

Characteristics of technology, transfer of technology process; important TOT programs in fisheries

What is Technology?

Technology refers to ways of making or doing things. The term technology derived from the Greek word “tekhne” meaning 'art' or 'craft' and “logia” meaning “an area of study”.

It is the application of science and technical advance to the production of materials to serve human needs. The technology is a replacer of human energy by mechanical energy, using natural sources of energy.

The concept of technology can be defined simply to mean the application of science in the development, production, utilization or application of materials or things or methods of undertaking a certain activity or work (**Hashim, 1978**). According to **Yotopoulos and Nugent (1976)** technology is a body of knowledge that can be applied in a productive process. According to **Rogers (1962)** a technology usually has two components: (i) a hardware aspect consisting of the total tool that embodies the technology as material or physical objects and (ii) a software aspect, consisting of the information base for the tool.

Agricultural Technology

Samanta (1985) defined agricultural technology as a body of systematically organized knowledge and materials applicable to local production problems to help to boost the present level of productivity and or extend the existing range of production.

Types of Agricultural Technology

Grabowski, Sivan and Tracy (1986) pointed out two types of agricultural technology: (i) mechanical, (ii) bio-chemical.

- **Mechanical Technology** involves the application of machinery to the production process i.e. boats, nets, aerator, fish fed manufacturing machine etc.
- **Bio-chemical Technology** is generally yield increasing and is really package of inputs: Fertilizers and insecticides (Mahua oil cake, rice bran, cow dung, pig dung).
- **Scale Neutral Technology:** Grabowski (1967) stated that technology is scale neutral if it can be effectively and efficiently used on small as well as large farm; otherwise, there exists scale-bias.

Characteristics of technology

The degree of acceptance of a technology depends on five criteria: (i) relative advantage (ii) compatibility; (iii) complexity; (iv) trialability; and (v) observability.

1. **Relative Advantage:** the degree to which an innovation is perceived as better than the idea it supersedes. The relative advantage may have a number of dimensions. For example, if a new technology or practice gives more yield or income: or saves time, labour and cost or has less risk than the existing one; it has more relative advantage. Multiple use of an innovation may be a form of relative advantage. For example, an equipment or material which may be used for a number of activities has more advantage than an equipment or material which can be used for a single purpose.
2. **Compatibility:** the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of the potential adopters. Compatibility has at least two dimensions- situational compatibility and cultural compatibility. When a new fish variety suits the climatic condition of the farmer, it indicates situational compatibility. When a breed of livestock advocates to the farmers is in agreement with their beliefs and values, it is cultural compatibility.
3. **Complexity:** the degree to which an innovation is perceived as difficult to understand and use. An innovation should, as far as possible be less complex for the farmers to understand and use. However, complexity of an innovation may not deter its adoption, provided it has more relative advantage. For example, Biofloc system is profitable to fish farmers as it gives high production in small area but due to its complex procedure it is adopted by less fish farmers.
4. **Trialability:** the degree to which an innovation may be experimented on a limited basis. Adoption of new seeds and fertilizers are more, compared to new farm machinery, simply because seeds and fertilizers may be purchased in small units and tried, whereas, purchase of a farm machinery, requires large investment and cannot be tried in parts. The minikit demonstrations have helped in spreading the cultivation of high yielding variety crops as this method involves small scale trial by the farmers. Early adopters appear to be more concerned about the trialability of an innovation than later adopters.

5. **Observability:** the degree to which the results of an innovation are visible. The visible impact of an innovation facilitates its diffusion in the social system. For example, recommendations for high production in agriculture are easy to accept as the rapid growth of crops are visible to everyone on daily basis but the recommendations of fish culture are not accepted by fish farmers as the fishes live under water and their growth is not visible all time.

Predictability refers to the degree of certainty of receiving expected benefits from the adoption of an innovation. It may be generalized that the attributes relative advantage compatibility trialability, observability and predictability of an innovation, as perceived by the members of a social system are positively related to its rate of adoption. The complexity of an innovation, as perceived by the members of a social system is negatively related to its rate of adoption.

Process of Transfer of Technology (Tot)

TOT can be defined as "the spread overtime of a new idea or technology through a social system via communication channels". The crucial elements, in the diffusion of innovations or TOT are: (i) **the new idea or technology**, (ii) **which communicated via certain channels**, (iii) **among the members of a social system**, (iv) **overtime**.

Here the question of transfer of technology (TOT) comes - how the innovation, the new technology is evolved by the scientists (research system): how it is transmitted (extension system): how the farmers receive and adopt it (client system) and how the situations help the farmers to adopt it (support system).

So, the most effective system for diffusion and adoption of agricultural technology depends upon efficient functioning of **four systems of transfer of technology**.

Important TOT programs in fisheries

There were four main transfer of Technology projects of ICAR namely the All India Coordinated Project on National Demonstration (AICPND), Operational Research Project (ORP), Krishi Vigyan Kendra (KVK) and Lab to Land Project (LLP). All the projects were of mobile type except KVK which are vocational training institutions the projects were shifted every 5 to 6 years from one location to another in the large interest of the farming community and the extension personal of the area.

The first line transfer of Technology projects was implemented through ICAR institution, agricultural universities, some state Department of Agriculture and some selected voluntary organisations.

All India Coordinated Project on National Demonstration (AICPND)

The national demonstration intended to show the genetic production potentiality of new technologies and to influence both the farmers and extension agencies.

A nationwide program of demonstration, known as National Demonstration (ND) on major food crops was launched in 1964. The rationale behind the scheme was that until the scientist could demonstrate what they advocated; their advice might not be heeded by the farmers.

To achieve the best results, the most enthusiastic and cooperative farmers was selected. The best technologies and techniques used, and a team approach followed involving scientist from relevant disciplines, including local extension agents. The organisation of field days, field visit and training for the farmers and field extension workers were considered important for rapid spread of technologies.

Operational research project (1974-75)

The operational research project aimed at disseminating the proven technology in a discipline or area among farmers on a watershed basis covering the whole village or a cluster of villages. The ORPs considered **two kinds of problems i)** the common agricultural problems affecting the farming community requiring group or community action that is plant protection and rodent control and **ii)** total resources development.

Krishi Vigyan Kendra (KVK)/ Agricultural Science Centre

The Krishi Vigyan Kendra designated to impart need based and skill oriented vocational training to the practicing farmers, in service field level extension agents and to those who wish to go for self-employment. The three fundamental principles of KVK are i. agricultural production as the primary goal ii. work experience as the main method of imparting training and iii. priority to weaker section of the society. The first KVK was established in 1974 at Pondicherry under Tamil Nadu Agriculture University. The objective is to gradually cover the entire country with one KVK in each district priority being given to the backward areas. Each KVK has to have a **mandate i.e. a specific set of responsibilities to perform.**

Mandates and activities of KVK

The mandate of KVK is technology assessment and demonstration for its application and capacity development. To implement the mandated effectively, the following activities are envisaged for each KVK

1. **On-farm testing** to access the location specific of agricultural technology under various farming systems.
2. **Frontline demonstration** to establish production potential of technologies on the farmers field.
3. **Capacity development** of farmers and extension personal to upgrade their knowledge and skills on modern agricultural technologies.
4. To work as **Knowledge and Resource Centre** of agricultural techniques for supporting initiatives of public, private and voluntary sector in improving the agricultural economy of the district.
5. **Provide farm advisories** using ICT and other media means on various subjects of interest to farmers.

Lab to Land Programme

The lab to land programme was launched by the ICAR in 1979 as a part of its golden jubilee celebration. The overall objective of the program was to improve the economic condition of the small and marginal farmers and landless agricultural labourers particularly scheduled castes and Scheduled Tribes by transfer of improved technology developed by the agricultural universities research institutes etc. The programme was initiated with 75000 for families over the whole country. The program had been in operation in a number of phases normally a phase ran for a period of 2 years with a particular set of farmers.

With effect from 1st April 1992 all first-line Transfer of Technology projects of the ICAR viz. ND, ORP and LLP have been integrated into KVK.