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# ICT ADOPTION IN AGRICULTURE: DIFFUSION THEORY OF INNOVATION BY E.M ROGERS (1962)

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**Abstract:**Today, Agriculture sector is confronting new challenges from time to time. ICT (Information Communication & Technology) helps in subduing these challenges. The green revolution increased agricultural outcome, But at the cost of farmers being exposed to vulnerable market, which was not known to farmers earlier . However, there is a growing need for adoption of new technologies to increase farmer's income and to decrease cultivation cost. Diffusion theory of Innovation(E.M Rogers ,1962) explains how an idea or product gets momentum and spreads into society. At the end this theory explains how the new idea or product change the thoughts and behaviour of people in the society. This theory is apt how farmers when countered with ICTs, develops new behaviour, new thoughts. According to E.M Rogers there are 5 types of people in social system same as in farming community, farmers can be categorised into *Innovators;* Risk takers, First to develop new Ideas. *Early Adopters* :No need to convince them , Readily adopts new ideas. *Early Majority* :Impressed by success stories ,Evidence based belief system for adoption of new idea. *Late Majority*; sceptical, people, Adopts new idea when others adopted successfully. *Laggards* :sceptical, Conservative people and bound to adopt due to pressure from others.

**Keywords**: ICTs, E.M Rogers, Diffusion theory, Adopters, Agriculture, Farmer, labour cost.

## 1.INTRODUCTION:

Since 1960s ,due to green revolution there is a rise in agriculture productivity. This rise in productivity was at the cost of adverse impact on environment. Later Liberalisation, Privatisation, Globalisation (LPG) reforms linked Indian economy to world economy, which brings in world of competition to Indian market .Indian farmer is vulnerable due to fragmentation of land, monsoon dependent, climate change, market volatility etc. Technology use in agriculture can mitigate above problems.

**2.E.M ROGER'S DIFFUSION THEORY OF INNOVATION(1963):** Diffusion theory of Innovation is designed by E.M Rogers in the year 1962.It theoretically explains an innovation spreads into society, Which results in adoption of it by the population. The adoption rate is directly proportional to his/her perceiving nature. The main pillar of adoption of new idea is based on one's perception. According to Diffusion theory whole population of the society is divided into five adopted categories .

**i.** Innovators – Those adopters who try new ideas and think of possibilities . They are first to try by taking any risk .Innovators population is small .They often encourage other categories to make use of new inventions and discoveries

**ii**. Early Adopters – Those population who has leadership qualities and suggest population to adopt new life changing ideas. Early adopters accept new ideas without hesitation. as an opportunity to change .They persuade other sections of society in various ways by chalking out new plans for their inclusion.

**iii.** Early Majority – This group of population adopts new ideas based on evidence of working and its effectiveness .Surely this group inculcates new ideas much before average group of people. This group believes in demonstration and success stories of others before they adopt new products or new ideas.

**iv.** Late Majority – This group of people resist change, and try to adopt new products only after major chunk of population used it. Many stories of successful adoption used to convince this group ,Which usually takes long time

**v.** Laggards – This section of population are orthodox and doubting personalities. Penetration of new ideas into this group is very hard .This group adopts new ideas only after mass persuasions from other sections of the society. Persuasions include strong awareness counselling driving out fear, creating pressure to adopt etc.

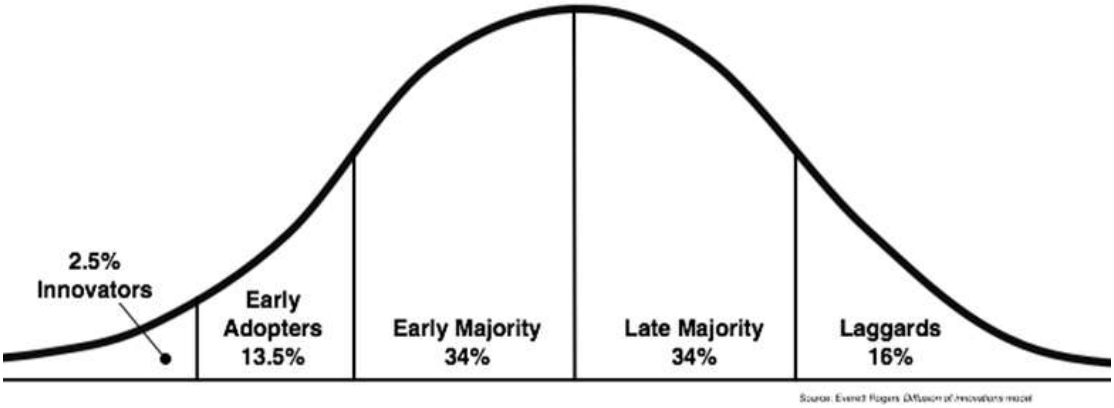


**Fig 1:Diffusion of Innovation Theory.**

**Table 1:List of Technology adoption models.**

| Theory | Year | Developed by | Constructs |
|---|---|---|---|
| Diffusion of InnovationTheory | 1962 | Rogers | Innovation, communication channels,time and social system. |
| Theory of Reasonedaction (TRA) | 1975 | Ajzen and Fishbein | Behavioral intention, Attitude andsubjective Norm |
| Theory of Planned Behaviour(TBP) | 1985 | Ajzen | Behavioral intention, Attitude, Subjective Norm and PerceivedBehavioral Control |
| Social Cognitive Theory | 1986 | Bandura | Affect, anxiety |
| Technology acceptance | 1989 | Fred D Davis | Perceived usefulness and perceivedease of use |
| PC Utilization | 1991 | Thompson et al. | Job-fit, Complexity, Long-term consequences, Utilization AffectTowards Use, Social Factors, Facilitating Conditions. |
| Motivation Model | 1992 | Davis et al. | Perceived usefulness, perceived easeof use, subjective norm , perceptionsof pleasure and satisfaction |
| Extended TAM Model | 2000 | Venkatesh and Davis | Subjective norm, voluntariness, image, job relevance, output quality, result demonstrability and perceived ease of use |
| Unified Theory of acceptance and use of Technology (UTAUT) | 2003 | Venkatesh et al. | Performance expectancy, effort expectancy, social influence andfacilitating conditions |
| Model of Acceptancewith Peer support (MAPS) | 2009 | Sykes et al. | Behavioral intention, System use, Facilitating conditions, Network density,Network centrality, Valued network centrality and Valued network density. |

## 3.POPULAR ICT TYPES IN INDIA USED FOR AGRICULTURE INFORMATION:

**Mobile:** SMS (Short Message Send) is common feature available on Featured phone and Smartphone. Possessing Smartphone has many advantages such as effective use of Social media, Internet ,browsing and sharing e-content etc. Content related to authentic seeds, Usage and dosage of pesticides, Agriculture marketing, Farm Machinery, Animal Husbandry, Sericulture ,Horticulture, Organic Agriculture, Government Schemes, Crop Insurance ,Media clippings, Water-release from dams for Irrigation etc are mostly shared through social media conveniently. It is portable device. Real-time customized solutions are obtained. Most millennials and middle aged farmers prefer using Smartphones.

**Social media:** It is most powerful tool in 21 st century. Popular social media applications among farming community are Whats App, Facebook. Agriculture content is frequently shared through social media. Social media is easily operated by even meagre educated farmers. Best practices, tools and techniques are shared via social media. YouTube videos on Agriculture and its allied activities are widely shared. Internet cost in India is one of the Worlds cheapest. Many farmers stressed that social media has created awareness like never before. Many farmers groups using social as platform for their closed group conversation.

**Agriculture Applications(Apps):**There are plenty of apps. Private players have developed many apps,where as few apps are by governments(Union & State) in India. Many apps are available in multiple languages.**Kisan Suvidha App**:This app is developed

by National Information Centre (NIC).It includes information about Weather, Dealers, Market Price, Plant Protection ,Agro-Advisory, Call to KCC(Kisan Call Centre),Plant Protection, Agro Advisory, Soil Health Card, Cold storage & godowns, Animal Husbandry ,Crop Insurance, Agri-Infra fund, Farmers corner .

**Plantix App:** This app provides disease details and pesticides to be used for the same disease after submitting a picture of damaged plant part .Also displays temperature of your locality .

**Television:** Agriculture Programmes are broadcasted according to fixed schedules. Most of the programmes are one-way communication. Programmes are generalised lacking specificity. Most of the TV sets are fixed at one place, not a portable device. Audio & video are synchronised in Television. Kisan channel is 24/7 exclusive agriculture channel. Programmes like Annadhatha(Telugu),Jai Kisan(Telugu) are popular agriculture programmes.

**Radio:** According to Agriculture Extension, Radio is old ICT. It supports only audio ,not video unlike Television. The radio listeners number is dwindling day-by-day due to availability of other sophisticated gadgets.Though radio is portable device ,but lost its charisma among farmers .

**Newspaper:** Since ages newspapers and magazines are lifelines of communication before advent of Mobile,TV, Radio.Young farmers are losing patience in reading due to advent of other sophisticated information means like Internet videos, animations etc. Newspapers are also catching the trend by becoming digitally available. Digital form can be accessed from anywhere anytime. Magazines like Agriculture Today ,Annadhatha(Telugu) print exclusive agriculture Information.

## 4.TYPE OF AGRICULTURE INFORMATION DISSEMINATED THROUGH ICTS:

Once Robert Thomas Malthus in his book "An essay on the Principle of Population"(1798) said Population increases in a geometrical ratio, while food grains in an arithmetical ratio. It is true in most third world countries and other developing nations. Rapid rise in agricultural output is need of the hour to feed rising population. Technology can provide a better solution to many agriculture challenges. Many developing African nations and India are sailing in the same boat in terms of ICTs usage. In India era of ICTs began in 1990's.Majorly used ICTs in India are Radio, Television, Later computer with Internet, now Smartphones and other gadgets ,Applications. Most of the old ICTs support one-way communication and generalised content, where as new ICTs provide 2-way communication in a personalised manner.

**Table 2:List of basic ICTs.**

| New ICTs | Old ICTs |
|---|---|
| Mobile | Radio |
| Television | Newspapers |
| Gadgets, Applications, Tabs, Internet | Magazines |

Union government launched first Krishi Vigyan Kendra (KVK) in the year 1974 at Pondicherry, Kisan Call Centre in 2004.Adoptions of ICTs makes agriculture easier in the following ways.

**Agriculture:** It is complex but sacred profession. Agriculture require capital in the form of seeds ,pesticides, likewise Information is also comes under capital Investment. Today ,Agriculture demands use of technology. Technology enabled awareness which helps farmers in identifying fake and authentic seeds, Seed availability with dealers or any other entities in the vicinity. Information Communication Technology (ICT) enables to know best farming practices about Horticulture ,Organic farming etc. e-Content can bring awareness about farm Machine tools their availability and use .

**Weather report:** Indian agriculture is vulnerable because it is monsoon dependent. A weather report is required by farmer throughout calendar on various occasions such as before and after sowing seeds, before and after harvesting crop. Timely weather report saves crop, because Indian farmer is vulnerable to natural calamities. Weather information can be disseminated through ICTs (Mobile, TV, Radio etc) which are commonly available pan India. Mobile applications such as AccuWeather, Real time weather India apps are widely used.

**Soil Health:** Soil sample record is digitally available .Soil health management aims for optimal utilisation of natural resources like water, soil. It also aims at micro and macro nutritional management and judicious use of fertilisers.

**Pesticides Usage and Dosage:** Rampant use of fertilisers increase soil salinity and causes eutrophication of water bodies. Scientific use of fertilisers and pesticides can save farmers money and our ecosystem. Broadcasting programmes related to usage and dosage during cropping seasons can create awareness about right use. Mobile apps such as Plantix, Pesticide Calculator etc used for this purpose.

Seeds:

**Mandi Prices & Logistics:** Agriculture commodities prices are dynamic. Knowing commodity prices timely will benefit farmer in bargaining at right price with traders. Market information used for trend analysis of prices. High prices fetch good profits for farmers. Price rise tempts farmers to sell their produce at positive note. Logistics information required to transport agriculture commodities from farm to market(point of sale). Agmarknet ,TNAU are few examples of Agriculture Information portals. Besides mandi prices ,these portals provide MSP(Minimum Support Prices ) of declared agriculture commodities . There are number of mobile

applications such as Mandi Bhav, Mandi central etc. A Most of market yards are increasingly becoming digitised due to e-NAM(Electronic National Agriculture Market).e-NAM integrated APMCs(Agriculture produce market committee) of 18 states and 3 Union territories.

**Cold storages & Godowns:** Farmers has right to sell their produce at right time to earn good profits. Godowns helps in Preservation of harvested agriculture produce before being sold at high prices . Timely information about cold storages in his/her vicinity can help farmer. Cold storages help farmers to store their perishable produce with minimal damage, till the same produce gets good price. ICTs can disseminate information through various modes for effective reach.

**Direct Beneficiary Transfer(DBT):**Rythu Bandhu, a farmer input investment scheme of Telangana State is source of information to PM-Kisan(All India), KALIA Scheme(Odissa),YSR Rythu Bharosa (Andhra Pradesh).All agricultural land holders are eligible for Rythu Bandhu scheme. Rythu Bandhu mobile app once installed by individual farmer ,gets access to all his DBT transactions. Financial schemes are effectively penetrated into masses with minimal advertisements because money is money. Today most of financial schemes has mobile applications ,which holds individual data for convenience .

**5.Summary:** This paper defines types of ICTs commonly used in India. Primary ICTs used in India are Mobile, Television, Radio and Newspaper. Types of Information browsed and shared by the farmers through various means is discussed here .Ancient agricultural practices are synchronized with modern technology for better yields. Various agricultural portals ,apps acts as repositories of knowledge readily available in sophisticated gadgets. There is huge demand for customized e-content in local languages. Social media is critical to agriculture. Information is emerging as new capital investment required in agriculture. ICTs helps making farmers aware of existing technology. Awareness is key to success.

**6.REFERENCES:**


**[1]** **https://kvk.icar.gov.in/**

**[2]** **https://www.manage.gov.in/kcc/infra.asp**

**[3]** **https://www.agriculturetoday.in/**

**[4]** **https://agmarknet.gov.in/**

**[5]** **https://agritech.tnau.ac.in/**

**[6]** **https://kisansuvidha.gov.in/**

**[7]** **https://plantix.net/en/**

**[8]** **https://www.soilhealth.dac.gov.in/**

**[9]** **http://rythubandhu.telangana.gov.in/**

**[10]** **https://kalia.odisha.gov.in/index.html**

**[11]** **https://ysrrythubharosa.ap.gov.in/RBApp/index.html**

**[12]** **https://pmkisan.gov.in/**

**[13]** **https://shodhganga.inflibnet.ac.in/bitstream/10603/234627/10/11.%20chapter%204.pdf**

**[14]** **Source: http://blog.leanmonitor.com/early-adopters-allies-launching-product/**