COMPLEX ECOLOGIC–ECONOMIC SYSTEM OF AFFORESTATION—AN EXAMPLE OF SUSTAINABLE AGRICULTURE

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ABSTRACT: The paper deals with a transformation model of a backward district into a prosperous one. The district is geographically located in Lixiahe region, Jiangsu Province. The region had long been known as one of the poorest area in China, and had been alternatively attacked by flood, waterlogging, drought, salinization, and plague of insect. Since the seventies of this century efforts to open up trenches on lowland and to level up the shoaly land have been made. A kind of tree, which is tolerable to high watertable, was used to afforest the land. Cereal crop, vegetable and beans are grown. In some cases, the shoaly land is used for sheep grazing and fishery. A favorable combination of forestry, agriculture, animal husbandry and fishery has been set up in the region. There are five types of managements in the system: 1) forestry–agriculture complex management, 2) forestry–fishery complex management, 3) forestry–aquatic plant–fishery complex management, 4) forestry–animal husbandry complex management, and 5) forestry–edible mushroom complex management. The principles and ecological benefits of this system can be identified: 1) Increase soil fertility by piling mud from marsh land on top soil, and thicken the arable layer. 2) Enhance the utilization rate of sunlight and energy, due to the change of microclimate in field. 3) As a result of multiple layer cultivation and multi-cropping, the production has been greatly increased. 4) Accelerate the cycling of matter and conversion of energy and nutrient of the system. 5) Decrease the consumption of soil fertility and increase the capability of controlling insect pests. 6) Improve ecological environment by afforestation. 7) Raise income and provide jobs for local peasants, even some ones from other part of this province.

KEY WORDS: Lixiahe region, complex ecologic–economic system of afforestation sustainable agriculture, agroforestry
Lying in the central part of Jiangsu Provence, Lixiahe region is situated on the water divide between the Changjiang (Yangtze) River and the Huaihe River. The region borders the general irrigation canal to the north, the Tongyang Canal on the south, the Beijing–Hangzhou Grand Canal over the west, and Tongyu Canal to the east (Fig. 1). Administratively, the region covers part or whole territory of 11 counties. The total area accounts for $14.5 \times 10^6 \text{km}^2$, of which $7.05 \times 10^5 \text{ha}$ are under cultivation. Total population reaches $847 \times 10^4$, among them $763 \times 10^4$ are peasants. The cultivated land per capita is $0.083 \text{ha}$.

![Fig. 1 Geographic location of Lixiahe region](image)

**I. NATURAL CONDITIONS AND THEIR EFFECT ON PRODUCTION**

Formerly, the region was a bay close to the Yellow Sea of China, under the sea surging, a large amount of sand and silt both from the Changjiang River and the Huaihe River were partly deposited in the bay, and partly formed sand bank along slope near the eastern margin of the bay. In the long run, the bay was completely closed both by sand bank and sand spits which were formed on the north bank of the Changjiang River and the south bank of the Huaihe River, and evolved gradually to a lagoon. Because the lagoon was continuously deposited by sand and silt from the Changjiang River, several marsh lands were finally formed in different sizes. Topographically, the marsh land, as a whole,