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Using Information Technology to Enhance Communications among Agribusiness Organizations

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Abstract

Formation of Agricultural Production and Marketing (P&M) teams is one of the strategies taken by the government to overcome the problem of small scale agricultural production units dominated by family farms. However, coordination tasks become a problem as the organization enlarges. The study intends to explore the feasibility of enhance communication through the use of information technology, and also to access information on the basis for using information technology for successful implementation.

Introduction

Promoting the use of information technology and formation of strategic alliance among agricultural organization are the top issues addressed by the Council of Agriculture of the Republic China in Taiwan. Small family farms characterize farming sector in Taiwan. The average area of land holding per farm family is about 1 hectare, while therefor those between 0.1 and 0.5 hectares of land holding, the percentage are 45.25%. The GDP from primary agricultural production valued 237.5billion$NT (approximately 7.2billion $U.S. with exchange rate of 1 US$=32.7 $NT), which is only 2.56% of the GDP in 1999 (DGBAS, 2001).

Although the percentage of population living in farm households has been declining, the average land holding per household remained almost the same due to the decrease in total farmland. In 1991 there were around 21% of the population in the farm household, and the percentage had dropped to 17% in 1999 (Council of Agriculture, 2000). While the percent of labor engaged in agricultural production activity also decreased from 14% in 1988 to 7.7% in 2000. Capital and labor intensive ways of using land resources by investment in net housing and other facilities to overcome climatic constraints were one way of combating the problem of small land holding. The idea of improvement in technology, and cut down costs were the slogan for farmers from the experts in agricultural technical extension personnel. One way of cutting down the costs of production is to increase the scale of production. However, cultural, social, and government policy have jointly contributed to the difficulty in physically increasing the family farm land area.[1]

The statistics still show that farmers have been lagged behind in competitiveness and farm income. Although we have about 782,136 farm households at the end of 1998, the average farm household income is only around 77% of that of the average non-farm household (COA, 2000). While the rate of dependence on farm income is only 21%. Which means that the average farm households depend heavily on off farm income. Also with decreasing population in the rural area, seasonal labors have been in short supply. The average age of farm managers is growing. Faced with such reality, and declining growth rate of agricultural productivity.

As shown in Table 1, the percentage of farm household with own farmland is more than 99%. Majority of the farm household holds less than 1 hectare of land, large area of land holding by a single household was quite rare. The land holding of more than 3 Hectares composed of only around 3%.

Table 1. Structure of Farm Ownership and Distribution of Land Areas

Year	Ownership / Hectares	With Own Farm Land						Without Own Farm land
		Sub Total	<0.1	0.1-0.5	0.5-1.0	1.0-3.0	>3.0	
1995	Farms	786,388	11,578	324,935	230,972	195,327	23,576	5,732

[1] The cultural and social factors associate with this phenomenon is that farm land was inherited by offspring with equal share. Many elderly people were unwillingly to sell farm land because speculation on land price and the believe that the farmland inherited from the ancestors should be handed down to the next generation.

	Percent	99.28	1.46	41.02	29.16	24.66	2.98	0.72
1997	Farms	774,951	31,422	333,211	213,821	172,900	23,597	5,295
	Percent	99.32	4.03	42.71	27.40	22.16	3.02	0.68
1998	Farms	776,686	31,740	327,652	213,512	179,536	24,246	5,450
	Percent	99.30	4.06	41.89	27.30	22.95	3.10	0.70
1999	Farms	782,566	31,747	356,339	207,591	164,277	22,612	4,841
	Percent	99.39	4.03	45.25	26.36	20.86	2.87	0.61

Source: Council of Agriculture, the Executive Yuan (2000)

One of the strategies taken by the government was to encourage regional farmers to form into product specific teams to enlarge the scale for production and marketing activity. This special farming organization is called the "Production and Marketing Team (P&M Team)." There are successful P&M Teams and less successful ones. However, enlargement of the scale of management is the on going trend that efforts are being made to further increase the options and diversity of the operation. In fact, on top of the new medium term agricultural policy of the new administration for the years 2001 to 2004 is to promote the use of information technology, and followed by promoting the formation of strategic alliance among agricultural organizations.

There are three objectives in this study. First, to understand and compare the current situation of the production and marketing teams in terms of the basic settings of application of information technology. Second, to examine the factors that might contribute to the feasibility of using integrated information for enhancement of the performance of team communication. Finally, to explore the feasibility of the using the same framework for forming strategic alliance of production and marketing teams.

In the next sections we intend to explore the historical development and its relationship with the formal sector in terms of the organizational hierarchy in the government sponsored agricultural extension system, and the current effort in promoting the use of information technology as the background to this study.

Agribusiness Organizations in Taiwan

There are formal and non-formal agribusiness organizations in Taiwan. The formal organizations includes the Farmers Associations, Fishermen's Associations, Irrigation Association, or other agricultural cooperatives. Farmers' Association (FA) is, by far, the largest and the most important organization for farmers in Taiwan. It is required by law that only one farmers' association is allowed in each township, only one person in any farm household is allowed to joint in as a full member. Furthermore, the person is only allowed to join in the FA where his/her residence is located in. Since people can move freely and change residence from one township to another, it is possible for farm family that has separate residences to joint in the FA as separate households.

The FA is a multipurpose, nonprofit organization for farmers, which carries in its capacity four major functions—educational, economical, social, and political functions. The contribution of FA to rural community and agricultural development has been well- documented in many of the studies (e.g., Liu, 1995). The FA provided education services through its agricultural extension services. Farmers could make deposits and loans from the FA through its credit departments, and products may joint marketed through the FA. The government also use the FA

as the media for promoting new governmental agricultural policy, with some governmental support such as collecting service charges for conducting government entrusted businesses such as farmer health insurance programs. However, the prosperity of FA seemed to be the past glory for many FAs, especially in the rural area. The profit making business that the FA made was usually the credit department. However, with opening up local financial markets to bankers, the FAs faced severe competition, moreover, the credit department had a very shallow local market and also source of funding is limited to its administrative boundary that FA is sensitive to small shocks in the local economy. The Farmers' Association Law required that 62% of their annual profits from their business activity should be devoted to enhance the tasks of agricultural extension education activity. But for a FA running on debt, it would be impossible for them to have a stable funding for agricultural extension activity. Fortunately, the extension activity is not completely on the FAs' hands, the government would support regular extension jobs conducted by the extension agent in the FAs.

The idea of formation of Agricultural Production and Marketing teams came originally from the simplest unit of the agricultural extension services of the FAs. Although there have been some problem with FAs, the extension agency of FAs should still take responsibility for advising on the P&M Team. Coordination of production activities, exchange of labors, sharing of farm machinery and other equipment, exchange of farming information and joint purchase of farm inputs were the major functions of the team. Taking up marketing activity in the team extends beyond the farm gates have made the consumers more approachable by reducing marketing margins. Henceforth, farmers would be able to get a larger share of the consumer dollars. The policy is in accordance with the idea to promote a representative regional specialty product to create diversity in production, yet trying the support at least at certain scale.

In Taiwan, there are more than 6000 production and marketing teams in 2000 that specialized in many different products. Specifically, there were P&M team for rice, vegetable, fruits, floral, swine, poultry, to name a few. However, not all of the teams were in good working condition, and even for the teams that ranked among the top 100 best teams of the year might not be sustainable. One of the biggest problems is difficulty of coordination among team members, as the team gets larger. Therefore, the team may split into smaller teams to enhance consensus for more effective communication. Thus the scale factor that was expected from such organization diminishes. An effective way of enhancing coordination ability among the team members is to make the routine work of information collection and dissemination process to be carried out automatically by using modern information technology. This study intends to explore the possibility of using information technology to enhance their communication mechanism.

Current Situation of IT Applications in Agriculture in Taiwan

According to a survey released early 2000, nearly 40% of the Taiwanese household owns at least one personal computer, while only 17% of the farm households did (DGBAS, 2000). On the other hand, at the government level, PC-based the integrated agricultural information system was implemented in 1990. The applications were shared with FAs, agricultural cooperatives and farm households (Wang and Ni, 2000). Now the web pages of the Council of Agriculture not only provide data/year books over the net, it also became more comprehensive. Agricultural related news have been updated regularly, government policy, rules and regulation and services

at the government level were easily accessed. Moreover, concerned groups on price information updated daily from the agricultural wholesale markets have also been available. Although from the perspective of an end user, we would appreciate more detailed information should be added to the current data sets, and the relationship between different data sets should be made clearer. Efforts were also given to promote virtual markets for agricultural products through E-commerce. The production and marketing teams were also given a special web site (http://farm.coa.gov.tw) for them to identify itself from the rest of the production and marketing team. Information provided by each team had to fit in a certain guidelines, to ensure that they all have the same format and the amount of information. As of the 25th of March 2001, there were 83 Teams set up their web sites at the above location. In comparison with the total number of teams of more than 6000, it is a very small percentage. Although the site was not set up for commercial activities, the Team is still able to use the provided space to release communication details to attract the attention of the user of the site.

Ongoing project of the Council of Agriculture on application of information technology of the P&M Team is the developed by the Council of Agriculture mainly for the purpose of setting up management information system the whole team. The content of the system contains several major items. Maintaining good record of all of the team members, trace the use of equipment, information on the stocks of farm inputs, information on the names and contact of supplier, and basic transaction record keeping were the major function. In addition, the system was designed to provide opportunity for team members/leader have a better idea of what kind of the resources were available on the farm. Opportunity is given in this system to keep track of the wishes of all its team members. With better ideas of what would be the effect of their action, such as planed planting time span as well as areas planted, the needs and capacity of each of the team member could be respected, and better coordination could be generated. Especially when the information is combined with the demand prediction and supply prediction information that generated from other teams as well. This could be a start at the right direction and the first step toward really treat all the resources on the team as being at the disposal of the core decision maker of the team.

The use of information technology has the potential of greatly reduce the costs of collection and dissemination of necessary information from and to the team members (e.g., Migliarese and Paolucci, 1995). However, this should be taken one step further to consider the possibility of letting each member to use the system to in the convenience of their house without having to bring in their information to the team meeting site to accomplish the task. Otherwise, the full potential of the system cannot be employed. Secondly, the application of the management information system is only a very small part of the effort to make the P&M team a genuine agribusiness. The teams are legal entities to really taken up its responsibility as an enterprise (e.g., Westgren, 2000). Thirdly, the consensus among team member is essential for promoting the system as well as forming strategic alliance with others (e.g., Hsieh and Huang). Finally, functions of the system could be enhanced to include financial analysis to make the system more comprehensive. The system already had the basic book keeping function, therefore, it could greatly improve the usefulness of the system.

Results and Conclusion

Preliminary results from the survey shows that depending on the status of the production

and marketing team, the advanced application of information technology, to this point, was still quite limited. However the government has already developed and tested management information system software for production and marketing teams, and project to promote the use of the software is currently underway. Collecting of production information and help setting up a standard data exchange format for the future electronic commerce environment are part of the functions. We found out that although our idea of using information technology to enhance communication among team members differs from the government sponsored management system. But if a coordinated decision system could be based on the available information from the management information system, the difficulty of coordination of information sources would be greatly enhanced.

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