



The SEEA Ecosystem Accounts for China

POLICY BRIEF



1. MAKING NATURE COUNT

Biodiverse, healthy habitats and ecosystems provide essential benefits that people depend upon in their daily lives, such as clean water, productive soils, and flood control, but also over the longer term, such as climate regulation.

However, the economic contributions provided by this 'natural capital' have often been taken for granted and insufficiently accounted for when making important economic and policy decisions.

Ecosystem accounting (EA) helps facilitate more integrated policy and decision making by offering a means of monitoring an economy's impacts and dependencies on a region's ecosystems through a range of indicators and statistics.

The UN's System of Environmental Economic Accounting Ecosystem Accounting (SEEA EA) framework takes a landscape approach by accounting for the environment in terms of ecosystem extent and condition, which supply a flow of ecosystem services. The SEEA EA is now a global accounting standard

following adoption by the UN Statistical Commission at its 52nd session in March 2021.

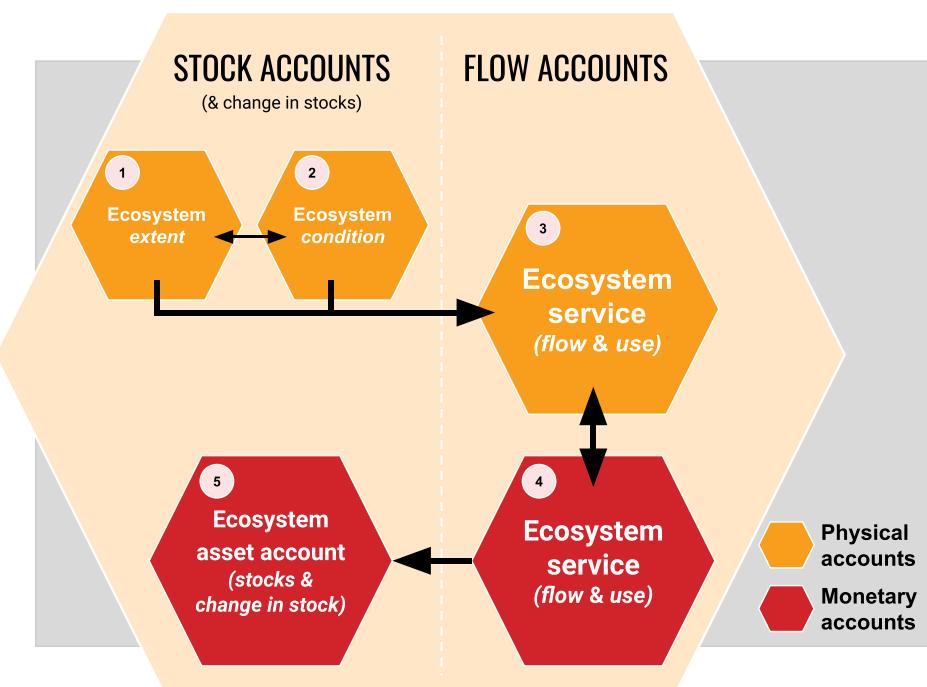
China has experimented with the SEEA EA framework as part of the NCAVES project. Better accounting for the contribution of the country's ecosystems supports the strategic national goal of becoming an 'Ecological Civilisation' as well as specific policies such as ecological compensation schemes and greening government performance (see Box 1).

2. ECOSYSTEM ACCOUNTING

The capability of a landscape to provide a flow of ecosystem services is dependent on both the extent and integrity of its ecosystem assets, such as its forests, wetlands, and its biodiversity. These two aspects are captured in physical units in the SEEA EA extent and condition accounts (see Figure 1).

For example, if a forest is large and highly integrinous, the flow of ecosystem services is likely to be high and at the same time, it will have a high capacity to generate future ecosystem services sustainably.

Across the landscape different ecosystem asset types provide different sets of ecosystem services.



These are recorded in SEEA EA's supply and use accounts. These accounts can be recorded in either physical units or monetary units, depending on the data needs and availability. Monetary estimates of the value of ecosystem services are derived by applying a range of established economic valuation techniques.

The SEEA EA provides statistics and indicators that are consistent with the system of national accounts, and indicators such as Gross Domestic Product (GDP).

3. CHINA AND THE NCAVES PROJECT

In 2017, the UN's Statistics Division, the UN Environment Programme, the Secretariat of the Convention on Biological Diversity (CBD), and the European Union launched the NCAVES project.

Whilst China has been undertaking natural capital accounting for a number of years, its involvement with the NCAVES project has helped use this rich experience as an input into the development and refinement of the SEEA EA, while also helping align Chinese national efforts with the international development of standardized methods and classifications. In China, NCAVES was implemented by the National Bureau of Statistics of China, in close collaboration with the Statistical Bureau of Guangxi Zhuang Autonomous Region, Guizhou Bureau of Statistics and the Research Center for Eco-Environmental Sciences of the Chinese Academy of Sciences.

In China, the NCAVES project set out to:

1. Strengthen capacity for the compilation of natural resources balance sheets.

► Box 1. Creating the ecological civilisation

China has declared its ambition to move towards becoming an 'Ecological Civilisation'. An Ecological Civilisation supports a harmony between society, the economy, and the environment and a balance between economic development and nature conservation.

Following the rapid economic development of the last 30 years

and the raising of many millions of its people out of poverty during its industrial phase, China is now making this transition by encouraging the sustainable use of natural resources, the protection of biodiversity assets, and reducing growth in greenhouse gas emissions in alignment with its commitments to the Paris Agreement on limiting climate change.

2. Pilot ecosystem accounts for two provinces: Guangxi and Guizhou.
3. Experiment with the SEEA EA at a national level

Outcomes included:

1. Support for the standardization of methods in natural capital accounting.
2. Support for China's long-term strategy of becoming an Ecological Civilization.
3. Using SEEA EA results to inform eco-compensation policy at the provincial level.
4. Piloting natural resource balance sheets for key resources.

A key outcome of China's engagement with the NCAVES project was the standardization of methods. This creates alignment of China's own ecosystem accounting with the SEEA EA framework. For example, this saw the revision of existing ecosystem services accounts to correspond with international methods and classifications, such as the distinction between 'provisioning', 'regulating', and 'cultural' ecosystem services. In addition, alignment was also achieved in how ecosystem services could be calculated in both physical and monetary units.

4. ECOSYSTEM ACCOUNTS FOR GUANGXI

Guangxi Zhuang Autonomous Region was selected as one of the two pilot areas for ecosystem accounting for the NCAVES project. Guangxi is on the southern national border and encompasses a vast and diverse landscape and vital habitat as well as ecological corridors. Guangxi has been one of the leaders in the national drive towards implementing policies that promote green-, circular-, and low-carbon development.

Ecosystem accounts were generated for six of the province key ecosystem types: farmland, forests, grasslands, freshwater wetlands, marine, and urban greenspace. Following the SEEA EA framework, Guangxi has generated a range of ecosystem accounts for the years 2016 to 2017 (see Table 1).

4.1 Ecosystem Stock Accounts

4.1.1 Extent accounts

Extent accounts for Guangxi used land use and land cover data sets. Physical asset accounts were also made to assess changes in the stocks of timber resources, carbon storage and freshwater stocks.

Reflecting the short period of study of the pilot (2016-2017), there were

only modest changes in ecosystem extent. Forests remain the dominant ecosystem type (145 million hectares), followed by farmland (4.9 million hectares). Also measured were urban green space, freshwater and marine ecosystems and grasslands.

4.1.2 Ecosystem condition account

Ecosystem condition accounts used a range of biophysical measures to determine the integrity, or health, of Guangxi's ecosystems and thereby their capacity to deliver ecosystem services.

The annual ecosystem condition accounts of Guangxi in 2016-2017 were obtained through a comprehensive assessment of remote sensing data and field survey data obtained from the responsible authorities.

The compiled accounts cover a range of variables, such as soil organic matter content, mean tree height, as well as measures of biodiversity richness, such as the Shannon-Wiener Index.

4.2 Ecosystem Services Accounts

Ecosystem service flow accounts in physical and monetary units were compiled for each of the three broad ecosystem service types:

1. Provisioning ecosystem services that contribute to major food commodity output, timber, non-

timber forest products, grazing and aquaculture.

2. Regulating ecosystem service accounts, which include air filtration, water purification, water flow regulation, local and global climate regulation, farmland protection (from erosion), sediment retention, and nursery and habitat maintenance.
3. Cultural ecosystem services, which cover nature based recreation.

Table 1 shows the summary of the final monetary flow accounts for ecosystem services for 2016-2017 for Guangxi Province.

The largest contribution is provided by regulating services, followed by provisioning services and then cultural services. The value of regulating services accounts for more than 60% of the total value, highlighting the important role that Guangxi's ecosystems play in maintaining the environmental conditions that benefit people and society

The total value of ecosystem services provided by Guangxi ecosystems was 914.1 billion CNY in 2016 and 879.45 billion CNY in 2017. This is the equivalent of 56.7% and 49.4% of GDP in Guangxi Province, respectively. As such, significant contributions provided by ecosystem services remain

invisible to policy makers if only traditional measures, such as GDP are considered in policy making.

5. PUTTING ECOSYSTEM SERVICE ACCOUNTING INTO ACTION 1: ECOLOGICAL COMPENSATION

5.1 Ecological Compensation (eco-compensation)

In China, eco-compensation is used for helping reduce poverty, while encouraging ecosystem protection. Eco-compensation attempts to reduce conflicts between development and conservation by having the 'beneficiaries' of ecosystem services (e.g. urban residents downstream) pay 'suppliers' (e.g. rural farmers upstream) to protect ecosystems for specific services, such as maintaining clean drinking water. By compensating ecological restoration and environmental protection, economic development that encourages land conversion and degradation can be discouraged.

The implementation of eco-compensation policies will both improve the environment and start to rectify the regional imbalances in resources and industrial and commercial activity, thereby promoting coordinated environmental and socio-economic development across all of China, thus improving the living standards, and

Table 1: Monetary flow accounts for ecosystem services. (Unit: 100 million CNY)

		Farmland	Forest	Grassland	Freshwater	Marine	Urban	Subtotal
Provisioning services	2016	100	987	14	98	206		1,406
	2017	100	955	15	103	216		1,389
Regulating services	2016	284	6,759	116	60	19	142	7380
	2017	289	6,337	132	52	22	164	6,993
Cultural services	2016	74	55	0.0	15	60	152	356
	2017	94	50	0.0	22	61	184	412
Total	2016	459	7,801	130	172	285	294	9,141
	2017	484	7,343	146	175	299	348	8,795

realizing sustainable development objectives.

As eco-compensation schemes proliferate, it is important that eco-compensation policies are calibrated and performed consistently. Ecosystem accounts can help to design and monitor the implementation of eco-compensation schemes and to guide eco-compensation policies. Implementation of the SEEA EA through the NCAVES project encouraged this consistency.

5.2 The Xijiang River Eco-Compensation Scheme

The government of Guangxi has introduced eco-compensation practices for the ecological benefit of forests in the Xijiang River basin (Figure 2). The ecosystem services provided by the Xijiang River basin in Guangxi Province play an important role not only in the economic development of that province, but also in yielding benefits for downstream provinces by ensuring the availability of clean water.

In order to investigate what could be the rate of eco-compensation, the project undertook policy scenario analysis, making extensive use of data from the compiled ecosystem account in Guanxi. Specifically, the analysis generated scenarios

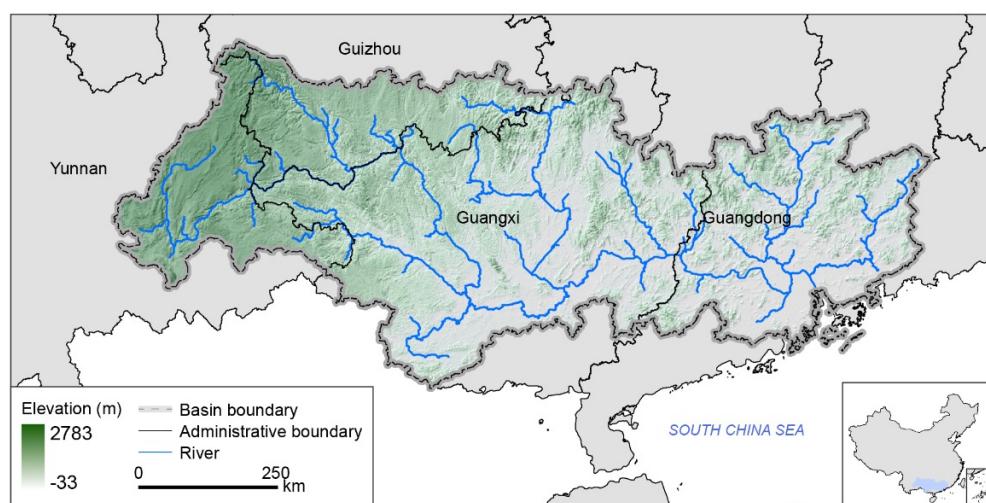
based on future land cover and ecosystem extent changes, overlaid with International Panel on Climate Change (IPCC) scenarios. These scenarios were:

- Business-As-Usual (BAU): The historical trend of land-cover changes from 1995 to 2015 was assumed to continue over the next 20 years (2015-2035).
- Ecological Protection Priority (ECOL): This scenario focuses on the protection and restoration of forests, grassland and wetlands.
- Economic Development Priority (ECON): This scenario focuses on economic development, with the expansion of built-up land at the expense of forest, grassland and wetlands.

These three scenarios were simulated using two IPCC climate scenarios: RCP4.5, approximating action to realize the Paris Agreement and the curbing of global warming; and RCP8.5, approximating a no-action scenario with no effort to reduce greenhouse gas emissions and reduce global warming.

Figure 3 shows the projected changes in key ecosystem services: under the six scenarios. It shows that land management and climate

Figure 2: Location of the Xijiang River in Southern China



change policy that place priority on ecological protection with action to curb global warming (ECOL-RCP 4.5) result in the highest provision of regulating services (water retention, flood mitigation, water purification, soil and carbon sequestration) for the river basin, and is characterized by a lower water yield, which demonstrate a sign of increased ecosystem quality.

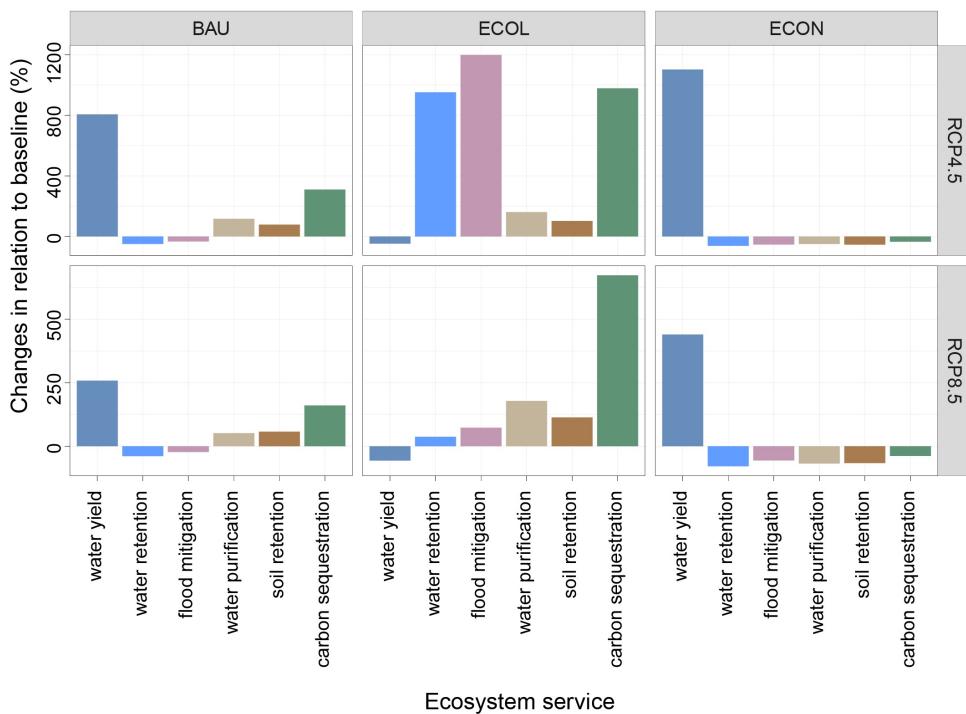
When these changes in ecosystem service supply were transformed into monetary values, total eco-compensation rates can be ascertained. In this instance, the total ecological compensation that is expected to be obtained by the upstream regions in 2015 should be between 48.5 billion CNY, when only the infrastructure costs for ecological protection are considered, and 693.5 billion CNY when the ecological benefit of supplying key ecosystems services are counted, with the largest value compensation value being estimated for the ECOL-RCP 4.5 scenarios.

6. PUTTING ECOSYSTEM ACCOUNTING INTO ACTION 2: GEP AS COMPLEMENTARY MEASURE

For many decades, Chinese officials have been evaluated for promotion in terms of their performance related to growth in GDP, which has helped drive the country's rapid economic development and the reduction in poverty. However, it has been recognised that this has often come at the expense of environmental integrity, which also, as demonstrated by ecosystem accounting measures, generate significant contributions to wellbeing.

China has years of experience integrating Gross Ecosystem Product (GEP)—a measure of the

Figure 3: Changes in the biophysical supply of ecosystem services for Xijiang under different climate and land cover scenarios in 2035 in relation to the baseline



value of final ecosystem services—into decision-making to evaluate the effectiveness of conservation policies. Moving beyond GDP to develop and implement measures and policies that capture the benefits that natural capital provides to the economy, society and human well-being are integral to China's social and economic progress.

GEP can provide decision-makers with clear and compelling evidence of the value of ecosystem services and the consequences of changing quality and amounts of ecological assets. A tractable measure of GEP can be widely applied for both planning and evaluation purposes, not only of officials, but in the evaluation of government policy and land use and infrastructure planning.

The NCAVES project has contributed towards alignment between the SEEA and GEP with the result that GEP is now included in the SEEA EA framework. The SEEA EA is also recognized as a measurement system in the post-2020 biodiversity agenda, and GEP is proposed as one of the headline indicators for its monitoring framework.

7. THE FUTURE OF ECOSYSTEM ACCOUNTING FOR CHINA

China's engagement with the NCAVES project has been considered very successful and has benefited both China and the development of the SEEA EA. In particular, the project has made significant contributions to the advancement of ecosystem accounting in China, particularly in light of the current discussions around the post-2020 Global Biodiversity Framework (GBF) and the recent national policy on the establishment of the ecological product valuation mechanism

The contribution of the SEEA EA and the statistical community to the post-2020 GBF and the mainstreaming of biodiversity in the national statistical system has been recognized both by the statistical as well as the biodiversity community. Within China, GEP is undergoing an approval process towards becoming an official standard.

Building on the newly adopted SEEA EA and the experiences from the

NCAVES project, China's National Bureau of Statistics will explore the feasibility of formulating a national plan on the compilation of ecosystem accounts across all of China and the working towards the establishment of a national standardized accounting system for the valuation of GEP in China by 2025.

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For more information please visit:

NCAVES project study of Xijiang River Eco-Compensation Scheme >>
https://seea.un.org/sites/seea.un.org/files/documents/China_Inception_Mission/c._scenario-based_analysis_of_ecological_compensation_standard_in_xijiang_basin.pdf

NCAVES China project >>
<https://seea.un.org/content/china-0>

Final NCAVES China project report >>
https://seea.un.org/sites/seea.un.org/files/documents/China_Inception_Mission/ncaves - china - country_report - final_web_ready.pdf

SEEA Ecosystem Accounting >>
<https://seea.un.org/ecosystem-accounting>

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