WAVES
Costa Rica
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WAVES – Global Partnership for Wealth Accounting and Valuation of Ecosystem Services

Costa Rica:
Country Report 2016

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Costa Rica:
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WAVES – Global Partnership for Wealth Accounting and Valuation of Ecosystem Services

Wealth Accounting and Valuation of Ecosystem Services (WAVES) is a global partnership led by the World Bank that aims to promote sustainable development by mainstreaming natural capital in development planning and national economic accounting systems, based on the System of Environmental-Economic Accounting (SEEA). The WAVES global partnership (www.wavespartnership.org) brings together a broad coalition of governments, UN agencies, nongovernment organizations and academics for this purpose. WAVES core implementing countries include developing countries—Botswana, Colombia, Costa Rica, Guatemala, Indonesia, Madagascar, the Philippines and Rwanda—all working to establish natural capital accounts. WAVES also partners with UN agencies—UNEP, UNDP, and the UN Statistical Commission—that are helping to implement natural capital accounting. WAVES is funded by a multi-donor trust fund and is overseen by a steering committee. WAVES donors include—Denmark, the European Commission, France, Germany, Japan, The Netherlands, Norway, Switzerland, and the United Kingdom. Country work on natural capital accounting and their policy applications are reported in a publication series, WAVES Technical Reports.

Content

Introduction

The Wealth Accounting and Valuation of Ecosystem Services (WAVES) is a World Bank-led global partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts. This global partnership brings together a broad coalition of United Nations agencies, governments, international institutes, nongovernmental organizations and academics to implement Natural Capital Accounting (NCA) and develop approaches for other ecosystem services accounts. Costa Rica is one of the initial core implementing countries that embarked on programs for NCA endorsed at the highest institutional level.

Costa Rica has followed a development path based on investment in human capital and the conservation of its abundant natural resources, with successful results. For instance, the country ranks 69 among 188 countries in the Human Development Index (HDI), with high level of human development.1 Meanwhile, natural capital in Costa Rica has an estimated value of US$9,473 per capita, similar to Gross Domestic Product (GDP) per habitant (World Bank, 2011). The country has a rich history of enhancing economic growth while managing its natural capital sustainably, being the first country to implement a Payment for Ecosystem Services (PES) scheme to conserve its forests and protect water reservoirs. Furthermore, the country´s commitment to nation-wide electrification and electricity production based on renewable sources is a milestone of economic development.

Notwithstanding, Costa Rica currently faces important challenges for its future development. A central issue is how to accelerate economic growth through a sustainable use of natural wealth. Urbanization, and increasing demand for energy and agricultural growth are generating pressure on the country's natural resources. Land use conflicts in different regions are causing soil degradation, water pollution and threatening coastal and marine resources. In addition, climate variability is affecting many regions of the country, its infrastructure and productive capacity. On the other hand, the country's future development is foreseen by government authorities with tourism growth, the conservation of forests, agricultural development, green industries promotion, renewable energy investments, and the consolidation of a low carbon growth path towards the decarbonization of the economy.

Therefore, Costa Rica is at a crucial moment to strengthen the foundations of sustainable development. In order to achieve this, good knowledge and quantification of the main sources of national wealth and economic growth is required, particularly the value of the country's natural capital. Policy makers need more and better information about the alternative uses of land, the economic implications of water resources degradation, the value of services provided by ecosystems for leading industries, and the effectiveness of different policy instruments for sustainable management of natural resources.

The compilation of environmental accounts provides key tools for policy decision-making. With technical support from WAVES, the country has compiled accounts for water, forests, and energy. Experimental ecosystem accounting is under development. Through this work, WAVES contributed to expand available information and indicators to monitor the progress of specific policy actions, with new analytical and decision-making tools.

1 See UNDP (2015): Human Development Report 2015. Work for Human Development. New York: United Nations Development Programme.

Context for Natural Capital Accounting

Wealth and sustainability of a country depend on the management and improvement of a portfolio of economic, social and environmental assets that constitute the total capital stock: physical capital (infrastructure, machinery, equipment), intangible capital (education, health, institutions), and natural capital (water, soil, forests, biodiversity). Ecosystems generate numerous environmental, economic, and social benefits.[2]

Natural resources, their importance and characterization have been extensively studied in Costa Rica. Several studies incorporate biophysical valuation or natural resource inventories, at national, regional or specific ecosystem level. Much of the academic and policy design work is related to water resources and forests. Others address issues related to biodiversity and climate change. There is also a vast literature related to the economic valuation of natural resources and ecosystem services. This knowledge base is a solid starting point for the construction of environmental accounts (a central component is the valuation of stocks and its variation in time.)[3]

Natural Capital Accounting (NCA) was not implemented in the country until 2014, with initial efforts from the Central Bank of Costa Rica (BCCR), the responsible organization for the System of National Accounts (SNA). Still, while limited, there is some previous experience in the country with natural capital accounting. During the 90s, initiatives to build environmental accounts were supported. Of particular relevance is the work "Accounts Overdue: Natural Resource Depreciation in Costa Rica" (Solórzano et al, 1991) developed by the World Resources Institute (WRI) and the Tropical Science Center (CCT), which estimated the value of natural resources in Costa Rica for 1970-1989. The depreciation of forests (deforestation), soil (nutrient loss) and fisheries (overfishing) was estimated at US$ 4.1 billion (at 1984 prices), an average 6% of GDP during 1970-1989.

Another important work was "Gastos Ambientales en Costa Rica, 1991-1995" (Barrantes, 1997), by the CCT, the National University (UNA), and logistical support from the BCCR. Government environmental expenditures were estimated (1991-1995), including actions related to forest and non-forest ecosystems, water resources, protection of air and climate, solid waste treatment, noise control, and soils. The exercise followed the methodological principles of SEEA-1993, with some adaptations to facilitate data collection. Years later, the study was updated and included environmental expenditure by the private sector (Barrantes, 2003). On average, during the 90s, Costa Rica´s environmental expenditures accounted for 0.5% of GDP per year.

From these past experiences the following lessons have been learned: a) environmental accounting requires solid institutional support, with interdisciplinary working teams, because coordination is a central input for success; b) a clear dimension of the scope of work and an adequate budget are necessary conditions for long term activities; c) limited technical capabilities and expertise in the field of integrated environmental-economic accounting should be addressed as a prioritized action (capacity building needs); and d) the lack of an official fully-developed environmental statistics system makes the compilation of environmental accounts more difficult.

Priority accounts: water, forests and energy

During 2013 and 2014, a series of technical studies, interviews with experts, and workshops helped define the policy questions and a work plan for NCA in Costa Rica. A feasibility study and a policy entry points report defined priority policy areas for environmental accounting support. Two natural asset accounts were developed

2 See Barbier (2011).
3 Further details can be found in Rivera (2012).

in a first stage: water and forests (2014/2015). Afterwards, at the beginning of 2016, energy accounts were compiled. The three accounts will make important contributions to inform national plans and policy design.

Water accounts: contribution to the National Plan for Integrated Management of Water Resources

Costa Rica has abundant water resources. The country´s annual water supply is estimated at 110 km^3 (73 km^3 of surface runoff and 37 km^3 of natural recharge to aquifers (MINAET, 2008).Total annual withdrawals to meet domestic demand are estimated at 24.5 km^3. Hydroelectric generation accounts for 80% of total demand, followed by agriculture with 16%, and the use for human consumption, tourism, industry, and services with less than 4%. It is estimated that 88% of withdrawals to meet the national demand for consumptive uses (other than electricity generation) come from groundwater sources, a fact that highlights the strategic relevance of a sustainable use of aquifers in the country.[4]

Despite the relative abundance of water resources in Costa Rica, water is not being used in a sustainable way. The degradation of watersheds (and consequently the coastal ecosystems) is worsening in recent years. Only 5% of the country's wastewater is treated before being deposited in rivers, while just 2.4% of the population has access to a treatment plant of wastewater. These figures are among the lowest rates in Latin America.[5] Recent analysis shows that 57% of rivers and estuaries of the country have high levels of pollution, which affects the use of water for human consumption, irrigation in agriculture, or recreation. Additionally, it threatens marine biodiversity and major tourism attractions.[6] Poor land use planning and the intensive use of pesticides have contributed to water resources degradation as well. Regarding hydropower generation, it is estimated that 75% of its potential has not yet been exploited (ICE, 2014). Erosion of soils, deforestation, high sediment production, and other consequences of the degradation of watersheds are affecting electricity generation. The sustainable management of watersheds is essential to maintain not only the quality of water resources but hydroelectric production, a key to future sustainable energy use.

The National Development Plan 2015-2018 indicates that aquifers are highly vulnerable, threatening water supply for human consumption and productive activities. Low coverage of sewerage networks and the use of nitrogen fertilizers and agrochemicals threaten groundwater sustainability, and represent considerable environmental risk factors. One consequence of the limited land use planning has been the unsustainable exploitation and pollution of aquatic and terrestrial ecosystems and the deterioration of water quality. National water resource management reveals coordination and planning failures (MIDEPLAN, 2014).

In response to problems with water resources management and to promote sustainable water resources use, policy guidelines have been established with the National Plan for Integrated Management of Water Resources (PNGIRH). One of the central goals of the PNGIRH is to complete the inventory of surface waters, aquifers, aquifer recharge areas and springs in the country. Additionally, it seeks to consolidate a program of monitoring water bodies' quality and strengthen the strategic management of groundwater. It also plans to consolidate interagency coordination and align the work of water management related organizations at a national, regional and local level (MINAET, 2008).

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4 IMTA (2008), *Elaboración de Balances Hídricos por Cuencas Hidrográficas y Propuesta de Modernización de las Redes de Medición en Costa Rica.* BID- Departamento de Aguas, MINAE.

5 UNDP (2015), Op. cit. Notwithstanding, recent investments on sewerage management and water treatment systems for the largest cities in the "metropolitan area" of the country (GAM) will contribute to increase the percentage up to 20% in 2020.

6 Mora, D. (2012) *Calidad sanitaria de los esteros y/o desembocaduras de ríos en los litorales de Costa Rica*: 1996-2011. Laboratorio Nacional de Aguas. San José: Instituto Costarricense de Acueductos y Alcantarillados (AyA).

The PNGIRH would be strengthened with the new Water Law, under discussion at the Congress.[7] The Law aims to regulate the protection, exploitation and sustainable use of continental and sea water in such a way as to ensure universal access, fair and equitable, in quantity and quality. A central principle of new legislation is the economic value of water. Article 2 declares water as an economic good with value in all its diverse competing uses. The Law states the responsibility of government authorities to use economic valuation of water resources as a working tool for policy decisions. Moreover, the Law creates the National Information System for Integrated Management of Water Resources (SNIGIRH), managed by the Department of Water at MINAE. The SNIGIRH will integrate and improve available data and information related to water resources in the country.

A key issue is the use of water for production and the demand from leading industries in the country. Manufacturing and services account for a significant share of national production and employment, and water demand as well. However, these figures do not yet account for all the consumption of water by agriculture (which might be significantly higher when incorporating irrigation and self-consumption) and hydropower generation (80% of national electricity supply..

These examples highlight the need for better accounting of water resources in the country and supports the case for the compilation of water accounts. The management of abundant water resources in the country can be strengthened with new accounting data. Accounting can inform policy and produce indicators for monitoring and better planning.

Forest accounts: contribution to National Plans for Deforestation Reduction and Forest Development

According to the National System of Conservation Areas (SINAC), forests have the highest coverage of land use in the country with 52.4% of total land area (including forest, wetlands, mangroves, heath and grasslands.)[8] Since the 70s, Costa Rica has invested significant resources in protecting forests and biodiversity through SINAC and the National Forestry Financing Fund (FONAFIFO). The country has 25.9% of its territory classified as protected area, distributed in various categories of management: national parks (46.4%), national wildlife refuges (17.5%), reserves forest (15.9%) and protective zones (11.6%). Since 1997, more than US$300 million have been allocated to reduce deforestation through the system of Payments for Environmental Services (PES), with over 10,000 contracts with private forest owners.[9] The policies for forest conservation, protection of national parks and PES, among others, have contributed significantly to the mitigation of greenhouse gas (GHG) emissions in the last decades.[10]

The REDD+ (reduced emissions from deforestation and forest degradation, including forest conservation, sustainable management of forests and enhancement of forest carbon stocks) strategy of the government is seen as the third generation of policy actions to reduce deforestation in the country. The strategy seeks to continue conservation efforts, strengthen the forest industry and promote the responsible use of wood and derived products, and increase the country's forest area. The REDD+ strategy is a key component of the National Plan for Forest Development (PNDF) 2011-2020. The Plan is based on seven strategic areas (forest

7 Asamblea Legislativa de la República de Costa Rica. Departamento de Comisiones. Comisión Permanente de Ambiente. Ley para la Gestión Integrada del Recurso Hídrico. Expediente No. 17,742. Dictamen afirmativo unánime. March 27, 2014.
8 Programa REDD/CCAD-GIZ - SINAC (2015): Inventario Nacional Forestal de Costa Rica 2014-2015. Resultados y Caracterización de los Recursos Forestales. Emanuelli, P., Milla, F., Duarte, E., Emanuelli, J., Jiménez, A. and Chavarría, M.I. Programa Reducción de Emisiones por Deforestación y Degradación Forestal en Centroamérica y la República Dominicana (REDD/CCAD/GIZ) y Sistema Nacional de Áreas de Conservación (SINAC). San José: Costa Rica.
9 Own estimation with data from FONAFIFO, www.fonafifo.go.cr, retrieved on January 30, 2016.
10 MINAE and IMN (2015): Costa Rica Informe Bienal de Actualización ante la Convención Marco de las Naciones Unidas sobre el Cambio Climático. Ana Rita Chacón Araya, Ed.; Ana Rita Chacón Araya, Gladys Jiménez Valverde, Nazareth Rojas Morales, Fanny Ramírez, Rev. San José, Costa Rica: MINAE, IMN, 2015.

land management, positioning the forestry sector, competitiveness of forestry industry, sustainability of forestry, coordination, organizational efficiency and effectiveness, innovation and sustainability of funding, and climate change, mitigation and adaptation.) The PNDF highlights the need of a solid and innovative policy framework that recognizes the value and importance of forests to society. The Plan makes visible the relationships and connections of forests with other development agendas such as clean energy production, the provision of water for human consumption and agriculture, tourism and other land uses that maintain a close link to forests (MINAET, 2011.)

The PNDF indicates that in order to maintain and increase forest cover it is necessary to make it profitable and sustainable through the recognition of their positive externalities. There is the need to accurately estimate the value of all ecosystem services provided by forests, like safe water supply for hydroelectric generation, control of land degradation and sedimentation to prevent damages to infrastructure, protection of biodiversity and its use in productive activities such as tourism (recreation, landscaping) and sustainable agriculture (buffer zones, pollination), and their roles as natural barriers to extreme hydro meteorological events (droughts, floods, storms). The estimation of the value of forests in an integrated way can orient policy design and financial engineering in the long term.

Forest Accounts can contribute to inform policy decisions on the REDD+ strategy, PES and the PNDF 2011-2020. Costa Rica has made significant investment in the past two decades to stop and revert deforestation and recover its forest assets. However, the national forests capital has not been valued and accounted for in wealth indicators.

Energy account: contribution to the National Energy Plan

In Costa Rica 90% of electricity generation is based on renewable sources (with predominance of hydroelectricity). However, the economy makes an intensive use of fossil fuels. Final energy consumption comes from petroleum (61% of total), followed by electricity (21%) and biomass (18%). Energy demand is driven by transportation (47% of total consumption), industry at 25% and 14% residential.[11] As a result, the country's emissions from fossil fuel use have grown by 22% between 2005 and 2012. Currently, 64% of total GHG emissions come from energy use.[12] This contrasts with a decrease in energy intensity (Energy use by GDP unit) in the last decade. The evidence suggests that energy generation and use in the country is heterogeneous in terms of alternative sources and carbon intensity.[13]

The National Electricity Institute (ICE) has developed an expansion plan of electricity generation (PEG) that aims to reach 98% of generation from renewable sources in the next two decades. This is part of the vision of the VII National Energy Plan (2015-2030) whose overall objective is to reduce the country's dependence on fossil energy sources and create the conditions for higher economic growth consistent with a less intensive use of petroleum and the reduction of GHG emissions. Moreover, the Plan pursues clean energy production in a sustainable and environmentally friendly way, with the reduction of oil imports, its substitution with domestic energy sources (ethanol, biodiesel, hydropower, geothermal, biomass, wind, and solar), the consolidation of an efficient transport system, and the strengthening of energy sector institutions.[14]

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11 DSE. (2015). *Balance Energético Nacional de Costa Rica, períodos 2012-2014.* San José: Dirección Sectorial de Energía (DSE), MINAE.
12 MINAE and IMN (2015), Op. cit.
13 Sancho et al (2015.)
14 MINAE (2015): VII Plan Nacional de Energía 2015-2030. San José, Costa Rica.

Energy accounting makes it possible to identify in greater detail which economic activities are more or less intensive in the use of energy sources. The level of detail with which the tables are constructed allows the quantification of energy dependence in the country's productive sectors, by type of source and industry, and to calculate input-output ratios based on energy consumption, providing detailed information on energy use. The energy account can contribute to better understand the relationship of the energy sector with the environment and the economy by specifying their interactions and showing their reciprocal influences. It can therefore assist in the formulation of policies related to the VII National Energy Plan, as a monitoring tool for energy use patterns, productivity and sustainability.

Project Development

WAVES Phase I Activities (2012-2016)

During WAVES Phase-I (2012-2016), several activities took place.[15] The dialogue with leading agencies, including the Ministry of the Environment and Energy (MINAE), the Central Bank of Costa Rica (BCCR), the National Statistics Agency (INEC), the Ministry of Planning (MIDEPLAN) and the Ministry of Finance (MH), was a key feature of the process, since environmental accounting was not part of the policy agenda of the country. Discussions were centered on policy and technical issues, possible institutional arrangements, and the creation of steering and technical committees. Two technical workshops (May 2012 and December 2013) supported by the World Bank were the formal channels for the WAVES project discussion and conceptualization. In addition, meetings with World Bank representatives and relevant organizations and stakeholders were organized during a first stage (2012-2013.)

Besides local events and technical workshops, WAVES promoted the participation of Costa Rican delegates in international activities. For instance, a local delegation was involved in the 50:50 Campaign[16] at RIO+20 (in June 2012), with the participation and support from President Laura Chinchilla (2010-2014) to natural capital accounting initiatives. MINAE ratified the support to WAVES initiatives and stressed the relevance of environmental accounting for Costa Rica with the new administration of President Luis Guillermo Solís (2014-2018.) The country has been active in regional and international workshops on NCA and WAVES meetings. Representatives from MINAE and the BCCR participated of WAVES Second, Third, Fourth and Fifth Annual Partnership Meetings, between 2012 and 2015. Moreover, Costa Rica was the host of the sixth Annual Partnership Meeting, from May 31 to June 1, 2016.

The definition of the institutional structure to develop water and forests accounting in the country started at the end of 2013. The creation of inter-agencies working groups on water and forests statistics was a key outcome of this process, after capacity building activities. This work has been part of the activities to define the statistical data to be included in the SINIGIRH and the National Forests Monitoring System. Water and forests accounts will be integrated to both statistical platforms. In the case of energy statistics, coordinated work between the Energy Department at MINAE and BCCR will be strengthened to compile energy accounts.

The formalization of the National Environmental Indicators System (SINIA) took place in April 2013, with the goal of contributing to the creation of an official integrated platform for environmental statistics in the country. SINIA is part of the National Statistics System (SEN) administered by INEC. WAVES work in Costa Rica focused on the components related to water and forests statistics. In the future, SINIA will integrate the required

15 The Global Results-Based Monitoring Matrix in the Annex presents a general overview of the process and its outcomes.
16 A World Bank Group-facilitated initiative that provides a unique opportunity for the public and private sectors to join forces, demonstrating on a global stage the importance of taking collective action in support of including natural capital in economic decisions or business operations.

environmental information to complement the Central Bank´s databases and information structure used for the implementation of the SNA 2008 and SEEA 2012.

A scoping report based on a literature review and interviews with more than 50 experts from academia, government, and private organizations served as analytical base for the identification of possible natural assets accounts that could be constructed and contribute to national policy objectives. An outcome from a WAVES Costa Rica workshop (May 2012) was the recommendation to start with two accounts: water and forests. On January 2014, the BCCR initiated the compilation of those two accounts. Furthermore, during the first semester of 2016, additional work to compile energy and ecosystems accounts started. As a result, water, forests and energy accounts have been published in June 2016.

Also, a significant number of socialization workshops were held during 2015-2016, with the objective of sharing the existence and relevance of NCA in decision-making and policy design, and in other cases, the level of knowledge about NCA among stakeholders. The audiences included academia, government offices, and potential NCA experts.

Steering Committee

A Steering Committee (SC), formalized in September 2013 and ratified by the new Administration in September 2014, leads WAVES Costa Rica. The main tasks of the committee are: i) overall management and coordination; ii) work plan supervision; iii) budget elaboration and expenditure programming; and iv) validation of project outputs and institutional development of environmental accounting. The actual SC members are high level officers: Edgar Gutiérrez Espeleta, Minister of Environment and Energy (Chair); Henry Vargas Campos, Director of Macroeconomic Statistics at the Central Bank of Costa Rica; Fernando Rodríguez, Vice minister of Finance; Luis Fallas, Vice minister of National Planning and Economic Policy, and Floribel Méndez Fonseca, Manager at the National Institute of Statistics and Census. They designated their organization´s representatives and staff for permanent coordination with the World Bank, WAVES partners and interagency working groups. The SC defined policy priorities in terms of specific requirements for the compilation of the accounts. It is expected that the SC will continue working to mainstream NCA into policy decision-making in Costa Rica after WAVES Phase 1.

Technical committees

Two Technical committees (TCs) on water and forests worked in coordination with BCCR to improve updated environmental accounts. In the future, the TCs will be responsible for database and information management, statistics validation, and interagency technical work. Both committees will follow the interagency and coordination structure established by the SINIA. In this way, data quality management work, required staff time, and necessary working channels will be in place for data provision.

Achievements and Progress

Institutionalization

The BCCR recently finished the update and publication of the System of National Accounts, based on the SNA 2008 international statistical standard. Starting on June 2016, the System of Environmental-Economic Accounting (SEEA 2012) will be aligned with BCCR´s work. In 2012, United Nations Statistical Commission adopted the SEEA Central Framework as an international statistical standard (United Nations et al, 2014.)

The Board of Directors of BCCR approved the creation of a new Unit at the Department of Macroeconomic Statistics. Starting in June 2016, four full-time professionals will update the accounts compiled so far (water, forests, energy). NCA work will continue as a formal part of national accounting and macroeconomic analysis responsibilities. After the first publication of the accounts (June 2016), a process to improve and update them and strengthen the coordination between BCCR and Ministries and government agencies to promote NCA use in the country will start. As mentioned before, NCA will help to develop better analytical and decision-making tools for sustainable development planning, particularly for the National Plan for Integrated Management of Water Resources and the National Plan for Deforestation Reduction and Forest Development. Furthermore, the VII National Energy Plan towards decoupling of growth and emissions for next decades, will be better informed with Energy accounts.

Furthermore, the Ministry of Finance will start its work with public environmental expenditures accounting. A general objective is to make a better estimation and monitoring of government expenditures in the country, from a fiscal policy perspective. The Ministry of Planning will incorporate a natural resources wealth framework into the National Development Plan guidelines. From a legislation perspective, relevant environmental law bills are under discussion at the Congress (water, natural capital, climate change), with articles related to economic valuation of natural resources and its importance for policy decision-making. Therefore, it is expected that these institutional and legislation progresses would contribute in the medium term to institutionalize NCA in the country.

From a medium to long-term perspective, MINAE is moving forward an advocacy and communication strategy, in order to create the links to policy and integrate the agencies that would use the information of the accounts. A key aspect is how to create and strengthen demand for accounts in the future. It is necessary to develop the policy pull to make NCA a practical tool for decision-making and policy design.[17] The strategy aims at building long-term institutional, political support and capacity for NCA in the country. The work for 2016-2019 will be based on four pillars: 1) policy evaluation and improvement with key stakeholders' interaction and contributions; 2) synergies and linkages between stakeholders responsible for NCA related work (producers and users of information); 3) Advocacy and communication strategy for NCA strengthening; 4) environmental accounts positioning (services and uses from natural capital.)

NCA institutionalization in Costa Rica represents both a significant challenge and a great opportunity. Success will depend primarily on integrating resources and operations of Ministries and a wide range of stakeholders in an effective way. Mainstreaming NCA into policy decision-making is necessary for a better understanding and alignment of natural wealth with national development priorities.

Accounts results

Water, forest and energy accounts have been compiled. The framework used for the development of the accounts is the System of Environmental Economic Accounting (SEEA). The SEEA is consistent with the System of National Accounts (SNA), which is used internationally to generate economic indicators, such as GDP. The Central Bank of Costa Rica has lead technical work related to environmental accounts in parallel with the implementation of the SNA 2008. NCA in Costa Rica is becoming a central issue for development discussion. The novel work with the compilation of environmental accounts, and the process of institutionalization have created the foundation for a deeper understanding and practical use of NCA for policy decision-making.

17 See Vardon, M., P. Burnett and S. Dovers (2016): "The accounting push and the policy pull: balancing environment and economic decisions." *Ecological Economics* 124 (2016) 145–152.

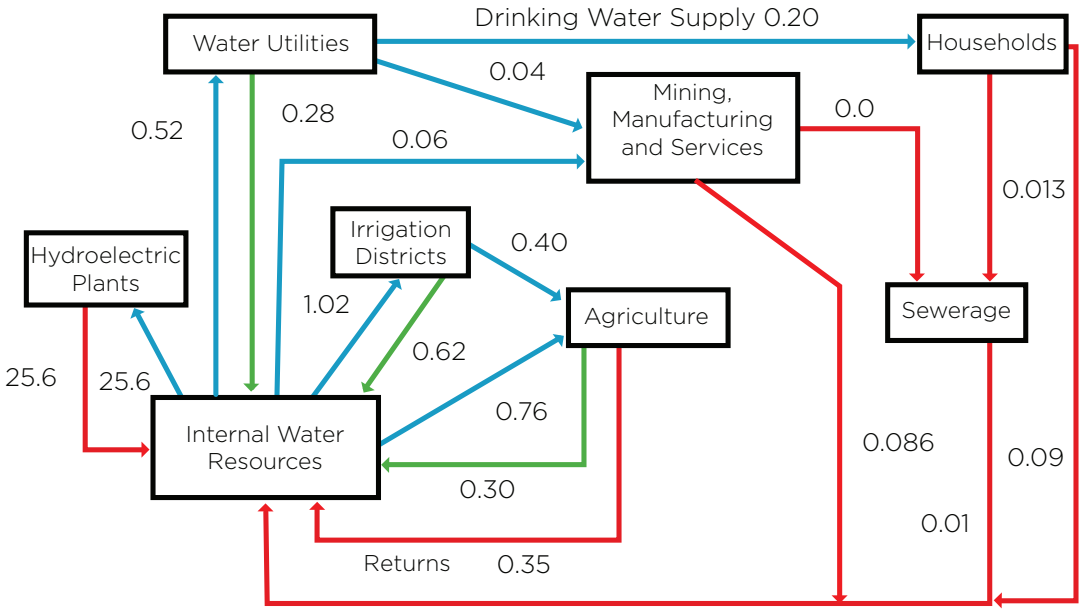
Water accounts

Water accounts have been compiled based on official data and BCCR estimates, for a new SNA base year 2012. Sources used include water statistics from national accounts, hydrological balances, water use and pollution data bases, and water utilities' financial statements. Costa Rica receives abundant rainfall (annual average precipitation of 2626 mm, among the highest rates in the world). However, most of it (73%) falls between May and October. In contrast, the province of Guanacaste, in the northwestern area of the country, has an annual average precipitation of 1711 mm with almost no rain between January and April.

Water and sanitation utilities deliver the services to the users and bill approximately 570 colones for each cubic meter of water ($US 1.00/$m^3$) supplied on average. The value added of the industry represents 0.5% of Costa Rica's GDP, and Net Operating Saving is 24% of total production. About 50% of the water abstracted by the industry is lost before reaching the users. Seventy-one percent of the country's electricity is produced in hydroelectric plants, which are mostly run-of-the-river plants, which means that they depend entirely on climate conditions as they take advantage of river flows without regulation. These flows may be decreased by other water uses. Seventy-five percent of the water abstracted for off-stream uses is used for agricultural irrigation, mainly in the northwestern part of the country. Water delivered by irrigation districts to users is billed at approximately 6 colones per cubic meter ($US.01 /$m^3$ in average), but subsidies from the government are needed for the operation of the irrigation districts.

Water supply and use tables analysis show that 75% of the water abstracted in the country for off-stream use is for agriculture, 22% is for drinking water supply, and the remaining 3% is water abstracted directly by manufacturing industries, services, construction, or mining companies, among others. In addition, in 2012 around 25.6 billion cubic meters of water were turbinated in hydroelectric plants, contributing 71% of gross energy production of that year. The SEEA-Water physical supply and use tables also show losses incurred by water utilities and irrigation districts when providing water to final users. It also shows wastewater (as defined by the SEEA-Water) which is generated after every use. This information is simplified in Figure 1.

Figure 1 Costa Rica: Water Flows in the Economy, 2012 (km^3/year)



Source: Water accounts, Central Bank of Costa Rica (BCCR.)

Forest accounts

Forest accounts that incorporate physical and monetary values have been compiled. Central Bank accountants coordinated with the National System of Conservation Areas (SINAC) and the National Forest Financing Fund (FONAFIFO) to analyze the results of the new national forest inventory and a carbon dynamics study for REDD+ strategy. The evolution of the country's forest cover shows that mature forest cover stabilized, beginning in 1992, and that new forests are growing since then. In Costa Rica 52.4% of total land is covered by forests, which is consistent with the creation and implementation of laws and policies for conservation and reforestation. Data show that while the country's forest area has grown, its composition has also changed. Mature forests show reductions of 1.35% in 2008-2011 and 0.53% in 2011-2013, while other forest land had a growth of 6.87% for the first period, and 16.45% for the second period, which translates into a total forest cover increase of 0.56% for 2008-2011 and 3.23% for 2011-2013 (Table 1 and Table 2.)

The forest flow accounts based on supply and use tables estimate the value of the forest within the national accounts. The identification of forest-related activities and products improve the estimation. The forestry industry accounts for 0.2% of GDP. But if accounting is extended to other products that have timber components, resins or some other material extracted from the forest for processing by the industries, the forestry sector share increases over 1% of GDP. Finally, if economic activities that are not classified as extraction of forest products but make use of forest products are accounted, the value of the "Extended Forest Economy" reaches over 2% of GDP.

Table 1 Costa Rica: Land Cover Account Transition Matrix, 2008-2011
Increases (positive numbers) and decreases (negative numbers) from other land areas (hectares)

Land cover	Opening area: January	Artificial surfaces	Crops	Grassland	Tree covered areas	Mangroves	Shrub covered areas	Sparse natural vegetated areas	Terrestrial barren land	Inland water bodies	Net change	Closing area: December 31
Artificial surfaces	83,289	0	1376	11	-2224	-30	0	22	-172	82	- 935	82,353
Crops	721,678	-1376	0	621	-2416	-48	-1	1544	-1061	-36	- 2,771	718,906
Grassland	1,238,692	-11	-621	0	-10188	4	0	3244	208	-113	- 7,476	1,231,217
Tree covered areas	2,953,171	2224	2416	10188	0	-182	0	1953	323	-632	16,290	2,969,460
Mangroves	47,617	30	48	-4	182	0	0	50	-97	254	462	48,079
Shrub covered areas	10,385	0	1	0	0	0	0	0	0	0	1	10,386
Sparse natural vegetated areas	11,701	-22	-1544	-3244	-1953	-50	0	0	-65	-136	- 7,014	4,687
Terrestrial barren areas	32,280	172	1061	-208	-323	97	0	65	0	-10	854	33,134
Inland water bodies	24,022	-82	36	113	632	-254	0	136	10	0	590	24,613
Total area	5,122,836											5,122,836

NOTE: some differences occur due to rounding to whole numbers.
Source: Forest Accounts, Central Bank of Costa Rica (BCCR.)

Table 2 Costa Rica: Land Cover Account Transition Matrix, 2011-2013
Increases (positive numbers) and decreases (negative numbers) from other land areas (hectares)

Land cover	Opening area: January	Artificial surfaces	Crops	Grassland	Tree covered areas	Mangroves	Shrub covered areas	Sparse natural vegetated areas	Terrestrial barren land	Inland water bodies	Net change	Closing area: December 31
Artificial surfaces	82,353	0	3976	4192	-47	-7	0	50	258	195	8,617	90,970
Crops	718,906	-3976	0	8655	-48038	-848	-2	217	-184	-410	-44,585	674,321
Grassland	1,231,217	-4192	-8655	0	-46171	-541	0	224	544	-1166	-59,958	1,171,259
Tree covered areas	2,969,460	47	48038	46171	0	-31	0	-445	2265	96	96,140	3,065,600
Mangroves	48,079	7	848	541	31	0	0	-13	122	-151	1,385	49,464
Shrub covered areas	10,386	0	2	0	0	0	0	0	0	0	2	10,388
Sparse natural vegetated areas	4,687	-50	-217	-224	445	13	0	0	108	73	148	4,834
Terrestrial barren areas	33,134	-258	184	-544	-2265	-122	0	-108	0	-501	- 3,614	29,520
Inland water bodies	24,613	-195	410	1166	-96	151	0	-73	501	0	1,865	26,478
Total area	5,122,836											5,122,836

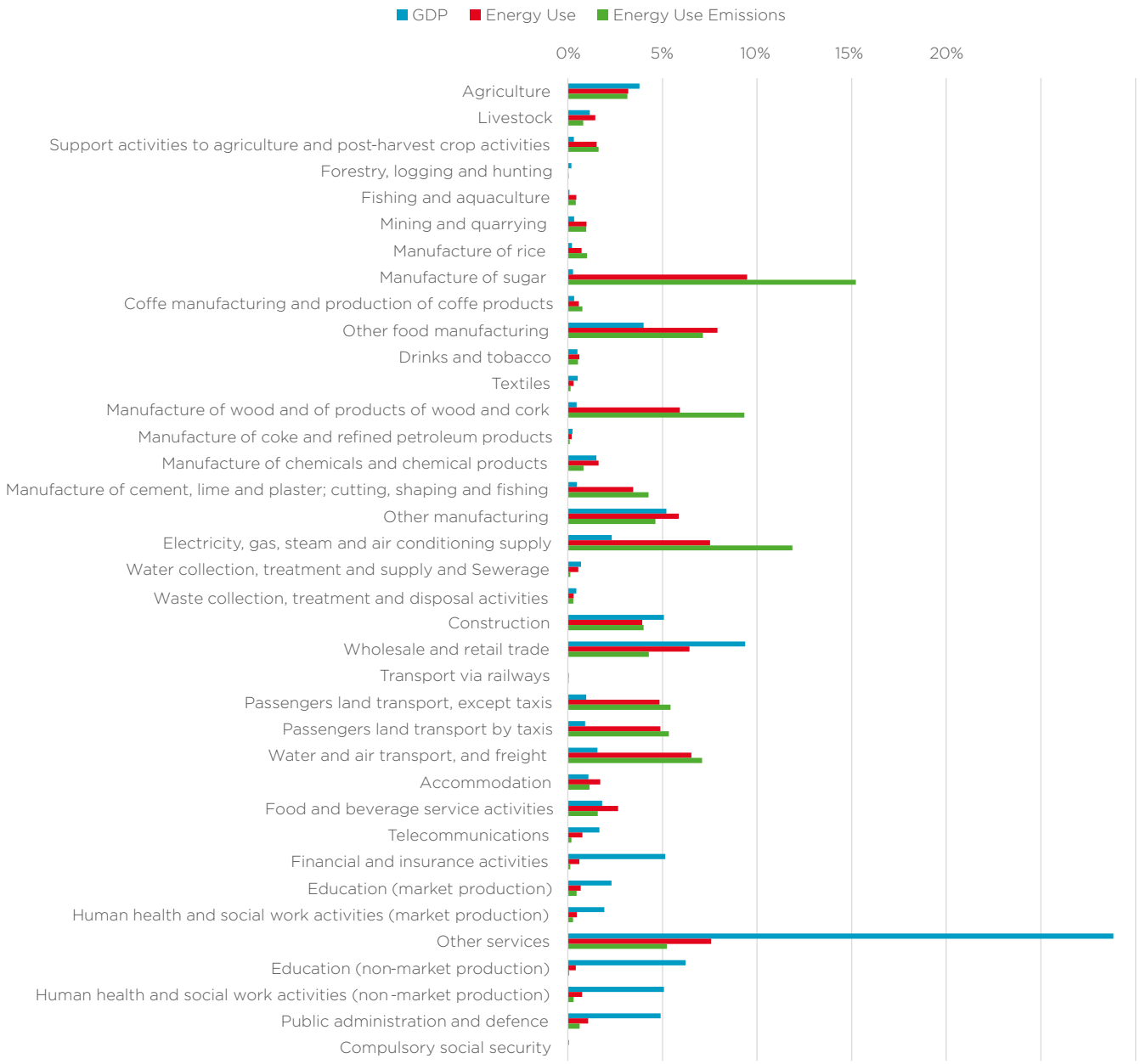
NOTE: some differences occur due to rounding to whole numbers.
Source: Forest Accounts, Central Bank of Costa Rica (BCCR.)

Energy accounts

A first version of Energy use and CO_2 emissions accounts for 2011, 2012, and 2013 has been compiled. The work is based on consolidating the information of the country's energy resources and complementing the national energy balances with the compilation of accounts in physical and monetary units. The estimation of input-output relationships with the consumption of energy and the generation of emissions between the industries and the quantification of energy dependence according to different sources are under development. Preliminary results show that the electricity industry, the food industries, and the transport sector are the most energy intensive productive activities of the country, while services contribute with the highest value added and employment generation (Figure 2.) The energy intensity of the economy has decreased in recent years, because of electricity production based on renewable sources. However, more than 50% of energy consumed in the country comes from non-renewable sources. On the other hand, 70% of CO_2 emissions generate from fossil fuels use.

The resulting emissions in the energy use sector depend on the country's economic growth, its productive structure, its energy intensity, and the amount of CO_2 emitted by each type of energy source used. Therefore, identifying the composition of use of energy sources and CO_2 emissions associated with this use are an essential element in following up on policies associated with climate change and emissions mitigation, serving as input in the evaluation of compliance with sustainable development goals. In 2013, close to 70% of gross CO_2 emissions from the energy sector generated from fuel combustion, while the remaining 30% resulted from the use of renewable sources (geothermal sources, bagasse, coffee husks, and other plant residues, and firewood.) Consistent with energy use participation, food industries, transport activities and electricity production contribute with high shares of total emissions from industrial activity.

Figure 2 Costa Rica: Contribution to GDP, Energy Use and Energy Use Emissions, by Economic Activity, 2013 (%)



Source: Energy Accounts, Central Bank of Costa Rica (BCCR.)

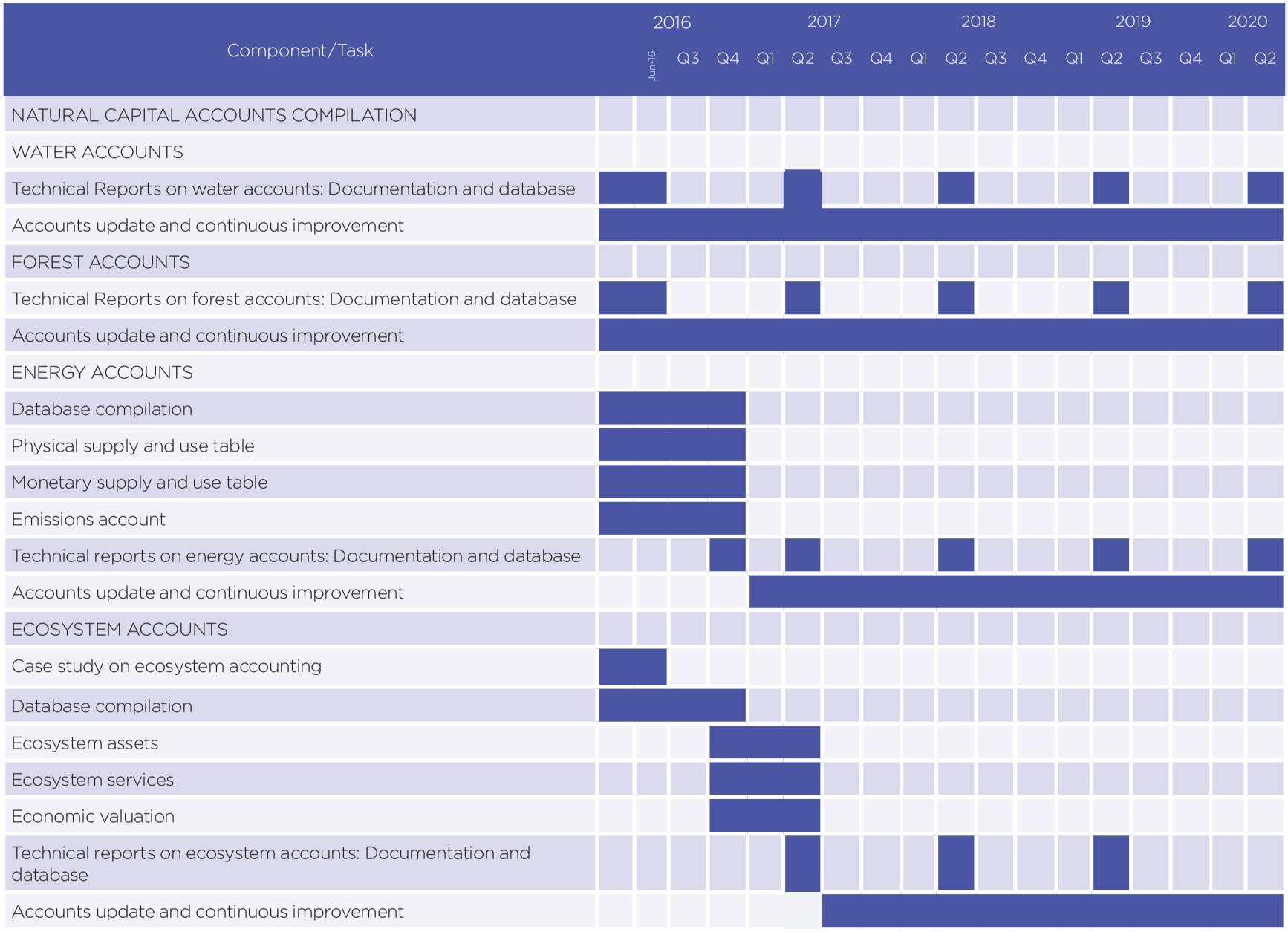
Next Steps: The consolidation of NCA

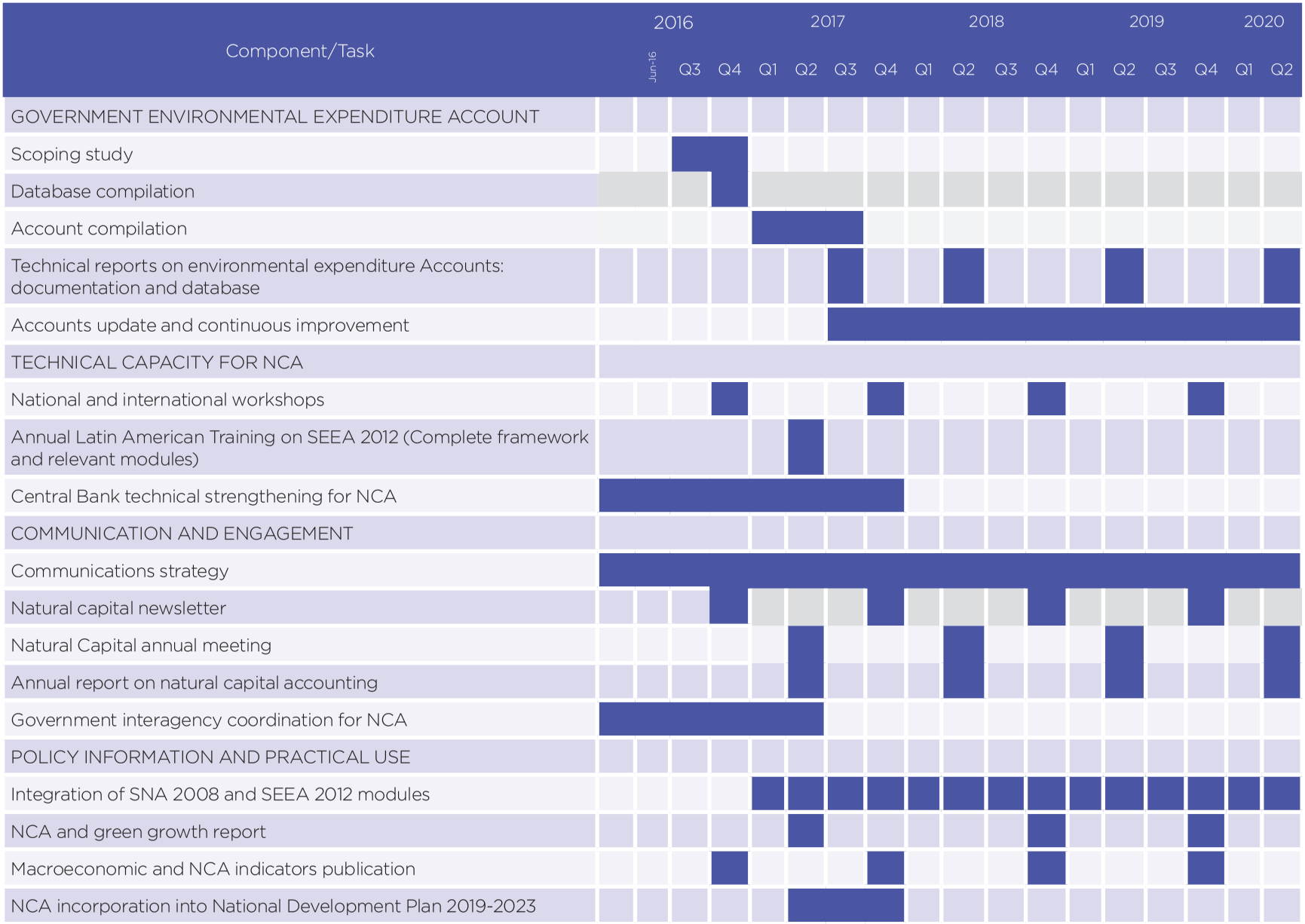
A roadmap for Natural Capital Accounting in Costa Rica has been developed.[18] Table 3 summarizes the components and tasks related to the planned work for NCA until mid-2020. It is intended as a living document that should be kept under continuous review and adjustments when necessary. An interim evaluation would be made by June 2018. This will review the extent to which current (mainly technical) challenges have been resolved, the extent of use of the accounts in policy decision making, and the degree to which stakeholder expectations and needs have been met.

Costa Rica will be involved with WAVES Phase-2 initiatives, particularly in the regional Community of Practice. A closer interaction and cooperation with regional training programs is necessary for capacity building and experience sharing. South-south cooperation on NCA will be pursued by Costa Rica. The technical assistance from WAVES will be requested for accounts upgrading and improvement, in coordination with BCCR. On the other hand, the support for NCA institutionalization should target capacity building and policy incidence activities, to promote the "demand pull" for NCA from policy makers.

18 For further details, see "Natural Capital Accounting (NCA) in Costa Rica: 2016-2020 Roadmap." June 2016.

Table 3 NCA Roadmap for Costa Rica (2016-2020)





Source: "Natural Capital Accounting (NCA) in Costa Rica: 2016-2020 Roadmap." June 2016.

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Annex 1 Costa Rica: Global Results-Based Monitoring Matrix – PDO 1

OBJECTIVES & OUTCOME (RESULTS) INDICATORS	Base-line June 2011	Prep year June 2012	Yr 1 Jun-13	Yr 2 Jun-14	Yr 3 Jun-15	Yr4 Jun-16	Yr5 Jun-17 (proposed)
PDO 1. To implement natural capital accounting in partner developing and developed countries							
Outcome Indicators:							
a. Country with a commitment to institutionalize natural capital accounting based on lessons learned from the WAVES program	None				Advocacy and Communication Strategy led by MINAE	NCA dedicated Unit established at BCCR. Compilation of accts integrated into BCCR operations. Advocacy and Communication strategy led by MINAE	Advocacy and Communication strategy led by MINAE
Intermediate outcomes indicators							
1.1 Country has completed the milestones for the WAVES Preparation Phase*	None			All milestones achieved			
1.2 Country with asset accounts for selected natural assets	None				Preliminary national water and forests accounts	Water, forests and energy accounts published	Updated water, forests and energy accounts
1.3 Country with flow accounts for selected natural resources	None				Preliminary national water and forests accounts	Water, forests and energy accounts published	Updated water, forests and energy accounts

OBJECTIVES & OUTCOME (RESULTS) INDICATORS	Base-line June 2011	Prep year June 2012	Yr 1 Jun-13	Yr 2 Jun-14	Yr 3 Jun-15	Yr4 Jun-16	Yr5 Jun-17 (proposed)
1.4 Country with experimental ecosystem accounts	None					Preliminary national ecosystem accounts	Updated national ecosystem accounts
1.5 Country with macroeconomic indicators based on NCA	None					Macroeconomic indicators developed	Macroeconomic indicators updated
1.6 Country with capacity for maintaining NCA (evidenced by dedicated government staff for NCA and regular reporting mechanism for production of natural capital accounts)	None			(2 staff members in Central Bank for NCA), TWGs for water, forest accts established and receiving training	(2 staff members in Central Bank for NCA), TWGs for water, forest accts established and receiving training	NCA dedicated Unit established at BCCR (4 staff members in Central Bank for NCA), TWGs for water, forest, energy, ecosystem accts established and receiving training	Training continues through in-country, regional, and other training workshops, and by working with int'l experts on the accts

Annex 2 Costa Rica: Global Results-Based Monitoring Matrix – PDO 2

OBJECTIVES & OUTCOME (RESULTS) INDICATORS	Base-line June 2011	Prep year June 2012	Yr 1 Jun-13	Yr 2 Jun-14	Yr 3 Jun-15	Yr4 Jun-16	Yr5 Jun-17 (proposed)
PDO 2. To incorporate natural capital accounting in policy analysis and development planning in core implementing countries							
Outcome Indicators:							
a. NCA informs policy dialogue on growth, environment and poverty reduction, evidenced by citing NCA or using NCA indicators and data in development plans, sector strategies and plans, executive orders, legislative documents, and the broader policy analysis literature (may include World Bank ESW, AAA and project formulation documents)	None			Legislation calling for NCA proposed to Congress	Follow-up on proposed legislation with the new govt.	Advocacy and Communication strategy led by MINAE	Advocacy and Communication strategy led by MINAE. NCA indicators and data used as input in WB country operations and projects
Intermediate outcomes indicators							
2.1 Country has policy notes and analytical work based on NCA	None			All milestones achieved			
2.2 Country with capacity for using NCA in policy dialogue (evidenced by government staff trained in using NCA)	None			1st draft technical report on national forest and water accounts	Policy notes and preliminary technical reports on forest and water accounts	Policy notes and technical reports on forest, water and energy; preliminary report on ecosystem accounts	Policy notes and technical reports on forest, water and energy and water accounts; preliminary report on ecosystem accounts

OBJECTIVES & OUTCOME (RESULTS) INDICATORS	Base-line June 2011	Prep year June 2012	Yr 1 Jun-13	Yr 2 Jun-14	Yr 3 Jun-15	Yr4 Jun-16	Yr5 Jun-17 (proposed)
2.2 Country with capacity for using NCA in policy dialogue (evidenced by government staff trained in using NCA)	None		SEEA Training workshop for 20+	3 staff attended UNSD-WB training in SEEA (Brazil), 2 attended Colombia workshop; 2-day training by int'l expert for 15+ policy-makers; regional workshop on natural capital accounting (NCA) and water accounts with 40+ participants from the three WAVES core implementing countries and partner countries and organizations from Latin America	Forest accounting workshop for 30+ people; water accounting workshop for 30+ people; 1-week ecosystem accounting workshop for 30+ people	1 staff attended SEEA 2012 - Central Framework for LAC workshop (Chile); forest accounting workshop for 30+ people; water accounting workshop for 30+ people; energy accounting workshop for 30+ people; 3 staff attended ECLAC-WB-BMZ-GIZ regional workshop on NCA for policy analysis (Colombia)	Regional and national training workshops, support from international experts

Wealth Accounting and the Valuation of Ecosystem Services

Wealth Accounting and the Valuation of Ecosystem Services (WAVES) is a global partnership led by the World bank that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts.

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