# Effectiveness of Paddy Expert System in Terms of Knowledge Gain, Skill Acquisition and Symbolic Adoption Behaviour among the Paddy Growers of Thoothukudi District in South Tamil Nadu

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## Abstract

A computer-based Expert System is one such emerging Information Communication Technology which has great potential to apply in agriculture. Computers and other information technologies are now pervasive throughout the agricultural community. Keeping the importance of Expert System in Extension Service, Paddy Expert System was developed with help of ICAR at TNAU, Coimbatore. There is a need to study the new Paddy Expert System effectiveness among the different categories of paddy growing farmers so as to use it effectively in the extension service system. In this study was conducted (2013) Thoothukudi district of Tamil Nadu, Srivaikundam block was purposively selected for the study because of more areas under paddy cultivation and progressiveness of the farmers in terms of adopted new technologies. Total sample sizes of 105 respondents were selected, accordingly 35 farmers were chosen from each selected villages among different categories of paddy growers by employing snowball technique of sampling. The Before-After Exposure experimental study was conducted with three treatments, namely marginal & small farmers (T1), medium farmers (T2), large farmers (T3), with before and after exposure to the paddy expert system. The required data were collected using structured interview schedule, and observation technique and analysed. The analysis of the three treatments, revealed that mean knowledge gain was maximum with a score of 5.52 among medium farmers (T2), marginal & small farmers (T1) obtained highest mean knowledge related to skill acquisition with the score of 6.77 and it was superior compared to other treatments and majority of the respondents had medium level of symbolic adoption behaviour which means symbolically accepted to adopt and follow the new innovations and technologies on paddy cultivation practices and allied aspects due to exposure the paddy expert system.

**Keywords: Expert System, Knowledge gain, Skill acquisition and Symbolic adoption behaviour**

## I. INTRODUCTION

In India, it is very difficult to contact each and every farmer in limited time to communicate latest agricultural technology. To diminish this difficulty, various mass media are certainly most effective avenues to convey information to the broad means of people, particularly to the huge illiterate segment of the farmers. In the changing agricultural scenario, agricultural field has not been computerized so far in a way it is demanded. However, in the last decade, artificial intelligence based computer programs called Expert System received a great deal of attention throughout the world, due to its impressive problem solving capability in a variety of fields. Information and communication Technology is a veritable source of knowledge for all people and bridges the distance between people and places; thus, it can be regarded as both a driver and an enabler (Herselman, 2003). ICT heralds the formation of knowledge societies in rural areas of the developing world, which are only realizable when knowledge and information are effectively harvested for overall agricultural and rural development. Keeping the importance of ICT enabled interventions in agriculture and providing timely expert advise to farmers, the expert system on agriculture and animal husbandry was carried out as a network project of Indian Council of Agricultural Research (ICAR) with partners from SAUs. The objective of the project was to develop expert system for Paddy for the three state in their respective languages ie., Tamil Nadu (Tamil), Karnataka (Kannada) and Kerala (Malayalam). The Expert System for Paddy was developed through network project mode at E-Extension Centre, Tamil Nadu Agricultural University, Coimbatore with partnership of Directorate of Research on Women in Agriculture, Orissa as a lead centre. The relevant contents and technologies were scouted from various sources viz., State Agricultural Universities, ICAR, Government Departments, NGOs and other mass media sources and validated the scooted contents with help of concerned experts. The photographs and videos were recorded in the field during different stages of selected crop growth. The workshops and brainstorming sessions were also organized to classify and to give priority for the validated contents for development expert system.

An Expert System is a computer program that stimulates the judgement and behaviour of a human (or) an organization that has expert knowledge and experience in a particular field. It is program that emulates the interaction a user might have with a human

expert to solve a problem. An Expert System is a problem solving and decision making system based on knowledge of its task and logical rules or procedure for using knowledge. Both the knowledge and the logic are obtained from the experiences of a specialist in the area (Yogesh Kumar and Yogyata Jain, 2010). In agriculture Expert System are capable of integrating the perspectives of individual disciplines such as plant pathology, entomology, horticulture and agricultural meteorology into a framework that best address the type of ad hoc decision making required of modern farmers. Expert system can be one of the most useful tools for accomplishing the task of providing growers with day to day integrated decision support needed to grow their crops (Helen et al, 2009).

The expert system was designed and developed to serve the farming community, extension workers, scientists and other stakeholders. The home page of the expert system has three important components which are Information System, Decision Support System, Diagnosing System (Crop Doctor).

Keeping this in mind the present experimental study was conducted the following specific objectives,

1. To find out the knowledge gain, skill acquisition and symbolic adoption behaviour of paddy growers before and after exposure to the expert system.

## II. METHODOLOGY

In this study was conducted (2013) south Tamil Nadu of Thoothukudi district was purposively selected based on the potentiality of paddy cultivation and progressiveness of paddy farmers. Among twelve blocks in Thoothukudi district, Srivaikundam block was selected for the study because of more areas under paddy cultivation and progressiveness of the farmers in terms of adopted new technologies. The assistance of extension officials, farmers association and nearby farmers was felt must for identification of real paddy growers for this study programme. The real paddy growers could be identified only through network and chain of link of fellow farmers and extension officials. Hence snowball sampling technique was used to identify the paddy growers in these selected taluk. According to Singh (1998) snowball sampling is a non- probability sampling method. It is basically a socio-metric method. It is defined as having all the persons in a group or organization identified through their friends who in turn identify that a friends and associates until the researcher observers of definite social pattern. The snowball sampling is used for obtaining collective behaviour and an impression of informal social relations among individuals. The snow ball sampling technique was employed till obtaining required sample size in the study area. Actual paddy growers who present in the area were selected for this study programme.

Total sample size of 105 respondents were selected, comprising of possible combination of types of farmers (35 from marginal and small farmers, 35 from medium farmers and 35 from large farmers) by employing snowball technique of sampling. The agriculture and horticulture department officials were also consulted for triangulation before finalizing the sample.

## III. EXPERIMENTAL DESIGN

Experimental design is defined by, Singh (1998) as " simply a sequence of steps (taken ahead of time), which permit the objective analysis of data in a way that a definite cause- effect relationship can be inferred between the independent variables and dependent variables". This design could enable the researcher to establish adequate relationship between the dependent and independent variables.

The first and simplest type of before – after research design contains only experimental group without any control group. The following illustration will make it clear for easy understanding. This is as simple as only after but instead of taking observation of control group, the value of dependent variable before exposure to experimental variable is noted. This value acts as control. The effect of experimental variable X on dependent variable Y can be ascertained by subtracting the value of dependent variable before exposure (Y') from the value of dependent variable after exposure (Y).

The observation before exposure to 'X'

Y'

| Exposed to experimental variable 'X' |
|---|

Experimental group

Y

Observation after exposure to experimental variable 'X'

Effect of (X) = Y - Y'

Before – after experimental research design without any control group in consultation for studying the effectiveness of the treatment among the different categories of farming community.

### *A. Selection of Treatments:*

- Treatment A - Before exposure to paddy expert system
- Treatment B - After exposure to paddy expert system

In terms of

- Treatment - 1 Effectiveness of paddy expert system among Marginal and small farmers
- Treatment - 2 Effectiveness of paddy expert system among medium farmers
- Treatment - 3 Effectiveness of paddy expert system among large farmers

### *B. Findings and Discussion:*

The findings of this study are presented under the following subhead effectiveness of treatments towards knowledge gain, knowledge related to skill acquisition and symbolic adoption behaviour.

Table - 1
Effectiveness of treatment towards knowledge gain due to exposure to Paddy Expert System

| *Sl. No* | *Treatments* | *Mean Knowledge gain* | | *Mean Knowledge gain* | *Percentage (%)* |
|---|---|---|---|---|---|
| | | *Before exposure* | *Immediately after exposure* | | |
| *1.* | *Marginal & Small Farmers ($T_1$)* | *5.11* | *9.94* | *4.83* | *13.80* |
| *2.* | *Medium Farmers ($T_2$)* | *4.71* | *10.23* | *5.52* | *15.77* |
| *3.* | *Large Farmers ($T_3$)* | *4.97* | *10.28* | *5.31* | *15.17* |
| | *Total* | *14.79* | *30.45* | *15.66* | *44.74* |

It is evident from the above Table 1 that the mean knowledge gain was maximum with a score of 5.52 in medium farmers (T2) which is indicated 15.77 per cent of knowledge gain. This was followed by large farmers (T3) with the score of 5.31, and marginal & small farmers (T1) 4.83 which result in 15.17 per cent and 13.80 per cent of knowledge gain respectively.

The above results clearly indicate that all the three selected treatments were effective in imparting knowledge on paddy cultivation technologies with considerable variation in their effectiveness due to exposure to Paddy Expert System. The result also concluded that the three treatments were also not equal in imparting knowledge. This might be due to that, the medium farmers were highly knowledgeable about new methods and technologies of paddy cultivation. The medium farmers were mostly primary and middle level of education and had high farming experience on paddy cultivation. The farmers had monthly one time contact with extension personnel and regularly meet with relatives, friends and trained farmers to sharing their knowledge. Hence the medium farmers gained significant knowledge after exposure to Paddy Expert System.

Table - 2
Effectiveness of treatment towards knowledge related to skill acquisition due to exposure to Paddy Expert System

(n=105)

| *Sl. No* | *Treatments* | *Mean Skill acquisition* | | *Mean Skill acquisition* | *Percentage (%)* |
|---|---|---|---|---|---|
| | | *Before exposure* | *Immediately after exposure* | | |
| *1.* | *Marginal & Small Farmers ($T_1$)* | *3.40* | *10.17* | *6.77* | *19.34* |
| *2.* | *Medium Farmers ($T_2$)* | *3.28* | *9.80* | *6.52* | *18.63* |
| *3.* | *Large Farmers ($T_3$)* | *3.86* | *9.46* | *5.60* | *16.00* |
| | *Total* | *10.54* | *29.43* | *18.89* | *53.97* |

It could be inferred from the Table 2 that the mean knowledge related to skill acquisition was maximum with a score of 6.77 in marginal & small farmers (T1) which has indicated 19.34 per cent of knowledge related to skill acquisition. This was followed by medium farmers (T2) with the score of 6.52 and large farmers (T3) 5.60 which result in 18.63 per cent and 16.00 per cent of knowledge related to skill acquisition respectively. The above results clearly indicate that all the three selected treatments were effective in imparting knowledge related to skill acquisition on paddy cultivation technologies with considerable variation in their effectiveness due to exposure to Paddy Expert System. The marginal & small farmers acquired more skill through the computer based education from the exposure of paddy expert system.

This may be due to that the marginal & small farmers possessed more farming experience and acquired more skills about paddy cultivation technologies. The marginal & small farmers also had very good experience with the methods and techniques of planting, maintaining and management on the paddy crop cultivation related to skill aspects compared to other farmers. The study revealed that the majority of the medium category farmers had good information seeking behaviour, source exposure and extension agency contact, hence they had frequent contact with the neighbourhoods, fellow farmers, trained farmers, dealers and agricultural officers. This was the reason for high level of knowledge gain of medium farmers whereas the marginal and small category farmers were mainly engaged with the field work which gives good practical experience and which in turn helped them to acquire more skills. This was the reason for the high level skill acquisition of marginal and small farmers.

Table - 3
Effectiveness of the treatment Paddy Expert System in terms of symbolic adoption behaviour

| *Sl. No* | *Treatments* | *No. of Respondents* | *Percentage (%)* |
|---|---|---|---|
| *Marginal & Small Farmers* | | | |
| | *Low* | *4* | *11.43* |
| | *Medium* | *23* | *65.71* |
| | *High* | *8* | *22.86* |
| | *Total* | *35* | *100.00* |
| *Medium Farmers* | | | |
| | *Low* | *4* | *11.43* |
| | *Medium* | *29* | *82.86* |
| | *High* | *2* | *5.71* |
| | *Total* | *35* | *100.00* |
| *Large Farmers* | | | |
| | *Low* | *5* | *14.28* |
| | *Medium* | *19* | *54.28* |
| | *High* | *11* | *31.44* |
| | *Total* | *35* | *100.00* |

It could be observed from the Table 3 that more than half (65.71%) of the marginal & small farmers had medium level of symbolic adoption behaviour, followed by high and low level which accounted for 22.86 and 2.86 per cent of symbolic adoption behaviour respectively. Majority (82.86%) of the medium farmers had medium level of symbolic adoption behaviour, followed by 11.43 per cent low, and 5.71 per cent of the farmers had high level of symbolic adoption behaviour. More than half (54.28%) of the large farmers had medium level of symbolic adoption behaviour followed by 31.44 per cent high, and 14.28 per cent of the farmers had low level of symbolic adoption behaviour. In overall, it was found that majority of the respondents had medium level of symbolic adoption behaviour which means symbolically accepted to adopt and follow the new innovations and technologies on paddy cultivation practices and allied aspects due to exposure to expert system. Hence, expert system will get positive mindset among paddy farmers for future adoption of scientific farming community.

## IV. SUMMARY AND CONCLUSION

The analysis of the three treatments, revealed that mean knowledge gain was maximum with a score of 5.52 among medium farmers (T2), marginal & small farmers (T1) obtained highest mean knowledge related to skill acquisition with the score of 6.77 and it was superior compared to other treatments and majority of the respondents had medium level of symbolic adoption behaviour which means symbolically accepted to adopt and follow the new innovations and technologies on paddy cultivation practices and allied aspects due to exposure the paddy expert system.

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