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China's new forests aren't as green as they seem

Impressive reports of increased forest cover mask a focus on non-native tree crops that could damage the ecosystem, says **Jianchu Xu**.

In the United Nations' 2011 International Year of Forests, China is heralded as a superstar. Almost single-handedly, the country has halted long-term forest loss across Asia, and even turned it into a net gain. Since the 1990s, China has planted more than 4 million hectares of new forest each year.

Earlier this month, President Hu Jintao pledged that China would do even more. He told a meeting of the Asia-Pacific Economic Cooperation Forum in Beijing that the nation would increase its total area of forest by 40 million hectares over the next decade. China, he said, is ready to make new contributions to green, sustainable growth.

It sounds impressive, but we risk failing to see the wood for the trees. In China, 'forest' includes uncut primary forest, regenerating natural forest and monoculture plantations of non-native trees. The last of these accounts for most of the 'improvement' in forest cover.

The State Forestry Administration has claimed that total forest cover in China reached 20.36% in 2008. Most of this results from the increase in tree crops such as fruit trees, rubber and eucalyptus, not recovery of natural forest, yet Chinese data do not record this shift. The change threatens ecosystem services, particularly watershed protection and biodiversity conservation.

Exotic tree species are being planted in arid and semi-arid conditions, where perennial grasses with their extensive root systems would be better protectors of topsoil. Plantation monocultures harbour little diversity; they provide almost no habitat for the country's many threatened forest species. Plantations generate less leaf litter and other organic inputs than native forests, so soil fauna and flora decrease, and groundwater depletion can be exacerbated by deep-rooted non-native trees that use more water than native species. Afforestation in water-stressed regions might provide wind-breaks, and tree plantations offer some carbon storage. But these benefits come at a high cost to other ecological functions.

Why the intense focus on forest cover? China has long promoted the planting of tree crops. Since 1999, the Grain for Green programme has resulted in some 22 million hectares of new trees on sloping farmland. The programme began after the 1998 Yangtze River floods, which the government blamed on loss of tree cover, although reductions in riparian buffers and soil infiltration capacity probably also had a major role.

Since 2008, forest tenure reform has encouraged the privatization of former collective forests, with more than 100 million hectares affected. Privatization can benefit local economies. But in the absence of any management framework, it has also promoted conversion of natural forests into plantations: smallholders often fell natural forests for immediate income, then plant monoculture tree crops for long-term investment.

Although the Chinese government has shown that it understands environmental fragility, its scientific and policy guidelines do not adequately address the country's diversity of landscapes and ecosystems. I have seen massive tree plantations on the Tibetan Plateau, in areas where forests never grew before. Local governments face the need to respond to the national imperative for increased forest cover by planting fast-growing species, while also generating the biggest local economic benefits possible. This explains why unsuitable species such as aspens are planted in north China, whereas eucalyptus and rubber trees proliferate in the south.

Perhaps the International Year of Forests can help decision-makers to focus on the various meanings of 'forest', and the trade-offs each type entails. Natural recovery is still the best way to restore damaged forests, but restoration requires targeted involvement using the best science.

Afforestation can restore ecosystem function only if the right species are planted in the right place. Further studies are needed on how the mix of species affects ecosystem functions. Sloping lands, for example, benefit from perennial root systems and associated soil microfauna, but trees are not the only, or necessarily the best, way to establish these root systems.

China's forestry mandate should focus on enhancing environmental services, but policymakers cannot ignore rural livelihoods. Technical know-how should be provided to local foresters and farmers. Doing away with narrow, one-size-fits-all management targets would also help. The country, with its state-managed market economy, can afford direct payments for forest ecosystem services, but they should only be offered for natural or regenerated forests with proven biological or ecological value.

As an ecologist and agroforestry practitioner, I would like to see China establish parallel forest-management programmes for recovery and restoration of natural forests, and for incorporating working trees into farmlands. Each should include best practices from ecosystem science; a clear definition of tree crop plantations for timber or non-timber products would clarify the separate systems. A dual strategy would require increased collaboration throughout China's land-management ministries, well supported by interdisciplinary research. But it could ensure that China's massive investment in forests provides maximum benefits, to both local livelihood and the environment. ■

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