

Securing China's Natural Capital

Towards harmony of people and nature through balanced development policy

The Natural Capital Project (NatCap) is collaborating with Chinese experts to advance tools and approaches that balance development with the provisioning of ecosystem services in China at local, regional, and national scales. We have established long-term partnerships with leading Chinese research institutes and scholars to advance modeling tools that account for the benefits of ecological systems, explore connections between conservation and poverty alleviation, and further a new paradigm for integrating ecological functions into national development planning. NatCap plays a critical role in supporting China's efforts to site land areas for conservation, map and quantify their production of benefits, and analyze the efficacy of new environmental programs. Our software tools are also being used throughout China in critical evaluations of rural land uses and their impact on livelihoods.

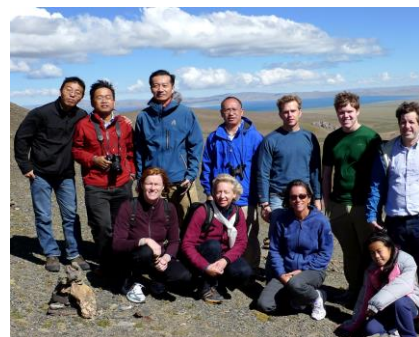
China is innovating national policies to secure its natural capital, alleviate poverty and advance human well-being

China's rapid industrialization over the past 30 years has led to massive advances in physical infrastructure development, widespread improvement in living standards, and unique economic prowess in the global economy. But intensive development has also produced vulnerabilities; in recent years China has experienced severe floods, water shortages, sand storms and desertification.

China's leaders recognize that they must balance growth with conservation to secure resources and promote sustained national well-being. Leaders are engineering programs that aim to cut soil loss and improve water retention, reduce desertification, and protect biodiversity. These investments are expected to generate large returns by improving flood control and agriculture yields, bolstering the efficiency of irrigation and hydropower production, and encouraging ecotourism. With the help from NatCap and our InVEST (Integrated Valuation of Environmental Services and Tradeoffs) software, planners are assessing the biophysical, socioeconomic and health impacts of proposed development on targeted areas and their populations.

NatCap has worked in China since 2007 to:

- **Implement** a national policy to secure natural capital and alleviate poverty through zoning ecosystem conservation areas, spanning 24% of the country.
- **Launch** the first-ever National Ecosystem Services Assessment that will report the status and trends of China's natural capital every decade.
- **Evaluate and improve** China's revolutionary policies designed to harmonize people and nature, such as the Grain for Green Program in its western regions, and other Payment for Ecosystem Services (PES) programs.
- **Expand** valuation tools to incorporate metrics of health and well-being in natural capital approaches, to link land-use policy with its impact on livelihoods, and to improve methods of modeling distributive equity among benefits.



Results

■ **Collaborating with Chinese government on land-use plans based on ecosystem services.** This includes partnerships with key agencies including the National Development Reform Commission, State Forestry Administration, Ministry of Environmental Protection, and the Poverty Alleviation Bureau.

■ **Building science capacity** by translating InVEST technical manuals and NatCap's book into Chinese. Our partnership with Chinese science institutes involves research exchanges and workshops with Stanford to ensure the science applied is practical, robust, and tailored to China's context.

■ **Directed a technical training** for over 200 Chinese scientists and government land-use managers in 2012 on the practical use and interpretation of InVEST.

■ **Advancing tools** for quantifying natural capital with support of Chinese scientists in fields such as ecology, hydrology, demography, economics and health.

■ **Providing analysis** of Payment for Ecosystem Services (PES) programs across China, such as the largely successful Sloping Land Conversion Program (SLCP). NatCap and X'ian Jiatong University provided feedback to the Chinese government that will be used to calculate future subsidy payments to millions of rural families.

NATURAL CAPITAL PROJECT:

■ China



Ecosystem Services

■ Flood Mitigation

China has invested heavily in reforestation since massive flooding in 1998. It aims to restore 40 million hectares of forest by 2020. Forests around China's Yangtze River Basin, pictured above, enhance sediment retention and shelter millions from flooding.

■ Climate Security

Because of reforestation efforts, forest cover has increased more rapidly in China than in any other part of the world - by 60 million hectares over the past 20 years. Forests around the Yangtze River Basin sequester an estimated 7.8 billion tons of carbon per year.

■ Biodiversity

Biodiversity loss may be as significant an agent of ecological change as global warming. China harbors 10% of the world's plant and animal species, making its valuation of environmental services critical to global conservation.

■ Water Supply

Beijing's 20 million urban residents depend on surface water supplies. Watersheds filter drinking and irrigation supplies and bolster the hydropower efficiency by distributing water flow in rivers. Improving farming practices and other activities in areas close to water sources reduces risk of shortages and contamination.

Brian E Robinson, Ph.D

Economist

brobinson@umn.edu

www.naturalcapitalproject.org



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Applying InVEST in China

NatCap's InVEST software offers alternative policy options to China's decision makers by quantifying the natural and financial impacts of development plans. Chinese scientists employ InVEST at varying scales to visualize and identify tradeoffs among valued ecosystem services. Led by our partner, China's Research Center for Eco-Environmental Science (RCEES), the following initiatives are helping establish policies that balance economic growth with biodiversity and ecosystem protection.

Ecosystem Function Conservation Areas (EFCAs)

InVEST is being used to zone EFCAs, an ambitious national zoning scheme that specifies areas for restricted development based on the high levels of ecosystem services they provide. EFCAs will span 24% of China's land area and focus on securing biodiversity, soils and water resources, and mitigating floods and sandstorms. EFCAs also have a major goal of alleviating poverty, particularly in China's rural areas. InVEST's sediment retention, water quality and carbon models are being used to map delivery of valued services. These analyses have so far supported the design of EFCAs in Sichuan Province, Hainan Island, and the upper Yangtze River basin.

Ecosystem Function Conservation Areas (EFCAs)

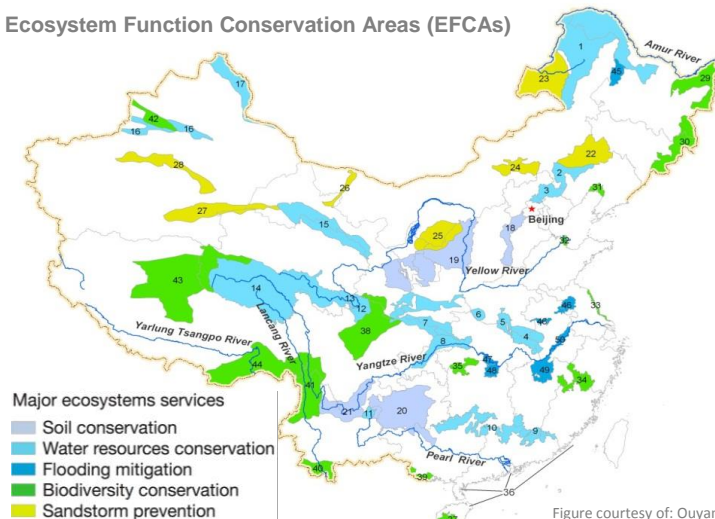


Figure courtesy of: Ouyang Zhiyun, RCEES, Chinese Academy of Sciences.

National Ecosystem Service Assessment

InVEST was also used for China's inaugural National Ecosystem Service Assessment, spanning a wide range of ecosystems and geographic scales, over 2000-2010. This official assessment will take place each decade to inform policy at highest levels.

Payments for Ecosystem Services (PES) Programs

NatCap is working to improve a PES program preserving water quality in Beijing's Miyun Reservoir, which provides over 50% of the water for the city. The program pays farmers to transition from paddy to dry-land agriculture, reducing water use and nutrient runoff. By quantifying the program's impacts on natural capital and its value, a clearer assessment of the associated costs and benefits are helping inform future management of the program.

Linking ecosystem services with livelihoods

NatCap works with scholars from Xi'an Jiaotong University's Institute for Population and Development Studies to analyze the impact of ecosystem services on human livelihoods. Drawing from the expertise of our partners in rural demography and health and development, we are pioneering ways to explicitly integrate measures of human well-being (e.g., nutrition, household income) into natural capital approaches and exploring the impacts of centralized land use plans on rural poverty alleviation.