AFITA 2002

ASIAN AGRICULTURAL INFORMATION TECHNOLOGY & MANAGEMENT

Proceedings of the Third Asian Conference for Information Technology in Agriculture

Chinese Academy of Agricultural Sciences (CAAS)
Asian Federation for Information Technology in Agriculture (AFITA)
October 26-28, 2002, Beijing, China

Edited by Mei Fangquan

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Mei Fangquan

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Preface

The Third Asian Conference of Federation for Information Technology in Asia (AFITA) jointly organized by the Chinese Academy of Agricultural Sciences(CAAS) and AFITA is a great assembly of totally more than 200 experts in information technology and information management in agriculture from over 30 countries in Asia and other continents. This grand occasion will surely produce far-reaching influence on the research and development of information science in agriculture.

In recent years, the amazing development of information and communication technologies (ICTs) has greatly changed the ways we do our business and the environment we live. The constant innovation and development of Internet resource controlling and searching systems, expert systems, GIS, RS, GPS, precision agriculture, simulation models, DSS, and data mining, database technology, digital libraries, as well as E-commerce are all important contributions to the world agricultural economy. ICTs in developing countries in Asia has achieved significant progresses while in developed countries it has reached a higher level in some major areas and obtained rich experiences. In such a favorable developmental environment, AFITA 2002 Conference has been an important opportunity for exchanging views and experiences on ICT and information/knowledge management, and for facilitating stronger collaboration among Asian countries as well as others.

The more and more newly produced methods and means in IT and IM by various countries need revelation and extension for their effectively and efficient use. From the enthusiasm of all the participants, we may see that the significance of the conference and the necessity of cooperation in the fields.

The conference proceedings cover 114 papers within comprehensive areas in IT and IM. The invited keynote speeches have given overall introductions in the development of main fields in IT and IM that are representative contributions from agricultural sector to the information society. From the dedicated papers of the conference and real practice of various countries, I would like to put further to stress that IT and IM are indeed strategic partners for innovation, progress, and success in the electronic and knowledge age emphasizing "global economy". I hope that this partnership will be strongly enhanced among various countries.

I really feel honored to be entrusted by the AFITA to organize this meeting and sincere appreciations should be given to friends and colleagues who helped to make the conference to be successful. I agree with the view that we are fortunate to live in such exciting times when there are so many technological tools available for us to experiment and use. The progress in information technology has truly transformed every aspect of our lives particularly in agricultural areas. And both challenges and opportunities facing us are many and we need to work together more closely to make further achievements to the development of agricultural economy in the future.

Prof. Mei Fangquan
Elected Chairman of AFITA

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KEYNOTE SPEECHES

A Study on China's Grain and Food Security and Early Warning System

Prof. Mei Fangquan *

Honourable Director-General, Institute of Information, MOA, China
Honourable Director-General, Scientech Documentation and Information Center (CAAS)
Vice-President, State Food and Nutrition Consultant Committee (SFNCC), China
President, Chinese Association of Agricultural Scientech Information (CAASI)
Elected President, Asian Federation of Information Technology in Agriculture (AFITA)

Abstract: China's grain and food security is a priority area that is focused by Chinese people and government as well as all over the world. The first prototype early warning system for grain and food security in China was researched and developed by this Study. Food security and early warning system contains basic theory analysis, database system, forecasting simulation model system, sign warning system. A soft system based on Internet was developed, and the function of food security early warning was realized basically, and then to prevent risk and solve problems by implementing the short forecasting and dialog between person and computer.

Keywords: China; Grain and Food Security; Early Warning System

Food security and early warning system in China is always the important work for Chinese government, it is also the focus of the international concern. It takes significant role to establish the grain and food security and early warning system when the management function of government has changed and China's agriculture has faced new situations.

In the research, food security and early warning system contains basic theory analysis, database system, forecasting simulation model system, sign warning system and internet for system function. The purpose of this research is to recognize the situations of the food security and to warn early.

I. The Methodology of the Food Security and Early Warning System

1. Systematical analysis on the theory of the food security and early warning system.
2. Select index of situation in food security (or insecurity) and set up the index system.
3. Determine the warning limit of the degree of food insecurity (every degree is defined in upper limit and lower limit).
4. Select and decide the signal index of food security or insecurity, that is, the forerunner or synchronous index of warning situations.
5. Forecast or simulate the index of food security situation
6. Analysis on the index of food security situation and overall index and estimate the degree of food security or insecurity, then use the different signal (red, yellow, green white and blue light) to forecast the degree of warning.
7. When there has been or potentially exist the risk, especially serious risk in food security, trace back to the sign indicators and the tendency of related variables, seek the reasons to cause the food insecurity (or unbalance in food demand and supply), find alternative measurement and policy, and then, simulate and forecast the result of implement of the policy, so to avoid the situation that influence on the food security.

* Team members: Zhang Xianshu, Huang Jikun, Fang Yu, Li Zhiqian, Zhou Guoming, Nie Fengying, Zhang Qiao, Qing Fu, Li Weike, Ma Jiujie, etc.

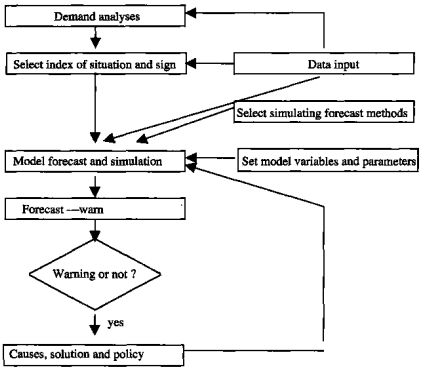

Figure1. Framework of Layout and Methodology in Food Security and Early Warning

Methodology:

1. In the index of food security, the qualitative method is used to analyze the concept of grain and food security, measuring index and warning index, and descriptive statistics to determine the warning limits.

2. The cluster analysis, matrix analysis, time trend analysis, auto-regression moving average, sector equilibrium model and food balance sheet are used in the warning models. C++ language is applied to write the software, which can have various functions such as analysis on different variables, sorting, policy stimulation, forecasting and warning. The expert questionnaire is used to analyze the condition of production of grain and prosperity.

3. In the data warehouse and network, TNG, firewall and safety inspecting technology are applied. Data is transformed and integrated in clear way and data base is programmed again according to criterion of data warehouse. The data relationship are change into star type of data structure.

4. Multimedia technique is applied to establish food security and early warning system and software, provide a platform with a friendly interface.

There are four parts in the grain and food security and early warning system: basic theory of the grain and food security and early warning system, warning index system, warning modeling and database and network for warning.

II. Basic Theory of Grain and Food Security and Early Warning System

In this part, the concept of food security is defined. The food security can be classified as long term and short term food security, macro and micro food security, production and marketing food security.

There are four characteristics in food security: historic, regional, variable and systematic. According to the characteristics, food security index can be divided into two groups: one is called basic quantitative index (e.g. balance between demand and supply), another is degree qualitative one (e.g. production variability).

There are various patterns of food security in the world. Four alternatives can be chose to achieve the goal of food security: total independency model, total free trade model, mainly independency model and

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