Comprehensive water resource management in Palau

Republic of Palau

When thinking of the tropical lushness of the Pacific islands, many people do not consider water scarcity as a major concern for the region. But, adequate and constant water supplies to ensure the well-being of people and environment has always been a significant issue for many small island states.

In the past, water scarcity was mainly due to the relative small sizes of Pacific islands and associated constraints on water resources, coupled with intermittent drought periods. These concerns are still valid today, but now Pacific Islanders must also cope with external pressures on their water resources from the effects of climate change among other environmental, social, and economic forces and internal pressures such as population growth and rapid economic development.

The Republic of Palau is an archipelago in the Western Pacific Ocean, located approximately 800 kilometres (km) east of the Philippines and 800km north of Papua New Guinea. Palau is the westernmost island cluster of the six major island groups that make up the Caroline Islands.

Following World War II, Palau became one of six island districts as part of the United Nations Trust Territories of the Pacific under United States Administration. In 1978, Palau opted for independence status rather than join the Federated States of Micronesia. A Compact of Free Association with the United States was approved in 1986, but not ratified by the Olbiil Era Kelulau (Palau National Congress) until 1993. The Compact of Free Association establishing Palau as an independent nation entered into force on 1 October 1994. The Republic was admitted to the United Nations on 15 December 1994.

The Palau archipelago stretches over 400 miles in a north-south direction, and consists of 586 islands of which only twelve are continuously inhabited. Total land area is 535km² with 25 per cent of Palau's landmass below ten metres above sea level.

Palau's current population is 19,129 with an annual growth rate of 2.3 per cent. Renown for is high biodiversity, particularly its marine environment, the Republic's largest economic sector is tourism with figures from 1996 showing that 47 per cent of Palau's GDP was derived from the tourism industry. Although Palau has a small resident population, water consumption is relatively high due to this expanding tourism industry and limited water management infrastructure.

According to climate change projections, Palau's significant watersheds will be highly affected by global warming. Increasing drought and severe storm patterns, of which Palau has seen a significant increase over the past ten years, has caused severe economic strain on Palau's infrastucture.

Disaster

In March of 1998, the peak of El Nino, Palau had the lowest rainfall on record for more than 100 years. Water supplies were depleted, agricultural production decreased by over 50 per cent, and fires burned out of control throughout many islands. In the past several years, Palau has experienced increasingly severe storm and drought activity. On the heels of the 1997/98 El Nino event, tropical storm 'Utor' caused an additional several million dollars worth of damage. Since Utor, Palau has experienced less intense storms that caused further small-scale economic and environmental damage.

Since little irrigation is done in Palau, the agricultural sector absolutely depends on regular rainfall for crop production. Because of this, the 1997/98 El Nino, the most severe drought event in recent history, caused the complete destruction of taro patches (traditional starch supply) in several islands and along the western coast of Babeldaob.

Severe climate

Climate change experts predict that severe drought and storm periods are expected to increase in intensity and duration in the future. In light of its limited financial and human resources, absorbing the costs of adapting to the changing climate impacts will add significant pressure to Palau's economic stability.

The primary source of fresh water in Palau is from precipitation with the majority of freshwater used being surface water. Groundwater is found in Palau, though the groundwater lens is fairly thin and most water pumped from the ground is non-potable.

The area's major water source is the Ngirikiil watershed, located on Babeldaob, Palau's largest island and third largest in Micronesia. During non-drought periods, the Ngirikiil watershed supplies approximately four million gallons of water per day. Studies indicate that a total of 450 billion gallons of internal renewable water is available in Palau.

Palau is renown for its high biodiversity, particularly its marine environment

Threats to Palau's water resources include man-made contamination and climate change. Uncontrolled development, poor land uses, and deforestation in combination with intense drought and storm activity are causing land degradation and sedimentation problems in or near significant watersheds.

Constraints on water usage are inadequate storage capacities and lack of well-established infrastructure for distribution. The current water treatment plant pumps four million gallons per day of which 35 to 45 per cent is lost through transmission. The lack of an efficient water distribution system is a major factor in the inability of the Republic to effectively conserve water at the source. Another major contributor includes high leakage of water from customers' pipes and fittings.

Eco-friendly council

To address Palau's growing water pressures, President Tommy E. Remengesau, Jr. has initiated several studies and directed stakeholder agencies to mainstream sustainable development issues at all levels. Particular emphasis focused on eco-friendly development to expand the private sector, protecting water resources, and managing food security.

To ensure that sustainable development is mainstreamed at all levels and in all sectors, President Remengesau created the Office of Environmental Response and Coordination (OERC) within his office to facilitate the coordination of environmental programs. In addition to the OERC, President Remengesau initiated the National Environmental Protection Council (NEPC), a multi-stakeholder council with members from national and state government, non-governmental agencies, and the private sector. The NEPC focuses on conservation of natural resources within the context of sustainable development.

In terms of water management, the NEPC took a four-pronged approach to water conservation in Palau. First, to identify and upgrade the inadequacies of the current water treatment and distribution system, including the reduction of water subsidies to facilitate water conservation through a two-tiered pricing structure.

The second approach was to develop strategic frameworks, including the development and/or support of legislation for the protection of critical watersheds. To date, the NEPC members have assisted in the development of the Nationwide Protected Areas Network legislation and the buffer zone legislation. In addition, the States of the Republic, with the assistance of the National Government, initiated State land-use plans that identified critical habitats in need of protection and proper areas of economic activity.

The third component entailed a comprehensive water conservation public awareness programme conducted by all stakeholder agencies. It was decided that water conservation would be mainstreamed throughout all agency public awareness programs. In addition to being addressed at community workshops relating to water and sanitation, agriculture, and fisheries, Project WET was initiated to focus on good water consumption practices within the Republic through the use of the media, community visits and formal education.

The last objective of the NEPC was to source new technologies to assist the Republic enhance its current water supplies. Many technological opportunities were reviewed for applicabil-

Ngardmau waterfall (left), President Remengesau Opening the Pre-Water Forum (right

ity, costs, eco-friendly aspects, and maintenance requirements. Of the many that were reviewed, Ocean Thermal Energy Conversion (OTEC) was found to be highly appropriate for Palau because it could address two issues of significant concern for the Republic. First it would increase Palau's existing water supplies through desalination, and second it would reduce Palau's dependency on fossil fuels by providing a locally produced eco-friendly energy source.

To further address freshwater limitations within the Republic, stakeholder agencies are coordinating their efforts to develop additional mechanisms to harness freshwater resources. These include rainwater catchment tanks and gutters included in the permitting process as a mandatory feature of development, reducing subsidies on freshwater thereby providing real economic signals to the residents about the value of water, among others.

By reducing water subsidies, the National Government will be able to reduce its overhead and facilitate the repair and expansion of the current water treatment and distribution plant. Reducing water subsidies will also motivate customers to stop leaks within their premises and promote water conservation.

From Palau's perspective, sustainable development cannot be realised unless an effective and holistic framework that balances economic activity and environmental management can be achieved. And sustainable development cannot be sustained without protecting necessary resources to sustain life, namely water supplies and food production, both in the sea and on land.

Although limited in its resources, Palau has developed and implimented strategies to support fisheries management, conservation and freshwater programs, pollution prevention, disasters prevention, vulnerability to the impacts of climate change, among other sustainable development requirements.

Palau understands that increasing awareness of good water consumption and requiring water catchment technologies on structural development will not be enough for its growing population and economic activity. It must find the means to facilitate the transfer of eco-friendly appropriate technology that will enhance its current water supplies.

Technologies that will allow Palau to better manage its limited water supplies through more efficient water management techniques, and where possible, seek additional opportunities to increase it's existing water resources. There is technology that is now available that can assist Palau increase its water resources through desalination. Ocean Thermal Energy Conversion or OTEC is just one such technology that may be available and appropriate for the characteristics of Palau's economic, social, and natural environments.

With Palau's limited landmass, resource base, technological capacity, and growing population, Palau must find the means to better manage its resources to ensure long-term sustainability. Climate change impacts that have cost the Pacific region a considerable sum were not a creation of the small islands yet Palau along with all the Pacific counties must address these costly issues within country. The United Nations System-Wide report on Water indicated that 20 per cent of the world water problems over the next few years will be climate change related. And while Pacific countries did not contribute to this trend, they are at the forefront of its effects.

Palau understands that some of its water issues are self-induced due to unsustainable water practices and increasing population, but a large per centage of its water issues are externally created. Unfortunately, Palau must address these problems with its limited financial, technical, and human resources. This is an almost impossible task without assistance from the more developed countries. But Palau is making every effort, within the context of its limitations, to address the many issues surrounding sustainable development—water, energy, food security, and appropriate economic development.

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