological advances. Sailing and navigation are outstanding examples of Pacific leadership and innovation in science.

- It is difficult to summarize science and technology transfer throughout the Pacific island countries. Successes include the use of hydroelectricity and the assistance to communities in participatory planning of in-shore fisheries management. At the same time, many solid waste management approaches in particular incineration, that have been considered are of dubious merit; others have failed as they may not have been adapted to the local culture.

- The "green and blue economies" have become a focus of the United Nations develop paradigm for small island states. Countries need to understand what this means and how it can be implemented.

  Many Pacific island countries are close to 50% urbanized. However, sustainable development still depends on appropriate technologies for rural development.

- Basic needs like energy and water security should be a key foci of science application and technological development.

- Numerous studies have shown a direct relationship between economic growth and funds expended on research and development.

- A vast majority of technological advances will be brought in from overseas; more effort needs to be made to ensure there are appropriate and sustainable. Often vested interests and hidden agendas instead determine what new technology is adopted, particularly with renewable energy technologies.

- There is a great need for feasibility studies, piloting. monitoring and evaluation of new technologies being considered for adoption. Development of best practices recommendations are needed.

BACKGROUND

Science and technology are part of all societies. People make observations and test their ideas in the advancement of science. Technologies are developed by innovations that discover better ways to address every-day needs. Over the millennia Pacific people developed a system of science and technology that they considered appropriate. Most Pacific Island countries over the last 40-50 years have experienced rapid changes which have resulted in new challenges that require new responses. Many of these challenges are being or have been faced by other countries and communities around the world and they have developed technology to address them. These include provision for water and energy, telecommunications, information technology, waste management, natural disaster management and sustainable use of natural resources. We should use these experiences and adapt their responses to suit our needs and local situation.

Science and technology is a key engine for economic growth and development. Many countries such South Korea, Malaysia and Brazil started as developing states and have evolved into major powers through the development of science and technology. Developed countries see their continued growth being dependent on maintaining a "smart society", where people work more efficiently due to better knowledge and technology. Numerous global studies have shown a linear relationship between a countries level of development and how much they spend on "research and development."

Pacific Islands countries, recognizing their limited capacity in this field have taken a sensible approach in establishing regional bodies to address technological issues, e.g. SPC for fisheries and agriculture, Forum Secretariat for transport and telecommunications and SPREP for environmental issues. However, none of these agencies has a specific mandate for science and technology policy. It is interesting that the Pacific Plan, our regional plan for regional cooperation and integration, makes no direct mention of the important role that science and technology needs to play. It has a section, under education but the focus is on basic education and technical and vocational training. There is the opportunity under the current review of the Pacific Plan to address this deficiency.

An understanding of science is basic to developing a spirit of enquiry and the ability to evaluate and use appropriate technology. In general, youth in Pacific countries and societies have high educational achievement. However, the education systems are in

most cases still based on colonial models of rote learning to prepare for external examinations. Science "experiments" often mean a student copying notes about what they would have seen if they had actually performed the experiment. This is contrary to cultural norms of learning by doing. Most Pacific cultures involve respect for elders and people in authority and youth are not encouraged to have a "questioning spirit", which is a necessary first step in becoming a scientist. Many reviews have recognized the need to reform the educational structures; these can only really succeed if there is the political and social will to make the necessary educational culture changes.

That being said, an increasing number of students are studying science and engineering at tertiary institutions, especially the regional University of the South Pacific and the various national universities. The numbers of students pursuing postgraduate studies in science have expanded. However, many who achieve a Masters of PhD degree use it as a ticket to emigrate to developed countries. Universities are also taking the lead in networking for joint research initiative among themselves. A recent workshop held at USP developed a network for all Pacific Universities to which to build pan Pacific Island research collaborations, including French research institutions.

Assigning regional agencies to look after technical needs in certain areas may constrain development of technology at the national level. Each Pacific country is unique and needs to have a policy on technological innovation that suits their specific needs. This would suggest that each country needs to have its own policy on science technology and innovations and a government section to look after this. These important tasks are often undertaken, if at all, by a desk officer in the Ministry of Education. To our knowledge Papua New Guinea is the only country with a specific government department for Science and Technology.

Local industries are limited in scope and often conservative in their approach; they see guaranteed profits through import licenses and reformulations rather than innovation. Of course innovation can be encouraged by government incentive for research and development. Samoa should be commended for setting up a dedicated scientific research agency – Scientific Research Organisation of Samoa and this is a good example for other countries. Partnerships are especially important for technology transfer as people who have experience can assess how the technology might best be applied in the Pacific Island country.

Most global development agreements call for "technology transfer" to developing countries. This is a complex issue as the scale, social appropriateness and sustainability of a "Western" approach is often inappropriate for Pacific Island countries. Technologies are often taken up without an appropriate feasibility study or trialing at a pilot scale. Technologies that will have a major social impact on the people need especial scrutiny. Increasingly "South-South" technology transfer is encouraged from developing countries to less developed ones as the solutions are likely to be more appropriate.

Pacific islanders have survived in fragile environments for generations and many of the traditional technologies they used and continue to use are "sustainable". There is increasing global recognition for sustainable development and a green economy. The UNEP definition of this "results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" is in line with the Pacific experience.

A major success in the region in the past 15 years has been the development of Locally-Managed Marine Areas. Government and/or non-government agencies work with local communities in a participatory way to assist the community to develop management plans for their natural resources. The focus is not on conservation per se but on human wellbeing (more fish) and social equity (all segments of the community working together to manage their resources). If successful, these efforts also lead conservation by reducing environmental risks and ecological scarcities and increasing community resilience to climate change. These efforts have been especially successful because they are culturally appropriate as they build on the customary resource tenure that exists in Pacific Island countries and the innate understanding that we must provide for future generations. This is one of the many examples in which considering an approach that is appropriate for the Pacific and builds on its uniqueness yields the best results.

Another example is with kava, the Pacific plants used for ceremonies and relaxation in many Pacific countries. In the late 1990s there was a boom for kava-based drugs in the United States and Europe and large companies adapted the Pacific practice/technology by using different plant parts and solvents for extraction (to

maximize profits). This led to health problems that destroyed a US$100 million industry. In response a group of Pacific kava scientists, government officials and the private sector formed a Kava Council that recommended that traditional protocols be followed in kava formulations for export. This has resulted in new products being developed that will likely revitalize the kava industry.

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