The Development of Computer Network Systems in Agricultural Extension Service in Japan and its Problems

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Abstract

This paper introduced an effective nationwide computer network system in the field of agricultural extension service in Japan. The network system was started in 1988 experimentally with a bulletin board and an e-mail system.

After that, a database system and a facsimile system were added and a part of the system was opened to farmers. In addition, the system made it possible to provide local information in each area. Therefore Fukui prefecture made its own bulletin boards to provide local technical information. And it has made possible speedy information exchange among extension centers.

From these progress and the present situation, the author pointed that importance of computer literacy, network activities, improvement of the network system and information disclosure are very important to make more useful network.

Keywords: agricultural extension service, EI-net (Extension Information network), rice diagnosis system

1. Introduction

A nationwide computer network system in the field of agricultural extension services was started in 1988 experimentally with 69 terminals across Japan. The network mainly include a bulletin board and an e-mail system at first and has made possible

speedy information exchange among extension centers. The number of terminals has increased and the system has improved year by year.

In addition, the system made it possible to provide local information in each area. Therefore Fukui prefecture made its own bulletin boards to provide local technical information. This paper shows the role of the nationwide computer network system on agricultural extension service and its usage in Fukui prefecture.

Fig. 1. System of the Cooperative Agricultural Extension Service in Japan

Fig. 2. Concept of the Extension Information Network System in Japan

II. The Role of Agricultural Extension Service in Japan

The Agricultural Extension Service of Japan has two purposes. One of them is to improve agricultural production and another is to improve the standard of living in rural areas. In order to achieve these purposes, nearly 10,000 extension advisers are allocated across Japan. The responsibility for this service is shared by the Ministry of Agriculture, Forestry and Fisheries (MAFF) and 47 prefectural governments (fig.1). The national government financially supports 40%

of the prefectural extension service. The prefectural government executes the extension services to farmers through about 600 extension centers. Therefore any farmer who lives anywhere in Japan can access the extension service. This service started in 1948.

III. The Nationwide Extension Information Network

About 20 years ago, the Extension Information Center was established from the need for information management within the Agricultural Extension Service. The Central Information Center

receives financial support from national and prefectural governments.

The Extension Information Center started to collect information by paper and they provided this information in a book every year. However, the present main role of the Information Center is to manage a computer network system called Extension Information Network (EI-net). The information flow of the EI-net is shown in Figure 2.

The EI-net is composed of many databases, bulletin boards, e-mail system and so on. The database companies provide news, market information and weather databases. The National government provides statistical information, research results and so on. Private agricultural companies provide agricultural material information on such topics as chemicals, fertilizer, machinery and so on. Of course the Extension Information Center provides their own database which is offered to extension advisers. These databases are used for on-line retrieval to get information which can help individual problems with data accumulated in the host computer.

The system includes not only database but also bulletin boards, forums, e-mail, free software, fax sending systems and so on.

The bulletin boards allow all users to review messages left by other users, and leave user's own messages or opinions if he want. There are many boards concerned with agricultural administration and technical information which are related to crops, vegetables, fruit, livestock, home life, food

processing, youth, farm management, computers, chemicals, machinery, fertilizer and so on.

The e-mail system is used for exchanging messages among members.

The free software is usually developed by the extension adviser and is open to public and used freely among members. Hundreds of software, spreadsheet data is available.

The fax system is used for sending or receiving a fax documents from the EI-net. If we want to

Fig. 3. Increasing Number of IO-net Terminals

receive the results of the retrieved spot information database, the EI-net can fax the results to our office within a few minutes. It is very useful when the information includes image data such as photographs, charts and so on.

Some prefectural network systems have their own local boards in the EI-net as a part of their system. These boards allow to use only the prefectural area.

The user of this EI-net is not only the agricultural extension staff such as farm advisers, home advisers and subject matter specialist, but also farmers. This nationwide network has made possible speedy information exchange among extension centers.

IV. The Agricultural Information System in Fukui Prefecture

In Japan, many prefectures have their own agricultural network system for extension service. These system are managed by prefectural governments, so the system is different in each prefecture. Fukui prefecture’s system is an example of a typical prefectural system.

Although Fukui prefecture is located in the central part of Japan, it has a lot of rural areas. The agricultural production in our prefecture mainly depends on rice. So the system is oriented toward

rice growth and rice production. In Fukui prefecture, the Rice Growth Diagnosis and Forecast System has been operating since 1991 (fig.4). The purposes of this system is to practice effective rice cultivation and to stabilize the production of superior quality rice by means of accurate diagnosis and forecasts.

Before we developed this system, diagnosis of growth and forecasting of main growth periods and rice were conducted individually. But in this system, the diagnosis and the forecasting are combined and function effectively.

All of this system except the investigation of

Fig. 4. The Rice Growth Diagnosis and Forecast System in Fukui Prefecture

rice plants is done by the computer network system.

V. The Rice Diagnosis and Forecast System in Fukui Prefecture

The rice growth diagnosis and forecast system in Fukui prefecture are characterized as follows: 1) Summary and diagnosis of the growth information is based on the investigated data from each week. Growth data has been collected on 46 specified fields for ten years. 2) Forecast of the panicle formation stage and the heading stage is based on the DVS system which calculates from the transplanting date, leaf age, daily air temperatures and day length. 3) Forecasts of the outbreak of rice blast is based on the BLASTAM system which is calculated from meteorological data such as temperature, precipitation, duration of sunshine and wind velocity.

On the basis of this data, a technical countermeasure is made as follows: 1) The applicable technical countermeasures are discussed by subject matter specialists, agricultural experiment station researchers, agricultural cooperative staffs, prefectural government staffs, etc. And the countermeasures are based on the results obtained from the discussion carried out on the growth information, weather information, growth forecast, plague and disease outbreak forecasts, etc. Finally the relevant guidance leaflets are prepared.

Transmission of the technical countermeasure to farmers is as follows: 1) Each extension center or local cooperative office gets the countermeasures from the network system at the next day of the investigation. 2) Each local organization adds their own local countermeasures and they informs the countermeasures to farmers.

The rice growth diagnosis on this system has

become more accurate based on the ten years of investigation data. For example, panicle formation stage varied more than 10 days because of weather change in past years. However, this system can estimate the panicle formation stage within 2 days.

Therefore we can provide an effective countermeasure quickly. So, this system is very useful for stable production of rice especially under abnormal weather.

VI. Advantages for Extension Advisers and Farmers

These network systems give the following advantages for extension advisers: 1) Quick collection of information, 2) Knowledge of current trends in agriculture, 3) Communication with extension advisers allocated across Japan, 4) Retrieval of necessary information from large-scale databases, 5) Utilization of free software, 6) Collection of up-to-date technical information, 7) Collection of weather data, 8) The ability to send information to many farmers simultaneously, 9) Effective collection of local information.

Advantages, for farmers are as follows: 1) Acceptance of management guidance, 2) Utilization of free software, 3) Collection of weather data, 4) Communication with farmers and other participants.

VII. Problems and Future Outlook

1. Computer Literacy

The purpose of the system is to provide useful information for extension advisers and farmers. The extension advisers are collecting information from the EI-net and their prefectural information system. They transformed the original information into the useful information which supports a farmer's decision making. However, there are a few extension advisers who can use the EI-net freely in each

extension center. The rest of the advisers should learn how to get information from the EI-net system and how to transform into useful information. They need effective training for using the EI-net.

2. Network Activities

A lot of these computer net work system did not functioned effectively but the EI-net is one of the successful network systems. The difference between the EI-net and other system is dependent upon their management.

Some technical boards are managed by extension advisers as a bulletin board operator. And they participate some committees, which manage the EI-net, as a member of user's representative. The purposes of these committees are promoting activities and improving the EI-net system. Participation of user's representatives in these committees are very important to keep the activities of the EI-net system.

3. Improvement of the Network System

The performance of computer network system is improving year by year. The transmission rate of EI-net has improved from 300 bps to 14,400 bps. The high transmission rate will make possible the transmission of large data such as image data. For example, the image of plant growth, plant diseases and injurious insects are possible to diagnosis by the user. These improvements in the network environment should renew the service of the networks.

4. Information Disclosure

There are a lot of information which has not been made open to the public yet. For example, each extension center makes many leaflets to advise farmers. However, most of these leaflets are usually not open to other extension centers. If some

extension advisers want to make a leaflet about the same subject, he must collect information from the beginning. It is a waste of time. It is important to strengthen an information collecting system from extension adviser or extension center. There are 10,000 extension advisers and 600 extension offices in Japan, so it will be a grate resources to collect information.

5. Future Outlook

The functions of the EI-net will be improved and will become more active. And it will be possible to connect to the EI-net though the Internet.

The social environment of agriculture is changing rapidly, so it is going to be difficult to keep up with the changes. The improvements within the extension information network system will be a strong tool in helping the extension advisers' activities and farm management for the individual farmer.

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日本の農業改良普及事業におけるコンピュータ・ネットワーク・システムの発展と課題

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本報告は、日本の農業改良普及分野におけるコンピュータネットワークシステムを紹介したものである。掲示板と電子メールシステムを持ったこのネットワークシステムは、1988年に実験的に始まった。その後データベースシステムやFAX配信システムを追加し、一部は農家にも開放された。さらに、それぞれの地域内の情報交換が出来るローカルネットの設置が可能になった。これにより福井県は独自の技術情報を提供する掲示板を持つようになり、普及センター間の情報交換が迅速に行えるようになった。

これらの発展過程と現状から、これらのシステムにおける普及員や農家にとっての問題点として、コンピュータリテラシー、情報活動、システムの改善、情報公開がより効率的なシステムの構築に重要であることを指摘した。

キーワード 農業普及サービス, EI-net, 水稻生育診断