

## 9. Implementation of natural capital accounting in the Pacific: A summary of achievements and lessons

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### Summary

In the Pacific region, natural capital accounting (NCA) is synonymous with the application of the System of Environmental-Economic Accounting (SEEA). Following the adoption of SEEA as an international statistical standard in 2012, the United Nations Economic and Social Commission for the Asia Pacific (UNESCAP) Pacific Office began implementation work, with most work occurring since 2015. To date, five Pacific Island countries have made significant progress: Federated States of Micronesia (FSM), Fiji, Palau, Samoa and Vanuatu. This paper reports on the development of the NCA in the region, providing concrete examples of the way information from accounts relates to key policies related to energy, water and waste. The achievements and lessons described are likely to be relevant to other regions and countries considering the development and application of the SEEA.

### 9.1 Introduction

In the Pacific region, natural capital accounting (NCA) is synonymous with the application of the System of Environmental-Economic Accounting (SEEA)<sup>12</sup> which was adopted as international statistical standard in 2012. In the Pacific region, while some work happened shortly after adoption, substantial work on its implementation began after 2015. This work was undertaken by the United Nations Economic and Social Commission for the Asia Pacific (ESCAP) Pacific Office.

As the Pacific region embarks on its journey towards attainment of the Sustainable Development Goals,<sup>13</sup> practical and scalable tools for collecting, analyzing and tracking data are necessary to support decision making in governments, civil society, development partners and the private sector. The SEEA has significant potential to improve policy making, resource use and environmental outcomes.

The general approach used was to build national capacity to produce policy-relevant environment indicators using SEEA. The approach was tailored to each country, with the development of accounts driven by national priorities, data availability, and the capacity within each country. Further details are found in a knowledge product published in December 2017, by ESCAP.<sup>14</sup>

This paper summarizes<sup>15</sup> the lessons from the implementation of SEEA in the Pacific in pursuit of better data to achieve sustainable development. It aims to share the experiences, achievements and lessons,

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<sup>12</sup> SEEA Central Framework <https://unstats.un.org/unsd/envaccounting/seearev/>

<sup>13</sup> See <https://sustainabledevelopment.un.org/sdgs>

<sup>14</sup> See <http://www.unescap.org/resources/implementation-system-environmental-economic-accounting-pacific-achievements-and-lessons>

<sup>15</sup> Based on contents of a publication issued by the United Nations Economic and Social Commission for Asia and the Pacific, Pacific Office (dated 20 December 2017), titled *SEEA Implementation in the Pacific – Achievements and*

and signpost future work in the Pacific region, which could guide development partners to focus and design any planned assistance.

To date, significant work has been done in five countries – Federated States of Micronesia (FSM), Fiji, Palau, Samoa and Vanuatu (Table 9.1). Notably, Fiji has completed three accounts (energy, water and solid waste), FSM has completed an energy account, Palau has produced both energy and water accounts, while Samoa has published a second iteration of water accounts. Other countries have also been involved, via, for example, regional training courses. So far, most work has been on production of accounts, but the accounts produced have had clear uses in mind and there have been a range of activities designed to engage the analytical and policy communities.

**Table 9.1 Status of SEEA implementation in Pacific Island countries**

Country	Accounts produced	Accounts planned or possible over short to medium-term
<b>Federated States of Micronesia</b>	Energy PSUT, MSUT	Water Further iteration of energy account
<b>Fiji</b>	Energy PSUT Water PSUT Solid waste PSUT	Land cover (in-progress) Further update and iteration of accounts produced
<b>Palau</b>	Energy PSUT, MSUT Water PSUT, MSUT	Waste Further update and iteration of accounts produced
<b>Samoa</b>	Water PSUT, MSUT	Energy Further iteration of water account
<b>Vanuatu</b>	Currently collating data for compiling land cover accounts	Water

The use of accounts in the design of policy has been limited to date, but information for the accounts have been used to derive indicators and in analysis of issues. One example is productivity indicators (the ratio of outputs over inputs)<sup>16</sup> in the analysis of energy and water issues.

## 9.2 Energy

Energy is a critical issue for the Pacific and the region is lagging behind in terms of access to energy, energy infrastructure, regulation and clean energy generation. Over 80% of electricity generation in the Pacific is from oil. The region's geographical isolation, small economies of scale, and limited generation capacity have translated into high electricity costs and low electrification rates, with 70% of households without modern electricity services.<sup>17</sup> Between 2005 and 2030, electricity demand is expected to grow by about 7% per year, while electricity generation is forecast to grow by only 6.4% per year. By 2030, refined petroleum fuels are projected to remain the Pacific region's dominant primary source of energy for electricity generation, but complemented by hydropower and natural gas.<sup>18</sup>

*Lessons.* See <http://www.unescap.org/resources/implementation-system-environmental-economic-accounting-pacific-achievements-and-lessons>

<sup>16</sup> Young, E.K et al. 2016. *Productivity as the key to economic growth*. World Bank.

<http://documents.worldbank.org/curated/en/314741472533203058/pdf/108092-BRI-Policy-3.pdf>

<sup>17</sup> UNESCAP. 2017

<sup>18</sup> ADB. 2013. *Energy Use in the Pacific*

Pacific leaders have prioritized the development of affordable and clean energy to break the dependence on volatile global fossil fuel markets, reduce high costs associated with transporting fuel, promote low-carbon growth, and expand access to electricity.

Energy accounts have been produced for the FSM, Fiji and Palau. Key results for each of these countries are highlighted below.

### **Federated States of Micronesia (FSM)**

Energy is a critical input to the economy and well-being of FSM. The FSM Strategic Development Plan 2004 – 2023 and National Energy Policy both aim for more efficient use of energy, diversification of energy sources, and increasing the level of renewable energy use. Achieving these aims requires understanding the cost and benefits of different courses of action. Such analysis requires an integrated analysis of environmental and economic considerations.

The experimental energy accounts for the FSM<sup>19</sup> included physical (kilojoules) and monetary (US\$) information and showing the main suppliers and uses of energy in the nation as well as for each of the four states. These accounts showed that:

- Virtually all energy is produced from fossil fuels.
- The value of energy used increased between 2009 and 2015.
- Pohnpei uses the most energy of all states.
- Physical energy productivity – the ratio of GDP (US\$) to physical energy use (kilojoules) – is declining.

The policy implications of the account include:

- Identification of the most cost-effective investments in energy supply infrastructure to reduce physical energy losses
- Assessing financing options for investments, including user pays principles
- Promoting more efficient physical energy use by business and households

### **Fiji**

The need for reliable and affordable energy, lack of public awareness regarding energy efficiency, and the consequent need to monitor energy use and the sustainability of its supply are all key concerns highlighted in the Green Growth Framework and the National Development Plan of Fiji. In addition, the national Energy Policy 2014-2020 outlines Fiji's vision and strategic direction for achieving sustainable energy for all.

In response to these policy demands, the Fiji Bureau of Statistics produced experimental energy accounts for 2006 through to 2014.<sup>20</sup> The accounts are in physical terms and only include the electricity generated and distributed by Fiji Electricity Authority (FEA) but this amounts to 97.5% of all electricity generated in the country.

The main findings from the energy accounts were:

- Energy use in Fiji is increasing.
- The major consumer of energy is the commercial sector, followed by other industries, and households.
- The physical energy productivity (i.e. the ratio of GDP to physical energy use) of the Fijian economy is improving.

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<sup>19</sup> Available at [www.unescap.org](http://www.unescap.org) and <http://www.fsmstats.fm>

<sup>20</sup> Available at [www.unescap.org](http://www.unescap.org) and [www.statsfiji.gov.fj](http://www.statsfiji.gov.fj)

- Over half of electricity generated in Fiji comes from thermal (diesel) generation – this comes at significant cost and environmental impact.
- A large proportion of energy content of the fuel being used for thermal (diesel) generation in Fiji is being lost in energy transformation.

The policy implications of the results are still to be analyzed thoroughly.

## Palau

The Palau National Energy Policy (2010) aims to reduce energy use, raise energy efficiency, and convert to renewable energy sources. A range of actions and targets are outlined in the Policy, including:

- 30% reduction in overall national energy consumption by 2020
- 20% of electrical energy generated in Palau through renewable sources by 2020

Such targets are directly measurable by energy accounts, and physical and monetary energy accounts were developed for the fiscal years (FY) 2014 to 2016.<sup>21</sup> The Palau FY is from 1 April to 31 March and is the same as the US FY. Key results for Palau included:

- The physical use of energy (kilojoules) declined between FY2014 and FY2016.
- Energy productivity (\$ of GDP per \$ of energy use) increased 60% between FY2014 and FY2016, due mostly to decreases in energy use and the price of energy products.
- The physical efficiency of energy use (gigajoules per \$ of GDP) declined from 9,049 gigajoules/US\$ million in FY2014 to 6,280 in FY2016.
- Per capita use of energy (kilojoules) declined between FY2014 and FY2016, due to a combination of increasing population and decreasing physical use of energy and water.
- The value of infrastructure for electricity supply, water supply, and sewerage treatment increased slightly from \$85.7 million in FY2014 to \$86.2 million in FY2016.
- Use of solar electricity more than doubled between FY2014 and FY2016, with government the largest user. However, solar electricity makes up less than 1% of total energy use.

The energy accounts had a range of policy implications, including:

- **Regulatory issues** - The retail price of fossil fuel is higher than regional benchmarks, but the retail price of electricity is lower (both in pre- and post-tax prices). Reviewing government taxes and subsidies on energy products might lead to a more equitable and user pays pricing regime, encourage renewable energy and switching to hybrid or electric cars.
- **Infrastructure planning** - The accounts reveal that there are significant losses of energy via the distribution networks, while energy efficiency has also declined. Increased investment in supply infrastructure may reduce losses while increased investment in energy saving technology may increase efficiency.
- **Renewable energy** - The accounts show the increasing use of solar energy reflecting positively on government policy. Reductions in price of renewable technology could see further reductions in the dependence on fossil fuels.
- **Tracking the Sustainable Development Goals (SDGs)** - The accounts can produce several of the indicators for the SDGs related to energy, e.g. SDG 7.1 to 7.3.

## 9.3 Water

Water, a basic human need, is also a key input to much economic activity, including the production of food. Water insecurity is rapidly increasing with pressure coming from climate change, urbanization and

<sup>21</sup> Found at [www.unescap.org](http://www.unescap.org) and <http://palaugov.pw/system-of-environmental-economic-accounting-seea/>

energy needs, and the UN estimates that global water use over the last century has been growing at twice the rate of population increase.<sup>22</sup> Given similar development challenges in the Pacific, access to safe, reliable and affordable water is also a priority. Samoa, Fiji and Palau have all produced water accounts and key results and policy relevance are presented below.

### **Samoa**

Samoa is fortunate in having high rainfall and a small population, but with increasing tourism, urbanization, and the impacts of climate change, water management is a key policy issue.

The Samoa Bureau of Statistics (SBS) produced two experimental water accounts. The first was published in 2015 and covered three financial years (2011-12, 2012-13 and 2013-14) while a second covered 2014-15 and was added in 2017.<sup>23</sup> The accounts included physical and monetary supply and use tables and showed that:

- Total water consumption varied little each year.
- Households were the major consumers of water in each year.
- The implicit price of water varied between water suppliers and sectors.
- While water use for electricity generation was extremely high, consumption was very low as the water used for hydro-electric power is immediately discharged back to the environment (and hence available for other uses).
- Estimated water use by livestock was relatively static.

The policy implications of the experimental water accounts included:

- The need for better targeted investments in water infrastructure and awareness raising of water conservation measures, particularly in rural areas
- Setting appropriate water tariffs and helping to ensure the production and use of water in Samoa is efficient and equitable
- Improved reporting against targets and indicators including the Sustainable Development Goals
- Compiling tourism satellite accounts in conjunction with relevant SESA accounts would allow policy makers to better understand the dependence of tourist industries on natural resources to be more fully appreciated.

### **Fiji**

The 2013 Fiji Constitution guarantees the right of every person to clean and safe water in adequate quantities. The National Development Plan and the Green Growth Framework for Fiji underscores the need, and adopts measures, to improve access to safe drinking water for the population. In particular, to address data gaps in water resource planning, the Framework calls for developing an “integrated database on national water use, extraction and replenishing rates and disseminate widely for water resource planning and matching water supply with demand by 2017.”

Experimental water accounts were prepared by the Fiji Bureau of Statistics for 2013 to 2016 in response to the need for better data and statistics to inform policies on water resource management and universal access to safe drinking water without increasing pressure on the environment.<sup>24</sup> The main findings of the water accounts were:

- Surface water extraction was increasing year on year.
- Most metered water consumption was by households, followed by the commercial sector.

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<sup>22</sup> e.g. UN World Water Development Report 2015 <http://unesdoc.unesco.org/images/0023/002318/231823E.pdf>

<sup>23</sup> Found at [www.unescap.org](http://www.unescap.org) and [www.sbs.gov.ws](http://www.sbs.gov.ws)

<sup>24</sup> Available at [www.unescap.org](http://www.unescap.org) and [www.statsfiji.gov.fj](http://www.statsfiji.gov.fj)

- Not all water abstracted for metered water production was used, as 44% is being lost through distribution and 2.4% through the purification processes.

This experimental account was the first attempt toward a more complete accounting of water availability, supply and use in Fiji. While the accounts could derive some useful information, further development of SEEA water accounts will facilitate gathering of water data to address a number of important policy questions, such as:

- How much water is available for use? How much of that portion has already been used?
- Which source of water have we been most dependent on? Is it sustainable?
- What is the main use of water?
- Which industry uses water more/less efficiently?

### Palau

The National Water Policy (2012) aims to protect and conserve Palau's water resources; and ensure access to affordable and sustainable water supply and wastewater services. Furthermore, an Executive Order, effective till May 2018, established water use and conservation policies in anticipation of extreme drought conditions. Measures target government offices and facilities, including implementation of water efficiency practices and technologies, and awareness raising and training.

Physical and monetary accounts for water were developed for the FY 2014 to 2016.<sup>25</sup> Key results for the water accounts in Palau were:

- The physical use of water (mega liters) declined between FY2014 and FY2016. Water productivity (\$ of GDP per \$ of water use) decreased 38% between FY2014 and FY2016 due mostly to increases in the price of water.
- The physical efficiency of water use (megaliters of water use per \$ of GDP) has declined by 31%.
- Per capita use of water (i.e. mega liters per person) declined between FY2014 and FY2016, due to a combination of increasing population and decreasing physical use of water.
- The value of PPUC infrastructure for electricity supply, water supply, and sewerage treatment increased slightly from \$85.7 million in FY2014 to \$86.2 million in FY2016.

Some of the policy implications from the water accounts were:

- **Infrastructure planning** - The accounts reveal that there are significant water losses (2,735 mega liters in FY2016) via the distribution networks, while water efficiency also declined. Increased investment in supply infrastructure may reduce losses while increased investment in water saving technology may increase efficiency.
- **Tracking the Sustainable Development Goals** - The accounts can produce several of the indicators for the SDG targets related to water.

## 9.4 Solid Waste

Solid waste management is a particularly challenging issue for Pacific Island countries. Volumes of solid waste have been growing in line with rising living standards, increased importation of goods, and larger tourist arrivals. Planned and careful management of solid waste is a priority for the countries of the region, but data on production, reuse, and disposal of waste is limited, making policy making and budgeting difficult. To this end, Fiji produced an experimental solid waste account.

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<sup>25</sup> Found at [www.unescap.org](http://www.unescap.org) and <http://palaugov.pw/system-of-environmental-economic-accounting-seea/>

## Fiji

Rapid urbanization and expansion of economic activity have increased both consumption and imports in Fiji, placing significant pressure on the management of all forms of waste. Ineffective waste management system, littering, absence of organized waste management systems in the rural and outer islands, and ineffective enforcement of existing laws are outlined in Fiji's Green Growth Framework.

The Fiji Bureau of Statistics produced experimental waste accounts for the years 2013 to 2016.<sup>26</sup> The main findings were:

- Increasing levels of waste generation; between 2013 and 2016, the quantity of waste increased at more than double the rate of GDP.
- The composition of waste is: general (80%), green (10%) and special waste (10%).
- Almost all waste generated in Fiji ends up in a landfill, almost nothing is recycled.
- In 2016, capital expenditure related to waste management by the Department of Environment represented 0.07% of total central government expenditure.

While providing extremely useful data to policy makers, due to constraints on data availability the solid waste account only includes the proportion of waste collected and sent to landfills from areas representing around 40% of the total population. Addressing this data limitation is among the next steps under consideration by the Fiji Bureau of Statistics.

## 9.5 Five selected lessons from the implementation of SEEA in the Pacific

Several lessons emerged from the implementation of the SEEA in the Pacific. Current efforts are located within statistics offices and not among data analysts or decision makers. However, the production of the accounts was a useful first step to engaging with the analytical and decision-making communities. Helping this engagement process is the ability of Pacific Island countries to compile pilot accounts, usually with simplified industry breakdowns, within a short space of time (within 12 months).

So far, water and energy have been a focus as they are key issues for all countries. As there is usually only one water supplier and one electricity supplier, information is relatively easy to obtain, and countries have been able to start with these to build knowledge and understanding of the SEEA. In this, a combination of local staff and development partner expertise has proved successful in preparing accounts. Development partner expertise must recognize country context, respect national systems and approaches, and adapt to national realities for successful outcomes.

In this, simplifying accounting tables, broadly consistent with the SEEA, has provided a practical way forward as well as recognizing the data realities of countries. While there are data gaps and deficiencies, these can be overcome using standard statistical techniques (e.g. imputation, extrapolation, use of coefficients); and the production of experimental accounts along with selected examples of policy use have helped demonstrate both the feasibility of producing and using accounts in the region.

A key feature of the work in the Pacific has been the upfront attempt to link account production to policy and analysis. This is reflected in the assessment process and in the documents produced, which in addition to the accounting tables have also provided a range of interpretive and analytical text. This goes beyond what is done in many statistical offices. Government resources are smaller in Pacific island countries and often there is limited capacity outside of statistical offices to interpret and analyze the accounts.

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<sup>26</sup> Available at [www.unescap.org](http://www.unescap.org) and [www.statsfiji.gov.fj](http://www.statsfiji.gov.fj)



Increasing the policy use of the accounts requires the involvement of planners, key sector agencies and budget policy makers in the planning, production and post-production analysis of accounts. This builds ownership and raises understanding of the policy applications of the accounts, with concrete sectoral, infrastructure and fiscal policy uses in mind. It is evident that specific policy, budgeting, and planning applications are still being developed globally, with little expertise among statisticians alone to fully integrate data for policy purposes. This highlights the importance of the Policy Forum on Natural Capital Accounting for Better Decision Making<sup>27</sup> for sharing experiences. In this, economists, planners and sector policy experts can comment and facilitate analysis of public policy using accounting. In the Pacific region, these include:

- Budgeting and fiscal policy issues, such as taxation to create incentives that determine use of natural resources
- Specific sector/resource policy and planning, for example, measuring sustainable tourism (as discussed in Fiji's case study earlier) and oceans management
- Infrastructure investment and maintenance planning
- Regulatory measures that determine production and use of natural resources

The SEEA also provides data relevant to monitoring progress against priorities and targets contained in national and international development plans. For example, Palau's SDG indicators 6 and 7 on change in energy and water use efficiency over time can be obtained from the energy and water accounts:

- **6.4.1 Change in water-use efficiency over time** – The physical efficiency of water use, as measured by GDP per liter of water use, increased between FY2014 and FY2016 from \$0.09 to \$0.16 per liter. Conversely, the economic efficiency of water use decreased, as measured by GDP per value of water use, from \$99 to \$62 GDP per dollar of monetary water use; and
- **7.2.1 Renewable energy share in the total final energy consumption** – The amount of electricity produced from solar is less than 1% but has increased from 1,397 to 2,907 GJ between FY2014 and FY2016.

Communication of the accounts to regional policy makers, the general public, academic audiences and the statistical world has also been a feature of the work in the Pacific. Short policy briefings with infographics (e.g. from FSM)<sup>28</sup> have been a highlight, while information has been shared through UNSD newsletters<sup>29</sup> and World Bank WAVES online<sup>30</sup> resources.

## 9.6 Future directions

Further support to Pacific island countries in the implementation and use of the SEEA should be provided. Capacity-building efforts should continue and draw on regional expertise and experience. In this, the initial aim will be to improve the quality of the existing accounts and eventually extend the range of accounts produced. Increasing the number of countries in the Pacific producing and using accounts is a goal, although ground realities, level of country commitment and policy value added will need to be assessed on a country-by-country basis.

Going forward, additional work needs to be directed at better understanding how the SEEA can be used for fiscal policy, infrastructure planning and regulatory measures to create higher national demand.

<sup>27</sup> Refer to <https://www.wavespartnership.org/en/forum-natural-capital-accounting-better-policy>

<sup>28</sup> Refer to <http://www.fsmstats.fm/wp-content/uploads/2017/07/FSM-Energy-Accounts-Infographic.pdf>

<sup>29</sup> Refer to newsletters 38-41, at <https://unstats.un.org/unsd/envstats/newsletters>

<sup>30</sup> Refer to <https://www.wavespartnership.org/knowledge-center>



Furthermore, greater effort to use SEEA findings to monitor the achievement of national priorities and SDGs will create added value.

In this context, broad partnerships are needed to sustain the development and application of SEEA in the region. Development partner support, together with the expertise already developed in Pacific Island countries, could support and improve the existing accounts as well as new ones. Relevant types of assistance for the Pacific region include:

- Regional workshops to share national experiences and provide training on account production/ use in areas where PICs have most interest (aimed to consolidate and build on existing accounts compiled). Use of PIC and other national statistics office expertise to facilitate such training could be explored
- Regional workshops focused on policy, budgeting and planning use of SEEA findings
- Regional workshops on sectoral application of SEEA could be explored, in particular, for measuring sustainable tourism (building on Fiji's case study findings discussed earlier), given importance of tourism in most PICs, and UNWTO and UNSD interest, and ocean resources
- Country assistance for assessment, production and importantly policy use
- Coordination of peer-review process for account production
- Prepare and disseminate knowledge products
- Facilitate access to specialist knowledge and guidance

A range of opportunities exist for consolidating and sustaining SEEA in the Pacific region, and for maintaining a tailored approach to implementation remains crucial.

## 9.7 Acknowledgements

This paper is based on content of a publication issued by the United Nations Economic and Social Commission for Asia and the Pacific, Pacific Office (dated 20 December 2017), titled "SEEA Implementation in the Pacific – Achievements and Lessons."<sup>31</sup>

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<sup>31</sup> See <http://www.unescap.org/resources/implementation-system-environmental-economic-accounting-pacific-achievements-and-lessons>