

Promoting Sustainable Development through Developing Green Food: China's Experiences

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- Comparisons among 5 models of agriculture
- Development of China's green food
- Contributions of green food to China's sustainable development
- China's experiences of developing green food
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I. Five models of agriculture

(1) Meanings of 5 models:

- Traditional agriculture;
- Conventional agriculture
- Organic agriculture
- Alternative agriculture
- Sustainable agriculture

(2) Comparisons among 3 models from aspects of economic cost & benefit and eco-environmental efficiency

Meanings of 5 models

- Traditional agriculture
- Conventional agriculture: huge amount chemically-synthesized materials such as artificial fertilizers and pesticides etc. are applied. The economic target is mainly pursued, but eco-environmental target is easily neglected
- Alternative agriculture
- Organic agriculture: refuses any chemically-synthesized materials. The main target is ecological effectiveness
- Sustainable agriculture: permits a certain amount of chemicals to be used. At the same time, tries to create conditions for the development of organic food. It pursues sustainable improvement of eco-environmental situation. The targets include coordination among economic benefits, social efficiency and eco-environmental effectiveness

China's green food: some basic concepts

- Meanings of green food
- The basic practices and objectives
- Four characteristics

Meanings of Green Food

- Green food refers to safe, fine quality and nutritious food produced and processed by specific model under the principle of sustainable development and certified by particular organization based on special standards and permitted to sold with green food logo and trademark. The certified green food can be divided into 2 groups: grade A (allowing to use certain amount of chemical materials) and Grade AA (the another name of organic food). The grade A lays good foundation for the development of grade AA.
- The concept of green food was firstly proposed in 1989 in China and the development and management of green food was formally initiated in 1990.

Logo of Green Food



Basic practices and Objectives for the development of China's green food

- Select and control ecological environment of producing areas for the production of agricultural products and raw materials for processing; Protect agricultural ecological environment
- Analyze, monitor and control the application of chemical-synthesized fertilizers, pesticides, veterinary medical products, feed additives, etc., and try to reduce the use of chemical materials.
- Ensure the quality and safety of agricultural products and processed food;
- Promote People's health and improve the living standards;
- Promote the sustainable development of rural areas, especially China's middle and western parts.

Four characteristics of green food

- Eco-system must be improved and try to be optimal for the products; It means to strict monitor the eco-system factors in order to ensure the fundamental conditions for green food.
- Conducting overall quality control to the products from field to table or even grave;
- Conducting logo and certification management according to regulations and standards;
- It emphasizes the sustainable improvement to the eco-environment and coordinates among economic, social end eco-environmental efficiency .

Comparisons among 3 models of products: basic concepts

	Normal food	Organic food	Green food
Definition			
Objectives	High output & economic efficiency	Best environment & food safety	Good environment, food safety, high economic and social efficiency-SD
Characteristics	Hugh use of chemicals	Best environment No chemicals	Less use chemicals, economic , social & eco coordination
Starting time	After 1945	1972	1990
Product scope	All	All agricultural products	Edible products
Names & labeling	Normal	Organic food & others	Green food: grade A & AA

Comparisons among 3 models of products: regulations & standards

	Normal food	Organic food	Green food
Laws & regulations	Normal	EU: 1991; US: 1990; Japan: JAS	Management regulation & trademark in 1993
Standards nature	State	Voluntary(IFOAM) & Recomened.	State Recomened.
Standards contents	Normal	Production, process, storage, transport, technical S.	Envi. quality, production, process, pachaging. Stor. Transp. Tech. S-overall quality control
Issued standards	Normal	IFOAM, CODEX, EU, Japan, US, Canada, etc.	52 S.: 7 general, 45 products,
Standard level	Normal	High envi. S, normal product S.	Grade A: better envi.S., product S-A; Grade AA: OF

Comparisons among 3 models of products: supervision and monitoring system

	Normal food	Organic food	Green food
Supervision system	Normal	1.Government authorized bodies; 2.NGO authorized	Ministry of Agriculture
Qualification of monitoring bodies	Normal	No	1.Provential level envi. quality superv. bodies, product quality-state level certification. 2.Abidy by regulations
Number of monitoring institution	No	No	Envi. quality: 56 Product quality: 11

Comparisons among 3 models of products: certification system

	Normal food	Organic food	Green food
Qualifications	No	Abilities; independency; transparency	Bodies under Ministry of Agriculture
Types of bodies	No	1. Approved by governments; 2. NGOS & private bodies 3. Soly governmental body	
Basic procedures	No	Application; check; post-check activities; approval	Application; check; field envi. quality monitoring; overall examination; product sampling; approval

Comparisons among 3 models of products: production system

	Normal food	Organic food	Green food
Types of producers	All	Special farmers, peasants, companies.	Enterprises, companies, or big farmers under managed, instructed, sold by companies
Producers number	Many	Many independent farmers & companies	1217 enterprises
Way of production	Convention	Organic production	Combination of traditional excellent way and modern agriculture including OF
Production materials	Normal	No chemicals	Less chemicals and meeting the requirements of standards

Comparisons among 3 models of products: economic cost & benefit(1)

	Normal food	Organic food	Green food
Area of cultivated land	many	Strictly limited	Limited but enlarging
Output per unit	high	10-30% less	Same or a bit less
Production scale	large	small	Limited but can be enlarged
Degree of process	Normal	Majority primary products	30% primary products, 70% processed goods
Product quality	Large differences	Normal products but high safety	Quality: Grade A of normal products Better safety

Comparisons among 3 models of products: economic cost & benefit(2)

	Normal food	Organic food	Green food
Cost	Low	Very high	Lightly higher
Price	low	50% or several times higher	10%-50% higher
Consumers	Normal	Higher environmental awareness & good ideals	Same as organic food, plus consumers with certain level of income and envi. awareness
Market scale	Big but decreasing	Small, increasing but limited	Large and increasing

Comparisons among 3 models of products: eco-environmental efficiency

	Normal food	Organic food	Green food
Producers' envi. awareness	Low	Very high	Higher and increasing
Increasing consumers' envi. awareness	No role even negative impacts	Very large	Very large
Promoting regional SD	No role even negative impacts	Big impacts but only limited to certain regions	Very big and sustainable improvement
Eco-envi. Impacts in production	Negative	Very large	Good to improve; Less chemicals

Conclusions for organic food

- **Organic food is very useful instrument to protect the eco-environmental system, if possible, all should support the development of organic food. But, from economic aspect, especially in the large developing countries like China, there are at least 4 constraints to the development of Organic food:**
 - (1) **The scale of cultivated lands suitable for organic food is limited, owing to heavy industrial pollution, heavy use of chemical materials, and distance from the market;**
 - (2) **The production scale is limited, only SMEs and small farmers can do it;**
 - (3) **Low output, very high cost and price limit the scale of market and number of consumers**
 - (4) **The scale of organic food is too small for the governments to take its importance and provide various supports.**

Conclusions for green food

- Green food is more practical work for the developing countries to develop:
 - (1) Many cultivated lands can be used and transformed;
 - (2) The production scale can be kept in certain level and enlarged;
 - (3) Output can be ensured in certain degree, cost and prices are reasonable for the consumers, thus the market scale can be brought up rapidly;
 - (4) Environmental efficiency can be increased and improved in sustainable way
- Green food lays very good foundations for the development of organic food;
- Green food can integrate economic and social efficiency with eco-environmental benefit, thus, through efforts, a realistic sustainable development can be reached.
- In a word, we should encourage organic food development, simultaneously, we should focus on supporting green food development.

II. Development of China's green food

- Up to the end of 2001, there have been 2400 products labeled effectively. 70% of them are processing products, 30% of them are primary agricultural goods.

Figure 1 Number of Products approved to use logo of green food, 1990-2001

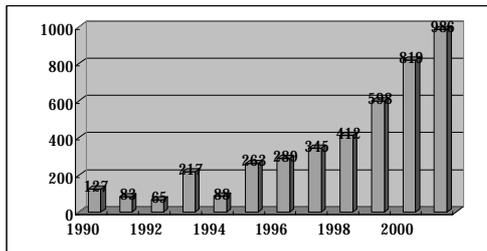


Figure 2 Green food by sector, 2001

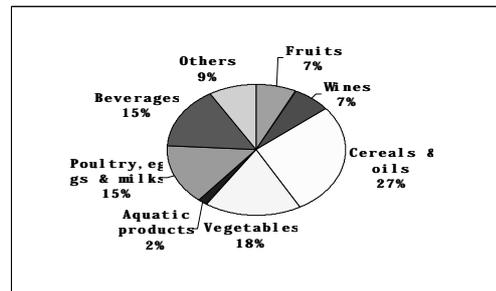


Figure 3 Green food by regions of China, up to the end of 2001

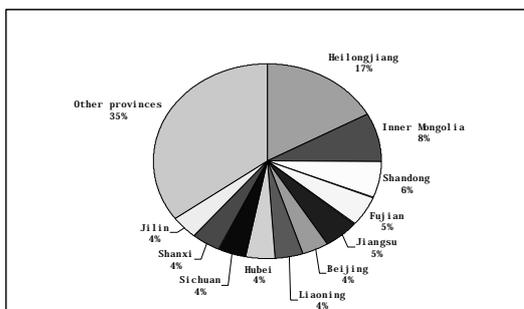


Table 1 Numbers of production enterprises by region, up to the end of 2001

Region	Number of enterprises	Region	Number of enterprises
Total	1217	Jiangxi	36
Heilongjiang	204	Sichuan	31
Jiangsu	87	Hunan	28
Shandong	82	Hubei	28
Jilin	68	Beijing	27
Fujian	66	Shanghai	20
Liaoning	65	Yunnan	19
Inner Mongolia	59	Shanxi	19
Guangdong	57	Gansu	19
Xinjiang	55	Henan	17
Hubei	50	Zhejiang	17
Anhui	47	Tianjin	17

III. Green food's Contributions to China's sustainable development

- Use E (economic) S (social) E (eco-environmental) assessment approach
- Contributions to China's economic development
- Contributions to social stability
- Contributions to ecological and environmental protection

Economic impacts of green food in China

- **Creating new pillar industry with potential comparative advantages and its complexity**
- **Promoting the regional economic development**
- **Increasing exports**

Creating new pillar industry and its complexity

- From 1997 to 2001: sales revenue increased by 107%; output by 98%; cultivated lands by 55.62%(Table 2).
- **Position in agriculture: in 2000, output of green daily products occupying 40%, tea and beverage for 5%, grains, vegetables, fruits, animal products for 1% (Table 3)**
- **Encouraging the development of related industries**
- **Increasing competition of enterprises: Cost-benefit-more economic benefits**

Table 2 Some economic indices of green food, 1997-2001, (10000mu/100 million RMB)

Item	1997	1998	1999	2000	2001
Product number	892	1016	1353	1831	2398
Enterprises number	544	619	742	964	1217
Output(10000 tons)	630	840	1106	1150	1250
Cultivated land (million Hec.)	2.14	2.26	2.38	3.20	3.33
Sales revenue (US\$ billion)	2.9	3.5	3.7	5.5	6.1

Table 3 The percentage of some green foods' output in the total output

	1997	1998	1999
Grains and oils	0.86	1.69	2.44
Beverage	0.91	1.37	3.01

Encouraging the development of related industries

- **Development of industries related to bio-fertilizers and pesticides, green packaging, equipment and facilities, storage and transportation;**
- **Encouraging the development of eco-turism**
- **Promoting the development of related services: supervision, monitoring, testing, inspection; consultancy, training, education, certification; research & development; marketing, advertisement, printing, etc.**

Table 4 Cost and benefit of green food: cases of soybean and peanut-yuan RMB

	Seed	Fertilizer	Eco-ferti.	Pest.	Eco-pest.	Rent	Mechanical	Labour	Total cost	Unit output	Price
Soybean											
NF	20	30	0	10	0	40	25	25	150	150	2000
GF	25	10	20	8	2	40	25	30	160	150	2200
OR	30	0	60	0	15	40	40	50	235	110	4200
Peanut											
NF	100	120	0	40	0	300	50	300	910	400	3400
GF	100	80	70	25	5	300	60	350	990	400	3800
OF	120	0	200	0	40	300	70	400	1130	350	4800

Increasing competition of enterprises

- There are 1217 green food producing enterprises. 48 enterprises of 151 leading trial enterprises produce green food. 23 production enterprises are share holding companies.
- The economic efficiency is quiet good (see Table 5)

Table 5 The number of green food producing enterprises having increased economic efficiency

	1997	1998	1999
Total	440	491	703
Increased by 0-10%	275	282	511
Increased by 10-20%	97	108	106
Increased by 20-30%	54	66	62
Increased by over 40%	14	35	24

Promoting the regional economic development

- The development of bases of green food;
- Development zones of green food
- 100 eco-counties, 105 trial plots of eco-demonstration-Qingan county
- Jilin, Hainan: eco-provinces

Increasing exports

- 1997: 585 million yuan RMB, US\$70 million
- 1998: 725 million yuan RMB, US\$90million
- 1999: 1.08 billion yuan RMB, US\$135 million
- 2000: US\$200 million

Social impacts of China's green food development

- Creating employment opportunities: 750,000 workers and staffs in producing enterprises; more peasants; people working in the related service sector
- Increasing income of the related people, especially the peasants
- Higher product quality and food safety increase people's health and living quality
- Increasing food security
- Increasing social stability
- Protecting traditional knowledge

Eco-environmental impacts of China's green food

- Increasing the environmental awareness of producers;
- Increasing environmental awareness of consumers and government officials
- Improving and protecting the regional eco-environmental situation
- Decreasing and controlling the pollutants through reducing the use of chemical materials
- Lay very good foundations for the development of organic food
- Encouraging new green industries: eco-fertilizers, pesticide, green packaging, and other industries such as green textile and garments,
- Increasing animal welfare

Decreasing and controlling the pollutants through reducing the use of chemical materials

- Chemical fertilizers: 1/3
- Chemical pesticide: prohibited; less use-growing period only once
- Chemical additives:

Table 6 Comparison of apple's sanitary standard(GF-Ca0.03; Pb0.05)

	Unit	Green food	Normal
Hg	Mg/kg	0.005	0.01
As	Mg/kg	0.1	0.5
F	Mg/kg	0.5	0.5
	Mg/kg	0.05	0.2
DDT	Mg/kg	0.05	0.1
Dichlorvos	Mg/kg	0.02	0.2
	Mg/kg	0.02	1.0
	Mg/kg	0.02	0.4
Fenthion	Mg/kg	0.02	0.05

Lay very good foundations for the development of organic food

- Grade AA used: 18 in 1997; 22 in 1998; 13 in 1999; 48 in 2000; 53 in 2001.
- China's organic food: 100 products and export US\$20 million

IV. China's experiences and lessons in developing green food

- Integration of governmental support, participation of enterprises and peasants, market-orientation;
- Combination of green food and organic food, integration of international experiences and China's specific situation, in search for the unification of economic, social and eco-environmental efficiency, pursuing sustainable improvement;
- Integration of product certification with systematic certification, such as ISO9000, ISO14000-integration of product quality, food safety and environmental improvement
- Establishing ensuring systems

Establishing ensuring systems

- Technical standard system: 52 standards(7 basic standards, 45 products), 33 standards to be issued(30 production operation guidelines, 3 products), AA standards
- Supervision and monitoring system to environmental and product quality: 56 for envi., 11 product quality
- System of certification
- Operation organizations: 40 local centers
- System of production and services: approving and recommend 60 production materials-30 eco-fertilizers, 9 eco-pesticides, 17 feeds and feed additives, 3 food additives, 1 packaging material
- System of marketing services

Recommendations for the capacity building

- **Establishing international standards for green food and encouraging mutual recognition system of certification**
- **Help the establishment of production bases**
- **Establishing marketing service system**