

# Eco-agriculture and Agricultural Sustainable Development Strategy

Xi Ding

School of Humanities and Social Science Harbin Institute of Technology, Harbin, Heilongjiang 150001, China  
[hitdingxi58@sina.com.cn](mailto:hitdingxi58@sina.com.cn)

**Abstract:** Eco-agriculture is a main characteristic of modern agriculture, it is vital to high-speed and efficient development of Chinese agriculture, it is also a fundament and premise of Chinese agriculture modernization and sustainable development. The result of eco-agriculture demonstration county construction shows that a comprehensive program, design, management and enforcement of eco-agriculture in a certain representative county area can realize the sound circulation of two systems in both local environment and rural economy. It is, therefore, to reach the unity of economic benefit, ecological benefit and social benefit and perform the function of radiation and, thus, to push Chinese eco-agriculture in an all-round way.

[World Rural Observations 2009;1(1):88-91]. ISSN: 1944-6543 (print); ISSN: 1944-6551 (online).

**Key words:** modern agriculture; eco-agriculture; sustainable development

## 1. Introduction

The development of agriculture has been had the history of ten thousand years. It has experienced the primitive agriculture, traditional agriculture and modern agriculture. The long history of agricultural development has been breeding the development of mankind's civilization. People, however, confined themselves to cognitive ability and pressured by the population growing, have done so many that had disobeyed the objective law such as the development of economy is the high price to pay for sacrifice resources and environment. Thus, it has been revenged and punished by nature violently. Entering into modern agriculture, that is "the petroleum agriculture" especially, global ecological crisis caused by resources damage, environment pollution and in shortage in both grain food and energy resources is getting from bad to worse. The development of agriculture is facing new trouble. To be lifted out of trouble, America raised "organic agriculture" for nearly half a century. Western European countries put forward "biology agriculture" and the third world countries also advanced "fine agriculture". Europe, America as well as Asian countries put forward eco-agriculture in narrow sense. All these are to study new ways of agriculture development actively.

## 2. The development of eco-agriculture in the world

Having been had beneficial experience in many countries of the world, many "alternative agriculture" developed slowly and cut down the production and benefit caused by resources and environmental

protection, reducing or refusing petroleum energy input. Eco-agriculture, however, drew the elite of traditional agriculture and modern agriculture. It raises productivity constantly in the meantime protect the harmonious development of biology and environment. Eco-agriculture has a tenacious vitality and a broad development prospects as it is a newly-typed agriculture production system with high efficiency and steadiness. In 1981, English agronomist Worthington M. defined eco-agriculture as small type agriculture in which it can be maintained in itself, low input and has vitality in economy. It is also accepted in environment, ethics and aesthetic. The main idea is to put agriculture on the basis of ecology. But there are also some extremes practice that chemical substance was prevented from being used in agriculture. So that was called "narrow sense" eco-agriculture. Instead of western countries, China is the source of true and comparatively complete eco-agriculture theory and technology. Followed by the traditional and petroleum agriculture, China's eco-agriculture is a new typed agriculture model of which people and nature developed harmoniously against China. Eco-agriculture of China is a systematic engineering system in which according to ecological theory and ecological economics law to design, assemble, adjust and manage the agricultural production and rural economy according to different places and areas. It demands the combination of development of farming with multi-economic crop production; and the development of grand agriculture with the secondary industry, tertiary industry and also the combination of

farming with forestry, animal husbandry, side-line production as well as fishery. The sound circulation in both ecology and economy and also the unity of economic benefit, ecological benefit and social benefit are formed by human design ecological engineering, coordination development with contradiction of environment, resources utilization and protection. It absorbs the elite of China's tradition and modern agriculture and does not refuse the moderate input of chemical fertilizer as well as pesticide. It utilizes and protects the natural resources rationally and maintain ecological system moderately both in strong substance circulation and energy flow with the characteristics of high production, high benefit and less pollution: eco-agriculture stressed the comprehensive and coordinated increase of economic, ecological and social benefit. These will unit agriculture production, permanent utilization of resource and effective protection of environment, so that China's agriculture, rural areas can be directed into the track of persistence, steadiness and harmonious development.

### **3. Sustainable development has been a common strategy of world economy and social development**

In 1983, the United Nations founded "World Commission on Environment and Development (WCED)", in 1987, the committee put forward global policy of "turning into sustainable agriculture in 2000 firstly". In 1991, the United Nations Grain Food Organization with Dutch government held the conference of international agriculture and environment. The conference passed renowned "*Den Bosch Declaration*". In 1992, the United Nations held the conference of international environment and development of which passed "*21st Century's Agenda*". It clearly put forward "the sustainable development strategy", that is, the development satisfied not only the present needs but also not to weaken the descendant that satisfy the ability of needs. In 1983, China clearly put rationally use natural resource to keep well ecological environment and keep strictly control population growth as the three major premises together for China's agriculture development and rural area's construction. In 1992 China first made "*China's 21st Century's Agenda-China's 21st Century Population, Environment and Development*". In 1996, China in "*the Ninth Fifth Program and Long-range Target Outline of National Economy and Social Development*" definitely put forward the science and education and sustained

development strategy has become the radical starting-point of China's agriculture and rural area development. For 20 years, China's eco-agriculture development has gotten great achievements and preliminarily formed the system of eco-agriculture theory instruction model distribution, technology, construction and protection. The development significance of eco-agriculture direction follows by:

#### **(1) Eco-agriculture is one of the characteristics of modern agriculture and the key of agriculture sustainable development**

It's a primary direction for the modern agriculture development that eco-agriculture as a modern agriculture development model different from traditional agriculture production type. It especially emphasizes the protection and improvement of natural resources ecological environment of which agriculture production depend on. Based on this, rationally use ecological environment and natural resources, rationally arrange agriculture productive forces so that agriculture production with resources, environment as well as relevant industries harmonious development can be realized. Thus, not only can production efficiency be increased, but also through the constant improvement of ecological environment, ecological superiority may further the rational use and appreciation of agriculture resources, maintain ecological balance and therefore realize the sustained development of agriculture economy.

#### **(2) Development of eco-agriculture can help to promote modern agriculture development and ensure grain safety**

Eco-agriculture construction always put grain production as the more important place and also put grain production development on comprehensive industries combined with many industries of rural economy. Thus, efficiency can be improved while developing grain production. On the other hand, the fields' quality can be improved through developing grain production. Eco-agriculture demands us of nourishing land by cultivating them, in the meanwhile pay attention to protecting fields' resource, so that the fields can get more and more fertile and better by using. This is an agricultural ecological economic principle of combining fields' resources utilization, nourishment and protection together. Such the utilization of organic fertilizer and crops straw returning back to fields, crops

rotation, planting leguminous plant and green manure and the measures of planting different crops in one plot of fields may renew soil and therefore improve the fields' productivity. By actual test, after constantly using methane manure for 3 years, the organic in soil containment increased 0.39 percent, the whole nitrogen increased 0.05 percent, hole gap increased 6.6 percent, soil microbe was active and drought resistance as well as water-saving ability was improved. By statistics after breaking straw into pieces and returning back to fields, around 30-40 percent of nitrogen could be found in the soil, phosphorus and potassium containment was as high as 70 percent. By test, edible bean crops contains nitrogen fixation quantity 75-105kg per hectare, apart from self-use of nitrogen itself, 2/3 of nitrogen still maintain in soil and thus improved the soil fertilizer supply.

### **(3) Development of eco-agriculture may benefits increasing farmers' income**

Instead of arbitrarily spoil natural resources people depended on, eco-agriculture emphasizes maintaining and improving it. While constantly improve agricultural products quantity and quality control production cost. Stop changing and spoiling natural environment by human being so that agriculture protection may acquire sustained development. This, however, doesn't mean returning back to the natural economic state of primitive agriculture. Build up ecology, ecological economics and other eco-agriculture based on modern science and technology research achievements may better satisfy people's demand of modern society for quality, quantity, variety and others, so that the farmers may increase their incomes, thus this is a win-win situation for both consumers and suppliers. Generally speaking, the market price of agricultural products from farmers who engage in eco-agriculture, their sales volume is two or three times higher than normal ones and their production cost is much lower for the reason that eco-agriculture demonstration county construction practice based on the design methods of eco-agriculture model. In this way the utilization of fertilizer and pesticide had decreased greatly and their agricultural cost had also been much lower. And that development of eco-agriculture facilitates combining many industries, such as fish breeding and poultry raising, cultivation together so that agricultural economic efficiency can be raised, therefore farmer's income channel can be widened.

### **4. China's eco-agriculture demonstration county construction achievement and significance of enlightenment**

Through the construction of eco-agriculture demonstration county, not only can ecological economic development in rural areas be pushed, but also the massed be freed from the expropriation management thinking and traditional small farmer's mentality, the massed be armed with new values so that spiritual motive power for building of a new countryside is provided.

First of all, eco-agriculture demonstration county construction may improve surroundings ecological environment and make people live in a good ecological environment and also harmonious environment for both people and nature. Take Dongguan city for example, through eco-agriculture construction these years, fruit trees coverage rate is up to 50 percent in farms with green shadow from fruit trees and villas against them, breeze blows gently just like an elegant Peach Garden.

Second, eco-agriculture demonstration county construction may raise farmers' scientific cultural quality. Eco-agriculture demonstration county construction pay more attention to training work, for example, the first training work for eco-agriculture demonstration county construction was held during 1994-1998, from then on, 1120 classes of training were held and one hundred and sixty thousands people were trained. Through all kinds of training, not only can the farmers' abilities of turning scientific knowledge into nowadays productive force be improved, but also their sense of admiring science, relying on science and technology. Enforcing eco-agriculture will promote to adjust industrial structure and make labor forces transfer from just cultivation in the fields to other industries, such as all kinds of new technology and knowledge intensive work so that gradually change farmers' production and living condition. In the process of eco-agriculture construction in Jingshan County, the labors' quality has been improved notably, the fields in getting rich in rural areas goes from low level to higher ones. There are more than 1000 farmers in the county have acquired middle and junior technique professionals, 2/3 of the labors have mastered one or two management practical technique or eco-agriculture knowledge. With improving qualities, farmers could look for way to get rich in fields of high technical production and outside conventional agriculture, labors could gradually transfer to the secondary and tertiary industry.

In the end, developing eco-agriculture can promote to improve rural area's environment and living quality. Developing eco-agriculture can not only mean the changing of agriculture production model but also have the great influence to rural area's living ways. Mankind

faces more pressures made by ecological problem than before. Eco-agriculture construction will improve farmer's living environment, influence or change their living ways and lead China's building of a new countryside to the correct way.

Eco-agriculture demonstration county construction may lead county area's agriculture productive economy to a rational ecological way to promote clean village appearance. Eco-agriculture demonstration county construction may solve the problem of dirt, disorder and mess within the productive living unit, the most marked characteristics are to recycle using energy and substances from crops through sunlight. The result is to get the maximum production in the less land, less space area, shorter time and the least drainage rubbish of environment. For human and animal's excrement, crop straw and biological rubbish especially, eco-agriculture may utilize rationally for multi-levels and multi-ways of all these. The procedure form of reproduction process follows as: material-product-waste materials-materials. Any of each productive process is the material of another productive process, thus the waste material in rural area has become resources and combined pollution prevention with agricultural increasing efficiency and farmer's increasing incomes. The biogas tank construction, especially, plays a button function of importance in clean village appearance. If the construction of biogas tank combines with the sty, kitchen and toilet changing together, people as well as animals excrement and living polluted water flow into the biogas tank to have the anaerobic ferment treatment, so the parasite ovum and partial germ can be killed to elementarily reach the standard of excrement harmless, the situation of people and animal living together can be changed and also decrease the disease of people-animal having together. "The backwards condition of smoke brings tears to eyes by chipping sticks for meals and excrement water as well as mosquitoes and flies everywhere in the yard will also be changed. All in all eco-agriculture construction embodies the traditional ideas of nature and human are harmonious, for it provide us with rural scenery of mountain water and quiet comfortable living environment. The ecological and living environment once were destroyed will evidently improve with deeper construction of eco-agriculture model, village appears tidy, everything is full of new life and the villages with the nature nearby combine perfectly.

## 5. Conclusions

With the twenty odd years' development, the Chinese modern eco-agriculture reveals great vitality. The practice proved: eco-agriculture construction can promote agricultural production development, increase peasant's income. It benefits to economize on energy resources, protect ecological environment and increase agricultural sustained development ability. It can promote agriculture to develop deeply and broadly so as to promote the whole quality of agriculture. As comrade Wen Jiabao said: the 21 century is the key historical stage to realize our agriculture modernization, the modern agriculture should be the effective eco-agriculture. Therefore, it is not only the farmer's survival base and development essence, the potential exist and charm show of agricultural steady development but also the target and long-term countermeasure of building of a new countryside and ecological civilization to promote eco-agriculture development continuously and protect fields and gardens sight and mountains-and-waters beautiful scenery of village during the strategies of the building of a new countryside and ecological civilization.

## Correspondence to:

Xi Ding

POB 232, 92 Xidazhi Street, Harbin, Heilongjiang 150001, China

Telephone: 01186-451-8208-9493

Cellular phone: 01186-151-0465-8493

Email: [hitdingxi58@sina.com.cn](mailto:hitdingxi58@sina.com.cn)

## References

- [1] Wenhua. Li. The eco-agriculture: the theory and practice of Chinese sustained agriculture. Chemical Industry Press, China. 2003 (in Chinese) :1-9
- [2] Changsheng Li, Zhongke Feng. Sustainable development ability of state-owned forest region in Heilongjiang Province, Northeast China. Journal of Beijing Forestry University 2005 (in Chinese); 27(2):105-107.
- [3] Marten G. R. Productivity, stability, sustainability, equitability and autonomy as properties for agroecosystems assessment. Agricultural System 1988; 26(4):291-316.
- [4] Qianji Ye. Eco-agriculture: the future of agriculture. Chongqing Press, China. 1987 (in Chinese):10-20.

