Land-use Decisions: A Need for a Systems Approach to Improve South China's Degraded Lands

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On the following pages are some representative examples of land-use practices in South China as they relate to degraded land. These cases are drawn from my field observations over the past fifteen years. Some examples show the land-use decisions to be effective and beneficial to improving degraded lands. However, others raise considerable concern because of the adverse unintended effects they produce.

Interdisciplinary assessments of land-use decisions need to include authoritative biological, physical, economic, social and institutional input during the planning stages to help minimize unwanted impacts later on. Because **Land-use Planning** and **Technology Assessment** involve the analysis of similar systems, an interdisciplinary approach is desirable and necessary in both processes.

Your comments and suggestions on the attached material are welcome. We hope to establish a dialog with you regarding our continuing work on South China's degraded lands.

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Names of Delegates on Land Use Planning/Environmental Assessment
Ministry of Land & Resources, P.R.China

Name	Sex	Office	Position
Huang Xiaohu	Male	China Land Science Association	General-Secretary
Feng Wenli	Female	China Land Surveying & Planning Institute	Director
Zhang Qing	Female	China Land Surveying & Planning Institute	Secretary
Lu Yanxia	Female	China Land Surveying & Planning Institute	Engineer
Zheng Weiyuan	Male	China Land Surveying & Planning Institute	Director
Ma Xiangchen	Male	China Land Surveying & Planning Institute	Engineer
Lu Weisen	Male	Land & Resources Bureau of Daxing District ,Beijing Municipality	Deputy Director
Hua Yuanchun	Male	Land Surveying and Planning Institute, Zhejiang Province	Senior Economist
Liu Xibin	Male	Information Center of Land & Resources Bureau, Zhejiang Province	Deputy-director
Zhu Yajuan	Female	Land Using and Planning Institute, Hebei Province	Director
Peng Chaobing	Female	Land Resources Planning Institute, Hunan Province	Deputy-director
Gao Heping	Male	Land Surveying & Planning Institute, Inner Mongolia Autonomy	General-engineer
Liu Weide	Male	Land Surveying and Planning Institute, Henan Province	Director
Shi Yilian	Male	Land Surveying and Planning Institute, Henan Province	General-Engineer
Xiao Youfu	Male	Land & Resources Bureau of Jinzhou Municipality, Hubei Province	Deputy-Director
Ding Shouhe	Male	Land Resources Bureau of Gansu province	Division-director
Zhang Mounian	Male	Land Surveying and Planning Institute, Shanxi Province	Director
Li Dengqin	Female	Land Surveying and Planning Institute, GuiZhou Province	Senior-Engineer

Mangrove restoration: The mangrove forests of Qi'ao Island, near the city of Zhuhai, were severely damaged by firewood collectors until the early 1900s. In addition, egrets were hunted and their habitat destroyed. Efforts to restore the mangroves have been effective and egret hunting has been stopped. As a result, the mangroves protect the shore line from erosion, provide habitat for egrets and a place for river fish to breed and, thus, to increase the fish population. The increased population of egrets now attracts ecotourists to the island providing a new income for the islanders.

Improving degraded lands with stereoagriculture: Degraded lands are widespread in Guangdong Province as a result of excessive tree cutting and damaging agricultural practices. Chinese researchers developed "stereoagriculture" (3-D agriculture) to repair the damage to once-productive hilly lands. Conservation forests are planted on hill tops to slow erosion. Firewood trees, fruit trees, and medicinal crops are planted on lower slopes where farm animals may graze. On the valley floors, fish ponds are excavated and fruit/vegetables planted on the surrounding dikes. The farmers' economic income increases as the natural environment is improved.

Reduced erosion and increased fruit production in degraded hill lands: Severe water erosion caused by damaging land-use practices adversely affected much of Wuhua County, Guangdong Province until the early 1990s. Natural resource experts planted vegetation on the eroded hills to slow erosion and dammed the valley mouth to trap water-borne sediment. In a few years, erosion slowed on the hills and sediment filled the reservoir behind the dam. Protective forests increased hillside stabilization so much so that the sediment-filled reservoir could be used to grow fruit trees. Combined biological and engineering techniques led to an improved natural environment and to improved agricultural opportunities.

1000 years of damaging land-use practices to South China's monsoon tropical forest: Population pressure and damaging land-use practices that began 1000 years ago destroyed much of South China's monsoon tropical forest. Excessive forest cutting and land clearance converted the original forest cover to low productivity grasslands like these on Lan Tau Island, Hong Kong. Even today during the dry season, periodic fires caused mostly by human activities, sweep across the dry-grass landscape further diminishing the remaining plant and animal species that live here. The combination of historic and current land uses here narrows options for recovery.

Today's Litchi/longan production may be beneficial yet harmful: Litchi and longan production began to expand rapidly across western Guangdong Province in 1990. Hilly, eroded degraded lands were converted to fruit production providing new economic benefits to the farmers. Continued expansion since then however has set the stage for new problems. Because the fruit production was so beneficial economically, farmers extended their planting up steep hillsides highly susceptible to erosion. In addition, many farmers used and continue to use low-cost city wastes, which included medical wastes, to fertilize the fruit trees. Workers handle the wastes and, erosion exposes the waste to the environment. The long-term effects of such land-use decisions need careful attention at the start to avoid possible adverse impacts later.

Tree planting to stabilize moving sand dunes and a cooking fuel concern: Loss of forest cover in the hills surrounding Lufeng, Guangdong led to severe soil erosion problems and coastal sandstorms. Sand covered farm fields and some villages were abandoned. Trees planted to stop the drifting sand were effective. However, local people were allowed to rake up litter under the trees for cooking fuel. Its continual removal stopped nutrients from returning to the soil. When trees died, replacement seedlings also died for lack of soil nutrients. These land-use decisions needed to be assessed in a systems fashion at the start to avoid such problems later.