Country Report of Taiwan

1. Background

Along with the continued development of the economy, the cost of land and labor has risen swiftly. Taiwan's agricultural products usually lack competitiveness on the market; thus the investment of 833,000 hectares (roughly 23.1% of the nation's land) and 591,000 employed personnel (about 6.0% of the entire working population) comprise only 1.70% of the nation's GDP(Table1). Taiwan's agricultural economy is a agribusiness model based on the family farm, it lacks economy of scale and there is no way to optimize technical efficiency. In addition, Agriculture agencies have always placed more value on production-oriented technological innovation rather consumer-based agricultural production and marketing events. It also aims for lower value-added manufacturing and processing efficiency in the industry value chain, and overlooks high value-added items such as innovation, R&D, marketing and services. Thus, it feels pressure in the face of internationalization and free competition.

Year	Total nation's land area (1000 hectare)	Cultivated Land Area (1000 hectare)	National working population (per 1,000 people)	Number of employed agricultural workers (per 1,000 people)	Gross Domestic Product (GDP) (billion US\$)	Agriculture Product share in GDP (%)
2000	3,600	851	9,491	740	321,230	1.98
2001	3,600	849	9,383	706	291,694	1.85
2002	3,600	847	9,454	709	294,803	1.75
2003	3,600	844	9,572	696	299,785	1.69
2004	3,600	836	9,786	642	322,179	1.68
2005	3,600	833	9,942	591	345,862	1.70

Table 1 Cultivated land, working population and output

In a small agribusiness economy, the transmission of agricultural information requires a large amount of manpower and time. The central government has established seven district improvement agricultural stations and various experimental agriculture stations. Besides conducting regional industry-specific agricultural experimentation and research, it also offers complete promotional services so that the results of research and development are realized in agricultural production. In addition, the town farmers' and fishermen's association that usually exists (Table 2) offers not only financial support, resources and materials for production, operations and sales services, but also performs the important task of the transmission of agricultural information.

Year	Number of Farmers' Associations	Membership	Number of Fishermen's Associations	Membership
2000	304			339590
2001	304	1930171	40	359449
2002	304	1959427	40	372052
2003	304	1950321	40	383893
2004	304	1925550	40	385124
2005	303	1930222	40	389164

Table 2 Farmers' and Fishermen's Associations

However, recent years have seen the quick development and widespread utilization of information technology and the World Wide Web. The agricultural department has risen to meet these developmental trends by transferring the traditional agricultural information and exchange model to a new management environment based on the World Wide Web. It has also employed information technology to construct an information system that connects the agricultural industry value chain to improve manufacturing and processing efficiency as well as stimulate the research, development and design of new products, and provide new kinds of services and marketing. Information technology has also inspired new creative insights, new product development, new services, new sales channels, and even new organizations, thus causing agriculture to develop new value (Figure 1).

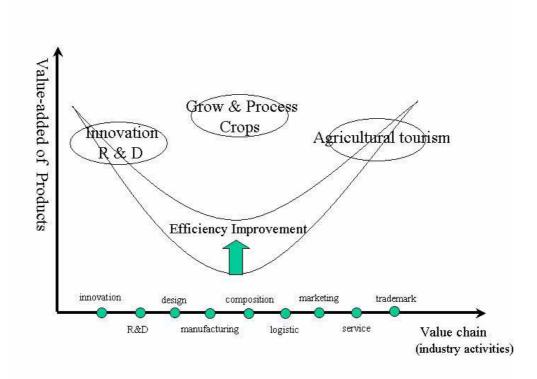


Figure 1 Agricultural Activity Value Chain

First, initiation of the construction of a network infrastructure for agricultural information, enabling the quick execution of agricultural R&D, promotion, manufacturing, marketing and other activities over the Information Superhighway, and the construction agriculture-related user groups. Next, the promotion information-centered agricultural services, encouraging various agricultural associations to jointly use a system of credit transaction information and links to the financial networks of various banks nationwide, enabling rural agricultural workers to enjoy financial services of the same quality as that found in urban areas. In addition, integration of related agricultural production technology, production and sales pricing information, and personnel education information. Furthermore, the development of an agricultural information management system, construction and promotion of a marketing system for the creation of a system for agricultural information, and through the World Wide Web, create a direct connection between the network for users from the agricultural sector and the lives of the public, to achieve a modernized agricultural economy that is the integration of production, ecology, and life, and establishing a firm basis for the sustainable management of the national agricultural system.

2. Agricultural Information Network Infrastructure

As mentioned earlier, farmers' and fishermen's associations are the most important agricultural associations in Taiwan, as well as the ones with the longest history. Having long assisted the government by initiating various agricultural and fishing policies, they play a significant role in the promotion of agriculture and the improvement of benefits for agricultural workers. However, an inability to react quickly to meet changes in the social environment and other factors has led to the generation of a large gap between the management effectiveness of these associations, the quality of services offered to workers in the agricultural and fishing industries, and social development. Thus, the initiation of network and information-based processes of farmers' and fishermen's associations can be considered a starting point for the establishment of a network infrastructure for agricultural information. With the assistance of the government, the construction of 344 local area networks for farmers' and fishermen's associations was completed in the three-year time period starting from 2001. ADSL was also employed to create a system for integrating the World Wide Web (Figure 2), enabling farmers' and fishermen's associations that directly serve agricultural workers to become connected to the Internet.

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農漁會非信用業務領域電腦共用系統架構圖

Figure 2 Network Structure of Farmers' and fishermen's Associations

Information technology can be used to elevate the operational effectiveness of farmers' and fishermen's associations, accumulate intellectual capital, improve organizational image, and lastly, develop

such that each farmers' and fishermen's association employee can quickly access new information through the Internet, be full of confidence, and be more capable of adapting to changes in the social environment. Farmers' and fishermen's associations can thus become modern corporations with a solid Internet and information base. At the same time, the government also assists in the planning of a production and marketing group with a management philosophy, the acquisition and installation of computers and Broadband Internet, and the construction of a network infrastructure for agriculture agencies' users, including agriculture-related government units, farmers' and fishermen's associations, and users in production and marketing groups.

3. Helping Farmers' and Fishermen's Associations to Develop Information-Based Processes

Developing web-based personnel systems, membership management systems, financial management systems, sales and inventory systems, joint transportation and marketing systems, accounting systems, farmers' insurance systems and so on, enables farmers' associations to become information-oriented. What requires attention, however, is that government agricultural departments also promote the automation exchange of document at farmers' and fishermen's associations (Figure 3), so that all farmers' associations and government agricultural agency can enjoy rapid and paperless transmission of official documents. This would be of tremendous benefit for the transmission of agricultural information.

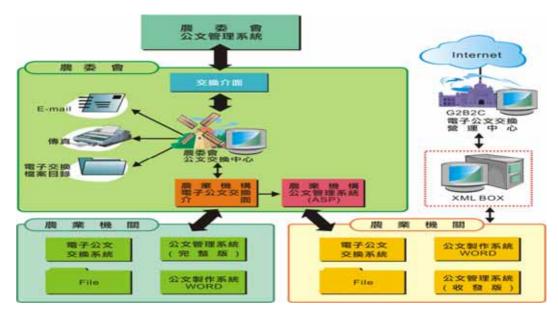


Figure 3 The Farmers' and fishermen's Associations electronic document exchange system

4. Strengthening the Information Content of the Agricultural Information System

The development of Taiwan's agriculture can be divided into three dimensions: production, life and ecology. With regard to production, the important thing is to utilize funds, land, labor and technology to produce agricultural products, keeping in mind manufacturing output value and the profit of farmers. With regard to life, the focus is placed on whether or not it is possible to produce a complete and high quality agricultural product or service that satisfies the public need. This also includes safety, public health and recreational farming information. On the ecological front, the most important considerations are natural resources and environmental protection. Because agricultural production is a production method which directly utilizes and depends heavily on natural resources, it is important to consider resource utilization, the preservation of the natural environment, and the harmony of the rural community while promoting the development of agriculture. In general, Taiwanese agricultural information services can be divided into three main categories: production and marketing information services which provide production technology and market information reports; life information services which provide safety information about fruits and vegetables as well as product propaganda; and the service of providing information about ecological resource preservation.

A. With regards to market transaction information, many of the major wholesale markets in Taiwan have gradually integrated market information. "Agriculture Production and Marketing Group's Information Service Networking" (http://farm.coa.gov.tw) (Figure 4) and "Agricultural Product Transaction and Market Site" (http://163.29.73.197) (Figure 5) are both linked to auction markets and offer seven categories of wholesale market information updated daily: vegetables, fruits, cut flowers, lamb, pork, poultry and fish. Aside from product prices, market comparisons by season, month, and year are also available for reference; farmers' and fishermen's association staff may find them of use when planning product shipments or making other adjustments. In the future, it should be possible to extend market information about agricultural products to retail operators and develop a system for aggregating transaction information from large wholesale markets and fresh specialty (bulk sale) stores. Thus, information can be used to connect all sales activities, wholesale and retail, of an agricultural product. This not only makes transaction information transparent, it also acts as an effective deterrent to unlawful acts of price manipulation.



Figure 4 Agriculture Production and Marketing Group's Information Service Networking

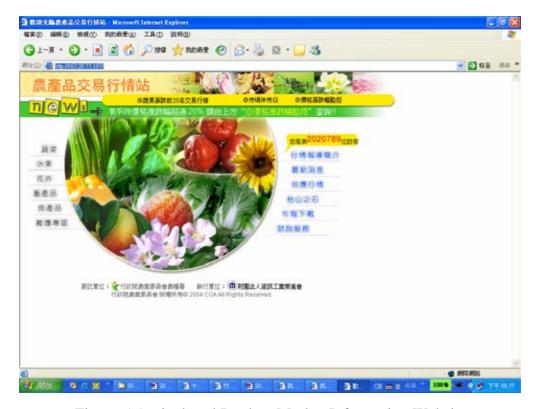


Figure 5 Agricultural Product Market Information Website

B. In terms of marketing services, due to the rapid development of the World Wide Web and the daily increase in the number of Internet users, Internet transactions have become a commercial opportunity virtually unlimited possibilities. However, characteristics of agricultural products such as low price, perishable nature, lack of a uniform set of product standards and high shipping cost, always functioned as barriers to the creation of an actual "agricultural e-marketplace." With the exception of some seasonal, high-priced products such as peaches, lychees, pomelos, pears and cut flowers which are sold directly to consumers over the Internet, agricultural products such as one's daily vegetable supply, rice and fresh farm products are all difficult to sell over the The establishment the experimental of "Commercial of agricultural websites products" (http://www.efarm.org.tw) (Table 6) was an unprecedented first step that could be considered the vanguard in the Internet marketing of agricultural products. In the year 2002, extensive efforts to promote sales and group purchases led to a turnover of NT\$491,665. In the year 2005, its sales had reached NT\$3,664,760 demonstrating that there is a bright future for the sale of high-value agricultural products over the Internet.



Figure 6 Commercial websites of agricultural products

However, agricultural Internet marketing by no means stops with B2B or B2C marketing of actual agricultural products. An even more important function is to assist the agricultural sector to develop new operational scopes. Aside from agricultural products produced in the field, the Internet can also be used to market the beautiful landscape of farming villages and farming culture and knowledge. The marketing of these precious farm stay experiences facilitates the crossover of agriculture from a primary industry to a tertiary industry which provides services. "recreational farming information website"(http://ezgo.coa.gov.tw) (Figure 7) integrate agricultural tourism information from each city and county, offering both prepackaged tours and DIY features that enable you to custom-build your own tours. By providing a variety of tourism information, this site makes it more convenient for the public to take recreational agricultural tours, thereby doing their part to facilitate the transition of the agricultural sector.



Figure 7 recreational farming information website

With regards to providing food product safety information, the

promotion of organic agricultural products and the production and dissemination of the Good Manufacturing Practices(GMP) symbol denoting safe agricultural products are both important government policies. Thus the "Organic Agriculture Information Center" (http://organic.niu.edu.tw/default800.htm) (Figure 8) provides organic agriculture technology and consumer information, organic agricultural producer search functionality, Internet publications, and other overview information, enabling users to search for information on topics related to organic agriculture.



Figure 8 Organic Agriculture Information Center

Pesticide residues have long been a source of concern for consumers. At present, though compliance with regulations governing the use of pesticides has reached 98%, the "GMP" safe fruit and vegetable seal has been designed because the consumer cannot recognize pesticide residue with the naked eye. This seal represents the quality and safety of products and the honor of farm operators. Consumers can rest assured that products bearing the seal can be bought and used. For a list of agricultural products fulfilling GMP safety requirements, one can search "GMP Announcement,"

Advisement and Service Web"

(http://www.tactri.gov.tw/htdocs/notes/gapweb/) (Figure 9) established by the Taiwan Agricultural Chemicals and Toxic Substances Research Institute, which provides the public with information about the safety of fruits and vegetables.



Figure 9 GMP Announcement, Advisement and Service Web

C. Because agricultural production is a production method which directly utilizes and depends heavily on natural resources, it is important to consider the utilization of these resources and the preservation of the natural environment. Today, the mission of Taiwan's agricultural development should not only be food production, but also the preservation of the natural environment and our common natural resources. The website of the Taiwan Endemic Species Research Institute

(http://nature.tesri.gov.tw/tesriusr/index.htm) (Figure 10) provides information about Taiwanese biological resources, endemic species preservation, and ecologically protected areas. Through the website, researchers and the general public can all quickly access the information that they are looking for.

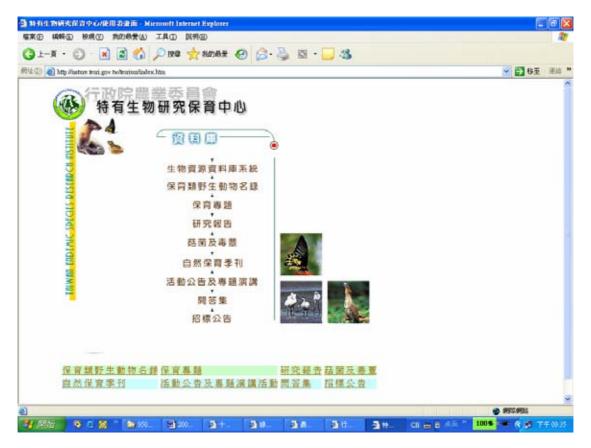


Figure 10 Taiwan Endemic Species Research Institute website

D. Because farmers and agricultural workers usually stay in rural areas on weekdays and are busy with farming tasks, they lack opportunities for continued study. However, the Internet allows them to exchange educational information without the constraints of time and space. The main purpose of the "Agricultural Industry Extension Network" (http://agrext.coa.gov.tw/) (Figure 11) and the "Agriculture Education Website" (http://agredu.coa.gov.tw/) (Figure 12) is to provide a forum for farmers and agricultural workers to learn and share experiences.



Figure 11 Agricultural Industry Extension Network



Figure 12 Agriculture Education Website

5. Future Developmental Directions

Though farmers' and fishermen's associations have not been as quick as other industries to become information-oriented, in recent years, having received encouragement from the government and facing the pressures of competition in a social environment, farmers' and fishermen's associations have met the challenge head-on. Managers of these associations and workers are all able to recognize the new life that information technology can bring them the strength for competition.

At present, the government agriculture department is in the process of establishing an "Agriculture and Food Traceability System," which makes it possible to trace the food supply chain. This work is carried out under the supervision of farmers' and fishermen's associations and includes producing and harvesting as well as sale and transport. Detailed records are kept regarding the application of pesticides, fertilizer and other production materials. After harvest, a production seal is affixed to the paper harvesting container, the container is shipped to the container treatment plant to be cleaned, and a shipping label is affixed. The Agriculture and Food Traceability System strengthens field management and enables consumers to rest assured about the safety of the products they use. Because in recent years, the processes of farmers' and have fishermen's associations become increasingly information-based, instructing agricultural workers to use the Agriculture and Food Traceability System will not be that difficult. At the same time, the government hopes that information technology can continue to increase the management and operational efficiency of farmers' and fishermen's associations and lower their costs, even allowing them to accumulate intellectual capital and improve organizational image. Ultimately, they can educational organizations that are able environmental challenges at any time.





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Chinese Taipei

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General Situation of Taiwan's Farmers' & Fishermen's Association

- Over the past five decades, Taiwan has developed from an agriculture-based economy to a newly industrialized one.
- Taiwan's agriculture sector shares 6.0% of the country's employed population and uses 23.1% of the country's territory, but its output accounts is only 1.7% of the GDP.



General Situation of Taiwan's Farmers' & Fishermen's Association

- Taiwan's agricultural production has been characterized by small-scale production and as a result of fast economic growth and rising labor costs, the production cost of Taiwan's agricultural sector has risen to a relatively high level.
- In an agriculture sector made up of small farms, the spread of agricultural information takes a lot of manpower and time.



General Situation of Taiwan's Farmers' & Fishermen's Association (cont.)

- The farmers and fishermens associations throughout the country also shoulder the responsibility of conduits for the free flow of agriculture information.
- In Taiwan there are totally 343 Farmers' & Fishermen's Associations with 2,319,386 members in 2005.

General Situation of Taiwan's Farmers' & Fishermen's Association (cont.)

The major works of FFAs are:

1. agricultural extension

 According to the law, every FFA should make a budget in this section from the surplus of the previous year.

2. economical activities

 In this section, FFAs operate various agricultural materials, farmers' shopping centers, supermarket and joint transportation and sales.

3. Finance and Banking Services

FFAs also provide banking services such as deposit and agricultural loan.

4. Insurance Services

In this section, FFAs manage farmers' insurance and livestock insurance.

Number of Farmers' & Fishermen's Associations and Members

YEAR	Number of Farmers Association (house)	Total members of Farmers Association (person)	Number of Fishermens Association (house)	Total members of Fishermens Association (person)
2000	304	1917938	40	339590
2001	304	1930171	40	359449
2002	304	1959427	40	372052
2003	304	1950321	40	383893
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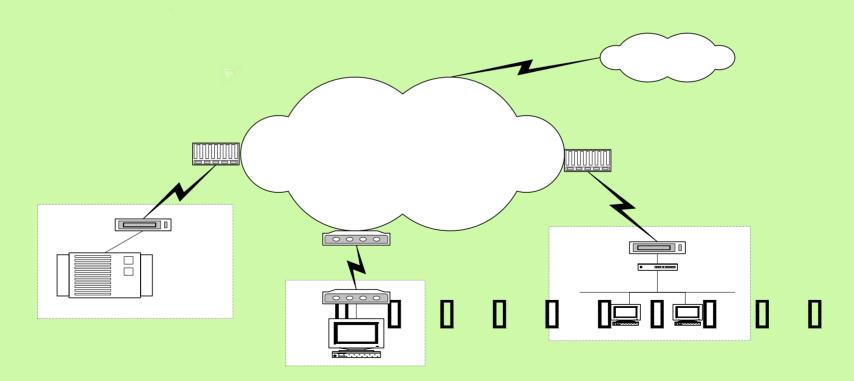
- In 1980's, the government encouraged FFAs to use and share the finance & banking information system which connect to nationwide banking networks.
- At present, there are four main Joint Information Centers. These centers have performed satisfactorily for the development and maintenance of the finance and banking network system, and government encourage them to provide ICT services to other sectors.



- The government started a program of "Establishing agricultural information community network" to facilitate the management computerization of FFAs from 2001.
- In 2003, The agricultural information community network completed.



Networking Structure of FFAs

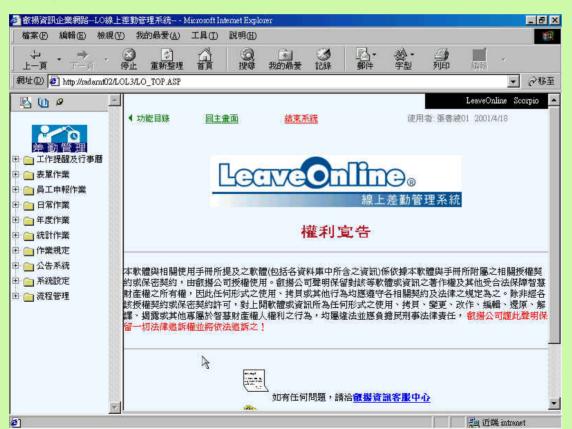




- On the other hand, the programs also developed.
- Many web-based management systems including personnel, CRM, property management, stock and sales management, joint transportation and selling, accounting, and insurance service.



personnel system : employee autobiography, salary, promoted history, absent apply...





Membership service system : members information records, member annual charge...



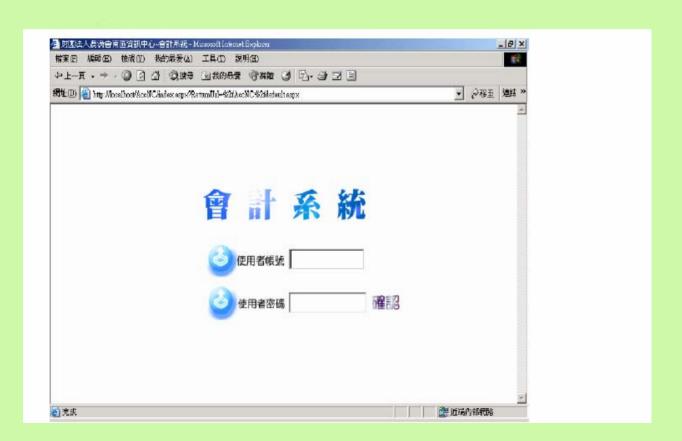


Asset management system : inventory, assets depreciation...





Accounting system





joint transportation and marketing system

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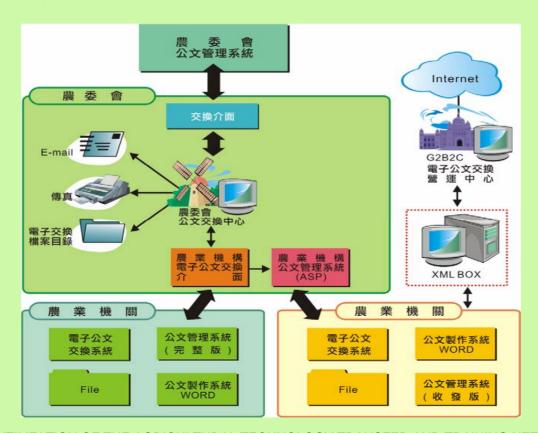


Farmers insurance system





The FFAs electronic document exchange system





Commercial websites of agricultural products





Present status of major information networking system in Taiwan

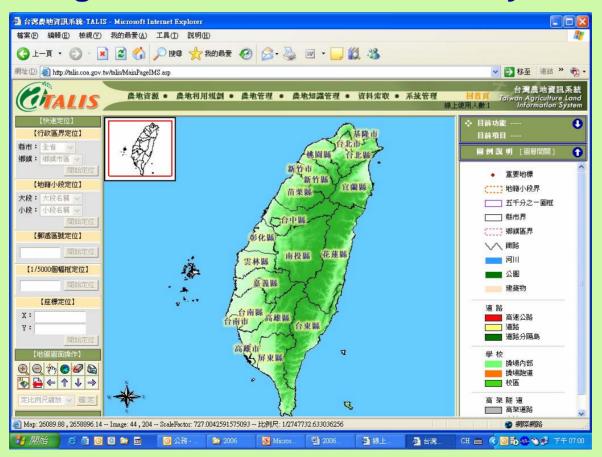
Council of Agriculture(COA) Website





Present status of major information networking system in Taiwan (cont.)

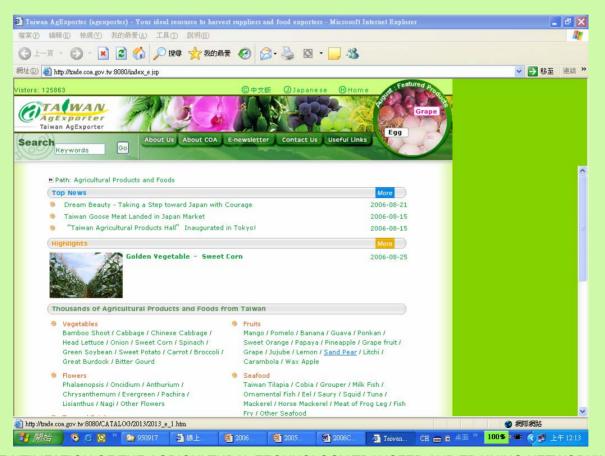
Taiwan agriculture land information system





Present status of major information networking system in Taiwan (cont.)

Taiwan AgExporter Website





Agriculture Extension Network System





The Internet Agricultural Pro



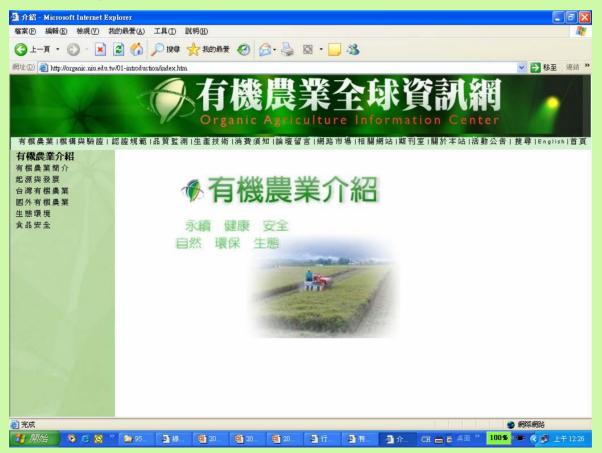


The Leisure Agriculture Info Network





Organic Agriculture Info Network





Homepage of Natural Conservation Network





Natural resources and Ecology GIS Database in Taiwan website





Agriculture Production and Marketing Group's Info Service Network





Agri Production and Marketing Info Network





Agriculture Education Website





Agriculturalist Portal Network





Taiwan Agriculture and Food Traceability System





Animal Protection Info System





Homepage of National Trail





Aspects in the future development

- In Taiwan, the computerization of FFAs were delaying, but they have gradually come up with other industries with the support of government projects and the pressure of competition.
- The leaders and employees of FFAs all can perceive that the computer and information technology has brought them the strength for competition.



- Due to the completion of the computerization of business practice in the FFAs, agricultural administration anticipate FFAs can play a supporting role in the agricultural products traceable systems, which build up a complete food chain.
- FFAs will be responsible for supporting farmers using computer to keep the records including the process from producing to harvest.











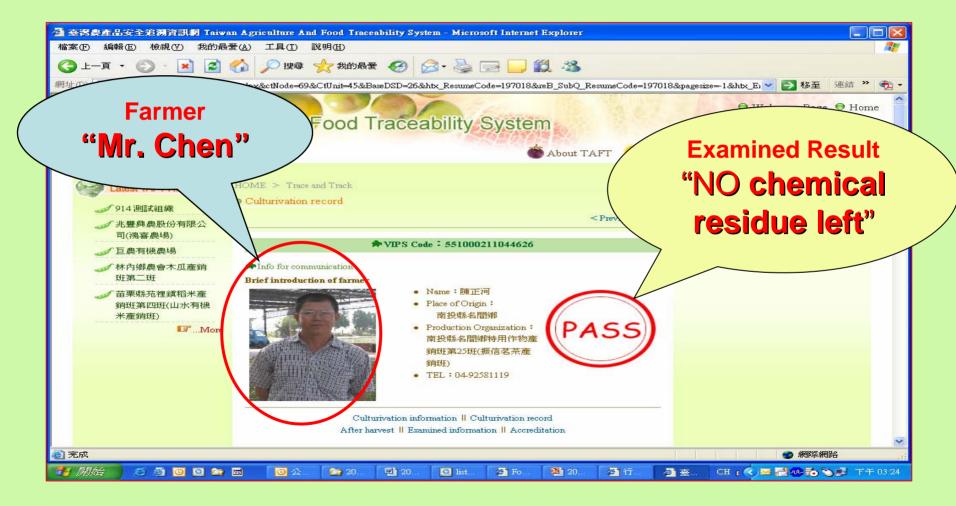




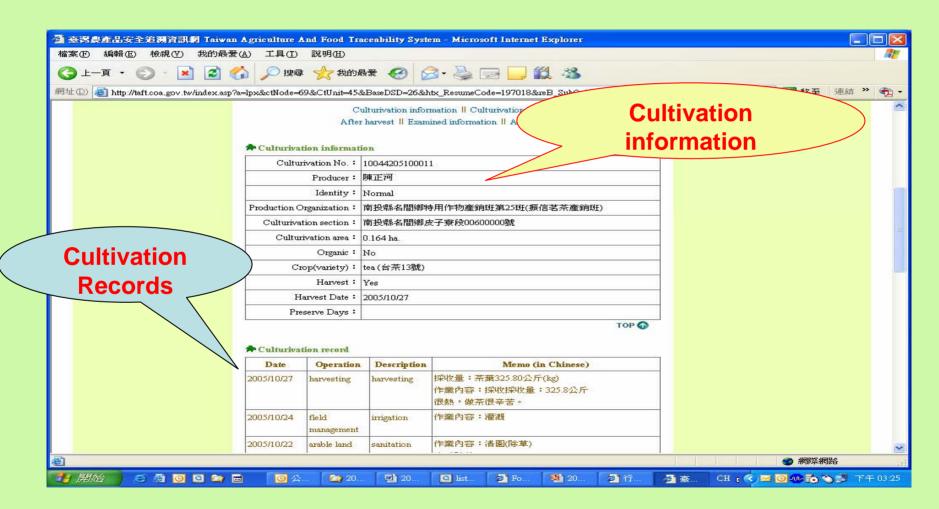














THANK YOU FOR YOUR ATTENTION!