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# Enhancing the adoption of farm technology – A conceptual model

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**ABSTRACT**

Adoption of a new farm technology is not instant act but a mental process through an individual passes from hearing about it to its ultimate adoption. Rogers (1983) termed it as 'Innovation Decision Process' consisting of five stages viz knowledge, persuasion, decision, implementation and confirmation. Before a new farm technology is recommended for adoption, it should be evaluated on the basis of relative advantage, compatibility, simplicity, trialability, observability, communicability and predictability. In order to promote the adoption of a farm technology, a conceptual model has been developed which comprises of three components namely, input, process and output. Any new technology generated through research acts as 'Input' to activate the 'Process' consisting of policy options, organizational characteristics and extension education efforts to produce the desired 'Output', that is, the feeling of satisfaction among the farmers.

**Key Words:** Adoption, innovation, decision process, relative advantage, compatibility, predictability, conceptual adoption model.

Adoption of an innovation is not an instant act. It involves thought, decisions and action. The diffusion researchers have agreed that in the process of adoption of an innovation an individual passes mainly through five stages, viz awareness, interest, evaluation, trial and adoption. There may be variations as some individuals may skip some stages. Rogers and Shoemaker (1971) termed adoption process as 'Innovation Decision Process' consisting of four stages viz knowledge, persuasion, decision and confirmation. Rogers (1983) further added a stage of implementation in between 'decision' and 'confirmation'. He defined it as a process through which an individual passes from first knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new technology or idea, and to confirmation of this decision. So, the five stages are knowledge, persuasion, decision, implementation and confirmation. Upto the 'decision stage', the process is strictly mental but the 'implementation stage' involves overt behaviour. The individual innovation decision process is influenced by

the existing prior conditions, the characteristics of the individual, the communication channels, the perceived characteristics of the innovation and the experience with the innovation. Therefore, before a farmer adopts any new farm technology or innovation he should consider the following attributes:

**Attributes of a farm technology**

The attributes/characteristics of a farm technology have a significant role to play in its adoption. Some of the most important characteristics are discussed below:

***Profitability***

It refers to the relative advantage of adopting a specific farm technology over the one which is presently being used. Profitability is assessed in terms of increased certainty of output, long term and short term returns to investment, saving of time, labour and cost etc depending upon the perceived priority of the farmer concerned.

***Divisibility***

It refers to the ability to divide the technology into smaller units so that its adoption could be implemented in an incremental manner thus adopted more quickly than that which does not lend itself to division.

***Compatibility***

It refers to the degree of harmony between the existing farming system and the new farm technology. It also refers to the congruity between culture that governs the behaviour of farmers and the farm innovations. Any farm technology which is compatible with the existing farming system can be adopted quickly compared to that which is incompatible with the existing agro-climatic and socio-economic conditions.

***Trialability***

It refers to the ability to experiment with a new farm technology on a small scale area to ascertain its utility relative to the total farm enterprise. Many farmers do not want to make wholesome shift in terms of existing farming practices without ascertaining its compatibility with the existing one and hesitate to take risk. Therefore, the new farm technology should be evaluated on a trial basis without threatening the viability of the farm enterprise so that the farmers may have a higher probability of adopting that technology on an experimental basis.

***Observability***

It refers to the ability of an individual to observe the results of any new farm technology in operation. The farmers are more likely to adopt innovations (at least on trial basis) if they could see the results of

the technology being used. Method demonstration and result demonstration on the new technology may certainly provide assurance to the farmers which can encourage them to adopt it as per their existing farming system at the farm level.

***Predictability***

It refers to the degree of certainty for receiving expected benefits from integrating a new farm technology into the existing farming system. Small and marginal farmers are very cautious in taking adoption decision because crop failure or substantial reduction in the output (in case the new farm technology fails) can cause a greater loss resulting in starvation of the whole family. Hence, before introducing any farm technology at the farmers' fields, it must be evaluated by the farming community on the basis of above criteria.

**Techniques for motivating/influencing farmer's behaviour**

Motivation is the process of initiating a conscious and purposeful action. It is goal oriented and need satisfying behaviour which influences a person to do things in desired way. Van den Ban and Hawkins (1988) suggested the following techniques for influencing human behaviour in a social system.

***Compulsion***

In this case, power is exerted by an authority, forcing the farmers or people to do something. Certain laws and legal provisions come in this category. For example, our government can give appropriate directions that the farmers must grow eco-friendly tree species for the protection of environment and soil erosion. This method can also be used in preventing the farmers from taking rotation like wheat-rice rotation in Punjab, Haryana etc. But this method is not suitable for changing the behaviour which requires initiation on the part of the people.

***Exchange***

In this method, goods or services are exchanged between the two individuals / parties or organizations. For instance, state government can motivate the farmers to grow multi-purpose tree species by providing marginal land free of cost or at minimal charges through a mechanism of mutual benefit sharing.

***Advice***

In this method of influencing the behaviour, advice is given for choosing solution to a problem. But the extension worker must have adequate information about the farmers' problems and their solutions. The farmers should also have confidence in the competency of the

extension worker besides sufficient means at their disposal to follow the advice.

### *Openly influencing a farmer's knowledge and attitude*

This method may be used when we believe that the farmers can not solve their own problems due to insufficient or incorrect knowledge or unmatched attitude with their goals. Farmers should trust our expertise and motives and must be prepared to cooperate with us in our task of changing their knowledge or attitudes. Long term behavioural changes are possible by using this method. Moreover, farmers' self confidence and capacity to solve other similar problems by themselves in future are increased.

### *Manipulation*

In this case, the farmers' knowledge level and attitude are influenced without their being aware of it. This method is used when we believe that it is necessary and desirable for the farmers to change their behaviour in a certain direction. The farmers should not actively object to being influenced in this way and we think that it is unnecessary or undesirable for the farmers to make independent decisions. For example, by showing the documentary on 'Deforestation and environmental degradation', we may motivate the farmers indirectly for afforestation, ie manipulating them to grow more trees. This method can also be used for promoting the adoption of various technologies related to health and safety measures in the country.

## Conceptual model for enhancing/ promoting the adoption of farm technology among the farmers

In order to motivate the farmers to adopt any farm technology, the extension functionaries should make sincere and concerted efforts for the transfer of technology to the farmers' fields. For popularizing and enhancing the rate of adoption of the new technology among the farmers, a conceptual model of extension system has been developed on the basis of field experience and empirical research. The model comprises of three main components viz 'input', 'process' and 'output'. The technology generated through research (based on the considerations of national, community, individual priorities and feedback from the farmers) acts as 'Input' to activate the 'Process' consisting of policy options, organizational characteristics and extension education efforts so as to produce the desired 'Output', ie the satisfaction among the farmers.

The above three components of the model are discussed as under:

### i) Input related aspects

### *Technological Package / Know-how*

In order to make farm technology acceptable to all categories of the farmers

it should be projected as a productive innovation in terms of relative advantage not in isolation of other crops or forms of land use, but in integration with them. This requires that our technological package should be such as to suit a wide diversity of agro-ecological and socio-economic conditions of the farmers means the development of need based and location specific farm technology. While recommending any new technology the care should be taken that it should be income generating and remunerative because it has been observed that besides meeting subsistence requirements of food, fuel wood, timber, fodder, better economic use of fallow land etc; economic incentive has been one of the strong motivating factors for the farmers (Sen 1995). Relative weightage should also be given on environmental objectives.

**ii) Process related aspects**

***Policy***

There is a need to adopt integrated land use policy at the micro-level by conducting land capability surveys at the individual farm level. At the same time, our policies should be such which favour integrated land use. The farmers need to be motivated for integrated land use keeping in view the national, community and individual priorities. The farmers should be persuaded to adopt the technology that achieves both the environmental and economic objectives. For example, supporting and well defined price policy of forest produce along with favourable norms for leasing out the land on 'Patta' may be certainly helpful in improving the adoption of forestry technology among the farmers.

***Organizational structure***

In order to reach the target group or clientele with the message of new farm technology there must be a distinct organizational structure upto the village level. It may be an independent wing or department like State Department of Forest or Horticulture having coordination with other line departments. It should have functional linkage with Non-Government Organizations (NGOs), village institutions (like Panchayats, Mahila Mandals, youth clubs, village cooperative societies, schools, Self-Help Groups, etc). The organization should have the requisite infrastructure facilities for providing training and information to the farmers and extension workers. Mobility and transportation facilities should be provided to the scientists and extension staff to facilitate timely advice and on the spot guidance to the farmers. It should also have a publicity wing to make available pertinent literature and for publishing success stories etc of successful adopters so as to motivate the other farmers as well. Besides adequate competent manpower, there must be favourable norms and regulations so that the extension personnel may enjoy independent work culture. For instance, transit rules for forest

**Conceptual model of extension system for promoting adoption of farm technology**

| Input | | Process | | Output |
|---|---|---|---|---|
| Farm Technology | Policies | Organization | Extension Education Support | Farmer's Satisfaction |
| Based on<br><br>* National Priorities Community Priorities<br>* Individual Priorities<br>* Farmers' Feed back (through participatory techniques) | Integrated Land Use at Micro Level<br>* Environmental & Economical objectives<br>* Cost-Benefit Sharing<br>* Land Tenure System<br>- Leased period<br>- Plantation<br>- Caring<br>- Compensation<br>* Institutional credit<br>* Supportive & well defined policy for farm produce | * Structure<br>- Independent wing/Department/ Directorate<br>- Integration with line departments<br>- Functional linkage with NGOs, Village Institutions, Self Help Groups, etc·<br>* Infrastructure Facilities<br>- Training, Information unit, Publicity, Mobility, etc·<br>* Man Power(Scientific and Field Extension)<br>- Existing Strength<br>- Requirement, Identificationand Selection<br>* Favourable Norms and Regulations | * Based on Innovation Decision Processed<br>- Use of Localite and Impersonal Information sources<br>- AV aids<br>* Motivating Extension Functionaries<br>- Training & Demonstrations<br>- Incentives<br>- Free, friendly and cooperative working environment<br>* Computer based Information Technology<br>* Proper Media Mix | * Increased<br>- Returns<br>- Production<br>- Socio-economic status<br>* Risk minimization etc. |

produce should also be made flexible under the emerging trends of diversification of agriculture.

After ensuring need-based, location specific technology, organizational infrastructure, favourable norms and regulations, the next step is to provide 'extension education support'.

***Extension education support***

Considerable efforts are required for providing extension support to convince the farmers to adopt farm technology. For this purpose, we will have to use various extension and communication methods. The choice of extension methods will be decided by determining at which stage of innovation decision process the farmers are there. Extension workers working at the grassroot level are required to be motivated through training, orientation and refresher courses, and by providing incentives like awards, appreciation letters, additional increments for their best performance, etc. A proper media-mix along with a sound information system like internet, fax, e-mail, computerized crop doctor expert system, audio and video conferencing etc (wherever possible) at the grassroot level should also be provisioned.

**iii) Outcome**

Farmers' satisfaction is the best indicator for the successful adoption of any technology or programme. This can be measured in terms of increased returns, additional income/profit, enhanced production, improvement in soil fertility, socio-economic status etc. Farming problems / constraints (if any) faced by the farmers should be brought to the attention of the concerned scientist / authority for their solution. A proper feedback from the farmers will certainly provide an insight to the scientists for further research or modification of the new farm technology.

## REFERENCES

Rogers EM 1983. Diffusion of Innovations. New York : Free Press.

Rogers EM and Shoemaker FF 1971. Communication of Innovations : A cross-cultural approach. New York, The Free Press, pp 167-169.

Sen D 1995. The management of transfer of farm forestry technologies - emerging trends. In : Farm Forestry in South Asia (Saxena & Ballabh, editors, pp197-218.

Van den Ban, AW and Hawkins HS 1988. Agricultural Extension. Essex, England. Longman Scientific and Technical, pp 42-45.

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