



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

# IJDR

International Journal of Development Research

Vol. 16 Issue, 04, pp. 70342-70346, April, 2026

<https://doi.org/10.37118/ijdr.30790.04.2026>



RESEARCH ARTICLE

OPEN ACCESS

## DIFFUSION OF AGRICULTURAL INNOVATIONS: A CASE STUDY OF GOVERNMENT EXTENSION AND UNIVERSITY OUTREACH SYSTEM IN DRAUGHT PRONE REGION OF MAHARASHTRA

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### ARTICLE INFO

#### Article History:

Received 29<sup>th</sup> January, 2026  
Received in revised form  
16<sup>th</sup> February, 2026  
Accepted 11<sup>th</sup> March, 2026  
Published online 30<sup>th</sup> April, 2026

#### Key Words:

Diffusion of Innovations, Development Communication, Agriculture, SDG.

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### ABSTRACT

**Introduction:** Diffusion of innovation is an approach with influence from technology companies, government policy, global agenda and Mass media. However, this institution led outreach is also getting reshaped by the peer learning processes within communities seeking to subvert the expert knowledges for their own benefit. Increasingly communities are adopting innovative knowledge practices and scientifically tested techniques to address their local, contextual and nuanced challenges. **Research Question:** Diffusion of innovation and knowledge practices in agriculture are documented in the research as an outcome of homophilic communication processes. Historically inducement from outreach initiatives by governments and aggressive marketing approaches by corporates across the world have played major role in diffusion and lately media is contributing to this process. This research studied how institutional actors in the government and agriculture university system facilitate this process along with efforts to document the challenges of the diffusion of innovations in agriculture sector in semi-arid region of Maharashtra. **Methods:** This study used exploratory qualitative methodology with in-depth interviews as a major method with interpretative thematic analysis for the final results. **Key findings:** Respondents involved in this research identified various lacunae in government and systemic aspects of extension and outreach. This research came out with important insights about qualitative aspects of how different agricultural innovations spread with peers, both homophilic and heterophilic, are adopting the innovations. Experts from agricultural university and outreach department interpret and comment on the contemporary challenges of development sector at large and agriculture in particular. **Relevance:** Interdisciplinary research is important to understand how the systemic aspects of communication of innovation are significant for evolving a set of indicators and framework for broad aspects of development communication and adoption of those innovations for empowerment and economic growth of rural Maharashtra.

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**Citation:** Rahul Sudhakar Mane and Dr. Mayura Bijale, 2026. "Diffusion of Agricultural Innovations: A Case Study of Government Extension and University Outreach System in Draught Prone Region of Maharashtra". *International Journal of Development Research*, 16, (04), 70342-70346.

## INTRODUCTION

Different opinions exist about the precise technical, social, economic and ethical criteria and characteristics required to assess and describe the 'sustainability' of agriculture. An additional challenge is posed at the local level i.e. sustainable agriculture requires different types of agricultural knowledges developed by research institutes and spread by their extension organizations. (Röling & Van de Fliert, 1994; Röling & Jiggins, 1998)<sup>1</sup>.

Experience has also shown that locally developed innovations and knowledges cannot be transferred through conventional transfer of technology or similar approaches. (*ibid*) Agriculture sector allied processes and situations are by nature locally situated along with diversity making awareness of the local situation deeply essential. In short, the characteristics of the requisite knowledge could be described as complex, diverse and local. This kind of knowledge is not readily available and needs to be developed with close co-operation between farmers, researchers and extensionists with long experience of context-based interaction, frequent experimentation and rational demonstration in a particular given setting. For this, free exchange of knowledge and information between (and even within) fundamental & applied research, extension system and farmers becomes crucial. For agricultural sectors across the world, it is a challenge to be aware, and contribute to, the rapid developments in knowledge, science and technology. Agricultural extension will have to be reinvented as a professional practice by adapting to its mission,

<sup>1</sup>Röling, N.G. & E. Van de Fliert (1994) Transforming extension for sustainable agriculture: the case of integrated pest management in rice in Indonesia. *Agriculture and Human Values*, 11, 96-108

Röling, N.G. & J. Jiggins (1998) The ecological knowledge system. In: N.G. Röling & M.A.E. Wagemakers (Eds), *Facilitating Sustainable Agriculture. Participatory Learning and Adaptive Management in Times of Environmental Uncertainty*, pp. 283-307. Cambridge University Press, Cambridge.

rationale, mode of operation, management and organizational structure.<sup>2</sup> The tendency among extension organizations to promote inadequately adapted or pre-defined innovations, many of which were developed by researchers with little understanding of farmers' problems and priorities, has been documented and criticized widely (Van der Ploeg, 1994)<sup>3</sup> It means that extension needs to play a more active role in processes of innovation design and adaptation. This may result in shaping, organization and facilitation of innovation processes along with 'translations' between farmers' and external researchers' views and concerns.

#### **Interaction between communication and agriculture systems:**

Various achievements of modernisation paradigm through development communication initiatives have proved enormously successful. The Indian government's legendary efforts to usher in green revolution in the country with the help of agricultural universities and outreach system of agriculture departments, universities, government was hugely helpful in incremental but decisive changes over the years. The results of the green revolution also gave rise to various standard practices about how Indian farmers can be oriented and trained for a systematic behavioural change and adoption of specific innovation(s). Green revolution also helped us to understand that only knowledge is not sufficient to bring in radical results. Along with it, skills and hands on approach coupled community initiative inspired by passion and motivation to experiment and take risk is also crucial. These kinds of efforts of behavioural change give special emphasis on group communication but it soon made extension agencies realise that one to one interaction also holds crucial importance for spreading of the message and changing practices at the ground level. So, after one-directional spread of mass media this particular field of agricultural-development communication evolved towards a phase where more importance started to be given to dialogue. Recently it has given more importance to joint partnership between knowledge institutions and farmers about joint understanding of knowledge production and dissemination. These kinds of approaches can also be understood from the point of view *social construction of science as well as community shaping the practice of science in the dynamics of modernisation*. According to Kaur (2022), "*communication is still an under-exploited sector in Agriculture and there is a need to enhance human and organizational capacities in the field of agriculture communication. Farming these days has become knowledge-oriented.*"<sup>4</sup> Effective dissemination of agricultural information plays a key role in supporting rural agricultural activities as it may improve farmers' knowledge and increase their agricultural productivity. Information helps to provide opportunities for rural farmers to improve their farming activities, while helping to improve their livelihoods. (Ballantyne, 2005)<sup>5</sup>

However, rural farming communities vary, thus require information services based on models that are context specific. Meyer (2005) asserts that information in digital or written format may be inaccessible to rural people due to their unfamiliarity with the source.<sup>6</sup> This situation compels policymakers, institutions and stakeholders to look for alternative ways of conversation with farmers.

**Challenges for agriculture extension system:** The challenges to agricultural extension in the early 21st century derive, on the one hand, from the challenges that farmers and agriculture face in view of their ever-changing social and natural environment, and, on the other hand, from the changes that emerge within extension organizations themselves in connection with, for example, new funding arrangements, developments in extension theory, and the emergence of new computer-based communication technologies. Successful application of most farm-level innovations is also often dependent on factors that transcend the farm level (e.g. input supply, marketing, community support, transport, processing). In other words, many innovations have been mistakenly looked at as being individual in nature. The conclusion that most of the innovations needed in present day agriculture have collective dimensions (i.e. they require new forms of interaction, organization and agreement between multiple actors) Clearly, a greater emphasis on collective processes would require that we pay more attention to issues like dealing with diverging interests, different actor perspectives, and conflicts, and hence shift our attention to processes like conflict resolution, organization building, social learning and negotiation. This shift in emphasis requires us to rethink nature of extension, our expectations from it and going ahead what type of people and organizations we need for the same. All this implies that extension needs to play a more active role in *processes of innovation design and adaptation*. Such a role may involve the shaping, organization and facilitation of innovation processes (i.e. process management), and/or the making of 'translations' between farmers' and external researchers' views and concerns. Field of extension is a union of diverse people like 'development worker', a marketing employee, an external communication manager, a trainer, a mediator, a public relations officer, a process facilitator, an organization development consultant.<sup>7</sup>

#### **Policy legacy and spill over effects of green revolution in India and Maharashtra:**

After independence, if India is one of the largest producers and consumer of self-made agricultural food it is because relentless efforts of government agricultural departments, agricultural universities, extension wings of both these institutions and collective efforts of the scientific community, policy makers and political leadership of India from generation to generation. There were different reasons why green revolution was successful. According to legendary M.S. Swaminathan, green revolution was possible because of government outreach but it became more realistic because of *farmer's enthusiasm and experiments they performed apart from tools like quality seeds, fertilisers and irrigation*. Maharashtra as a region was blessed with dedicated leadership in the field of agriculture lead development policy which constantly pushed state towards inclusive, innovative and incremental reforms in the agriculture related fields. In the decade of sixties due to instigation and policy emphasis by then Chief Minister Vasant Rao Naik, state established four agricultural universities in the different regions i.e. Balasaheb Sawant Krushi Vidyapeeth, Dapoli, Panjabrao Deshmukh Krushi Vidyapeeth, Akola, Vasant Rao Naik Krushi Vidyapeeth, Parbhani and Mahatma Phule Krushi Vidyapeeth, Rahuri. Along with this there were numerous extension centres were developed along with farmer training schools at post 10 level. In all agricultural universities extension departments

<sup>2</sup> Leeuwis, C., Leeuwis, C., & Ban, A. (2004). *Communication for rural innovation* (Vol. 231). Blackwell publishers.

<sup>3</sup> Van der Ploeg, J.D. (1994) Styles of farming: an introductory note on concepts and methodology. In: J.D. Van der Ploeg & A. Long (Eds), *Born from Within: Practices and Perspectives of Endogenous Development*, pp. 7-30. Van Gorcum, Assen.

<sup>4</sup> Agricultural Communication : A theoretical perspective, Anterpreet Kaur, *International Journal of Advanced Mass Communication and Journalism* 2022; 3(1): 73-77

According to Kaur: "Progressive farmers of the village keep on experimenting with the innovations and they also share their experience with their fellow mates thus act as 'opinion leaders' in their villages. That's why Extension workers from various government agencies always try to tap the progressive farmers of the villages to teach them about innovations, as they know that other farmers will follow the advice of the progressive farmers. These progressive farmers serve many purposes like:

- They pass new information to the farmers of their group or village;
- They interpret the information according to the requirements of the farmers of their group;
- They employ the new information and technology in their fields, thus set an example for other farmers;
- They act as advisors to other farmers when they seek their approval for the adoption of a new technology;
- They are generally more educated than the other farmers and sometimes also enjoy better financial position as compared to fellow farmers of the group."

<sup>5</sup> Ballantyne, P. (2005). Managing Agricultural Information for Sustainable Food Security and Improved Livelihoods in Africa. *INASP Newsletter*, No. 28 (March).

<sup>6</sup> Meyer, H. W. J. (2005). The Nature of Information and Effective Use of Information in Rural Development. *Information Research*, 10(2), paper 214. <http://www.informationr.net/ir/10-2/paper214.html>. Accessed 14 April 2015

Agricultural Information Dissemination in Rural Areas of Developing Countries: A Proposed Model for Tanzania, *Afr. J. Lib. Arch. & Inf. Sc.* Vol. 26, No. 2 (October 2016) 167-185, Grace E. P. Msoffe & Patrick Ngulube

<sup>7</sup> Communication for Rural Innovation, Rethinking Agricultural Extension, Cees Leeuwis, Anne Van den Ban

hold enormous importance. Due to policy impetus of central government, numerous Krishi Vigyan Kendras (KVKs) were developed over the years. Today Maharashtra has 49 number of KVKs spread over different regions of India.

**Diffusion of Innovations:** Diffusion of Innovation “is a process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 2003). The diffusion process typically involves mass media, group communications and interpersonal communication channels (ibid).

As explained by Sunding & Zilberman, examples of these are: a) mechanical innovations (improvement in tractors and combines), b) biological innovations (new seed varieties), c) chemical innovations (new fertilizers and pesticides), d) agronomic innovations (new farm management practices), e) biotechnological innovations, and informational innovations that mainly rely on computer technologies. Technological changes in agriculture consist of several types of innovations corresponding to scientific breakthroughs and economic conditions of the time. Further, Wignert referred to diffusion research carried regarding new fertility-control methods, new medical practices, improving agricultural technologies, new management styles of technological production.

**Research question:** Among the many questions probed during this research some of were:

- i) What are the systemic challenges and constraints regarding agricultural extension and communication of agricultural innovations?
- ii) What are the human centred challenges and constraints regarding agricultural extension and communication of agricultural innovations?

Diffusion research talks about role of opinion leaders in influencing adoption. But product and process opinion leaders are more and they not only innovative but also communicate about both positive and negative information about the product, process and practice. Their knowledge power i.e. technical competence and convincing power (Rogers, 1983), their social status (Soloman, 1994) and ability to evaluate, synthesize information (Menzel, 1981) influence process of adoption by followers. Wejnert (2002) argued that diffusion occurs due to spatial and temporal congruity between a source of a new practice and a potential adopter. This congruity, according to Wejnert, happens because media effects support role of institutionalization of innovative practices and further spreading information about those institutionalized practices that captivate public interest (Strodthoff et.al, 1985). Globally the experience has been that extension and advisory services have become more and more plurastic as innovative approaches in this area of work are happening over the years, the authors opine. Apart from government agencies and NGOs, these include lead farmers and private institutions also. This kind of integrated approach advocates for explicit policy or strategy for extension services, funding, coordination, decentralization, quality control, demand driven approach, real time information needs assessment, capacity building of people involved in knowledge delivery, organisational innovation and likewise for more efficient extension services. The authors envision the future of extension system is determined by their ability and resilience to face challenges of climate change by adopting practices of precision agriculture, nutrition and health goals, youth and gender, and sustainable food systems. Thus different mechanisms of interactions between source of innovation and an adopter result in diffusion processes which differ in nature. The success rate about adoption of innovations may increase as norms, values and expectations about innovative practices get ingrained in contemporary society and culture.

### Assumptions

- A1- Mass media (e.g. newspapers) ‘enabled (mediated) agricultural extension’ activities are more significant in diffusing innovation than knowledge disseminated through other institutional outreach efforts.

- A2- Diverse-Heterophilic individuals/communities are successfully adopting verities of agricultural innovations due to changing relationship (interactivity, real time response, User Generated Content) between ‘mass audiences’ and ‘mass media’.

## METHODOLOGY

Researcher has adopted exploratory comparative case study as a specific method for this project. Based on the literature review of the diffusion of innovation through mass media, it was decided to carry out an ‘*Exploratory Qualitative Case Study*’ which include probing, scrutinizing and investigating available information from media houses, journalists, opinion leaders, adopters, agents of dissemination, extension agencies and human capital, both expert and non-expert about adoption processes in agriculture.

## METHODS

This researcher adopted qualitative approach of in-depth interviews of outreach department of Govt. of Maharashtra in Solapur district, KVK Mohol and experts from extension department of Mahatma Phule Krishi Vidyapeeth, Rahuri. The geographical region selected for interviews was one of the most draught prone regions of the Maharashtra i.e. Solapur district in western part of the state.

**Sampling framework for data collection:** It was decided visit the agriculture universities, nodal ministry offices (if possible), government extension centres and media enabled/supported activities of agricultural extension in Maharashtra so as to have deep insight about how farmers receive information, how their behaviour and practices are influenced by media content and which are the agents/elements responsible for adoption/diffusion of innovations.

- Open ended (but self-monitored questionnaire based) interviews of experts/officers involved in extension work of university/government
- Questionnaire based survey of ground staff who are involved in agriculture extension work of university / government

### Coding of respondents for organizing and analysing data

**EGO** – All the outreach related experts and staff of government departments, whether involved in university extension or department of agriculture related staff are coded as EGO.

**EAR**--All the Experts/Academics/Researchers whether working in Academics i.e. Agricultural Universities or experts who are working about developmental aspects of agriculture since many years and who have profound understanding of critical issues of agriculture are all coded as EAR to make it an inclusive category.

### Data Analysis

#### Description about responses to thematic qualitative questions

#### Government Outreach/Extension Expert/Officers: EGO

EGO-1. S. R. Rathod, Panchayat Samiti, North Solapur

EGO-2. Somnath Manohar Shinde, Panchayat Samiti, North Solapur

EGO-3. V.D. Jagadale, Agriculture Department, Barshi

EGO-4. Raghunath Balbheem Bidgar, Krushi Sanshodhan Kendra, Jeur

EGO-5. Dr. Bhagwan A. Deshmukh, Mahatma Phule Krushi Vidyapeeth, Rahuri

EGO-6. Dr. Pandit Kharde, Outreach Dept, Mahatma Phule Krushi Vidyapeeth, Rahuri

EGO-7. Dr. Vikas Khanderao Bhalerav, Krushi Mahavidyalay Pune, MPKV Rahuri

**Experts/Academics/Researchers: EAR**

- EAR-1. Milind Ahire, Faculty Agriculture Extension, Mahatma Phule Krushi Vidyapeeth  
 EAR-2 Anand Karve, ARTI Pune  
 EAR-3. Dr. Mrunal Vilas Ajotikar, Regional Extension Centre, Pune  
 EAR-4. Satish Deshmukh, scholar of farmer's issues  
 EAR-5. Dr. Ratan Sukhdev Jadhav, Agriculture Development Trust KVK, Baramati  
 EAR-6. Dr. Manohar Dhadvad, faculty at Extension department, Mahatma Phule Krushi Vidyapeeth, Rahuri  
 EAR-7. Santosh Sopanrao Godse, KVK, ADT, Baramati  
 EAR-8 Y.L.Jagdale, KVK, ADT, Baramati  
 EAR-9 Dr. Govind Yashwant Parlekar, ex-employee of Rahuri Krushi Vidyapeeth extension section, Solapur  
 EAR-10. Shri. Navnath Bhaguji Darade, MPKV – researcher

**Summary of interviews with experts**

- ❖ **Important challenges in agriculture:** Loss of agriculture due to climate /weather disasters, lack of minimum support price, increasing labour cost and unavailability of labour, rising transportation cost.
- ❖ **Technological spread:** It has been happening in agriculture with relatively good impact. Farmers are harvesting good yield. Production cost is decreasing because of optimum use of water, fertilizer and pesticide, Hybrid, improved seeds, inputs, mechanization etc. These days farmers are involved in data driven artificial intelligence led agriculture. Farmers are getting information regarding weather forecast, market information etc. by using mobiles. KVKs have spread technology at the grassroots level. Technologies spread are: seed-varieties, fertilizer management, diseases and pest management, weed management and irrigation management.
- ❖ **Technology as available at the grassroots. Only farmers are not implementing it properly.**
- ❖ **Technology and innovation not reached to the small and marginal farmers.**
- ❖ **Farm productivity:** It is dependent on quality of soil, efficiency, water availability, atmosphere, technological use and right management technique. In Maharashtra, there has been emphasis on developing high yield giving varieties. Lot of research about rainfed agriculture, water management and vegetable led farming has happened. Research, extension and implementation, technology and entrepreneurship, proper selection of crops, Drip irrigation, skillful use of commercial fertilizers and Biotechnology. To reduce the cost of farming is one of the important initiatives, Quality seed, timely sowing, proper irrigation/fertilizer/weed control/disease/pest management. It depends upon investment and rate of return.
- **University and government extension system:** It is useful because it encourages rural farmers to engage in modern farming. It generates employment. Young farmers get opportunity to develop skills and earn employment. Need to upgrade and strong action. This has given outputs regarding inputs, finance, processing, allied business-like poultry, dairy etc. To make farmers aware of current research going on in Agricultural Universities. It is important to spread the technologies. Use of Improved varieties, and post-harvest technology should be increased. To transfer the proper technology on farmers field properly that enable maximization of crop yield. Investment is very less.
- **Extension organizations in Maharashtra:** Effective organizations implementing extension are: Vasantdada Naik State Agriculture Extension Management Institute, Nagpur and Regional Extension Centre, Pune, KVK and agricultural department, ATMA, KVK, Agriculture Department, BAIF. More than organizations, farmer and farm-labourers run the extension program.
- **Media's role in extension:** Media's role is very crucial in extension. Farmers can reform their work with the help of media. Few respondents shared that it is not performing its significant role which is noteworthy. Media helps to introduce

the technologies. One expert believed that not many media institutions are giving importance to the transfer of Agri-Technologies except Agrowon.

- **Weaknesses in Extension system of Agri universities highlighted by experts**
  1. Lack of awareness in farmers about adoption of new technologies
  2. Lack of modern tools and technology
  3. Lack of spread after research and development
  4. Lack of proper management in extension system
  5. Lack of education and training in extension staff
  6. Lack of professionalism
  7. Lack of human resources
  8. Lack of latest interventions.
  9. Lack of updated, latest research.
  10. Lack of participation
  11. Lack of outreach
  12. Proper extension officers from Dept of Extension are limited. REC and DEC centers are weakened now due to less man power and lack of scientists of Various disciplines. Funds are also not sufficient for extension
- **Role of information technology:** Weather prediction, market rates, seeds, fertilizers, crop security. Modern technology helps in spread of high yielding varieties. ICT helps in ensuring assured market and data management is possible. Need to educate more farmers from this point of view. Technology spread will be imminent. Agriculture related information can be conveyed in very fast manner. IT will play very vital role. Different mobile Apps, softwares, YouTube and Social media, Artificial intelligence will be required for precise management of agricultural inputs as per crop requirement and yield maximization. It is important but it should be farmer centric.
- **Impact of global and national economic situation:** Food security is threatened due to inconsistent policy. Country's economic condition deteriorates. Environment gets affected due to excessive use of chemical fertilizers. Mostly global and national policies are consumer oriented and not farmer oriented. Farmers are getting affected negatively from all the directions. Farmers should get minimum support price. Due to better Economy, investment in agriculture is increasing day by day. New technologies are implemented in agriculture. Young educated man power is attracting towards agriculture due to better returns from agriculture. This all is possible due to strong economic development and policies of Govt. Farmers production increases, but profit does not increase.
- **Impact due to flip flop in policy:** Policy changes regarding rate of interest and grants affect farmers. Farmers cannot do proper planning. This discourages them to adopt new technology. Negative mindset pushes them towards different profession. This situation also pushes them not to follow rules, regulations etc. Strong and consistent policies are required. Lack of agriculture centric policies is causing farming non-affordable. Inconsistent policy changes are affecting all the stakeholders. Disparity between market rate and MSP. Fall in farmer's income is still ongoing.
- **Adoption of innovation in agriculture:** This can increase farmer's income and it can lead to economic growth. The campaigns directed at farmers is run for farmer's benefit. In integrated farming poultry, dairy and fishery is done together. KVK teaches farmers modern technologies and approaches. Farmers can use eNAM portal for their benefit. Need of strong linkage between government and farmer. Latest technology & interventions should be easily & affordable. Good but initiative should be from both sides. Farmers must be trained with latest technology and they should be nurtured as a master trainer. These days interactions between progressive and innovative farmers with Government is increasing day by day. Govt is giving many awards to innovative farmers. Some experts said that innovative concepts are not seen, old concepts are given new name.

- **Basic facilities about extension:** Government and university have made available research centers, training centers, seed production centers and post-harvest processing centers. Farmers should get basic facilities at village level. Basic facilities provided by govt is limited. Staff is limited and fund not optimum. Basic facilities are not very promising.
- **Success story in agriculture extension outside Maharashtra:** Maharashtra government and institutions guide other state about Crop Management, Pest Control, Water Management, Micro Irrigation, Drone Technology, Value Addition etc. Extension work in Maharashtra has resulted in creating international markets for the horticulture of mango, grapes, pomegranate, banana, onion and many other crops. Transformation of farmers as agri-entrepreneurs is important. Israel and Germany are some of the promising examples. Vietnam, China and Japan etc. are good examples of extension system. Agri marketing is taught outside Maharashtra in a very good way. There may be some success stories of rich farmers.
- **Importance of print media in extension:** Importance of books, magazines has reduced. Digital technology has lot of potential. Agrowon is doing good. Printed information must be made available to the farmers, villagers. Important for village farmers and to transfer Agricultural technologies at grass root level of all farmers.
- **Importance of All India Radio or radio in extension:** Even though it is getting lesser attention, it has importance in rural areas. Its importance remains in the area where digital technology has not reached.
- **Importance of television channels in extension:** Various agriculture -farmer oriented programs are useful for raising awareness of farmers from the point of view of technology, weather prediction, market rates and new technology. YouTube and audio-visual are important. Every time new information is visible. Some experts emphasized that television is too much important. But now Mobile phone provides all agricultural knowledge to young farmers through Google and other social media. Many times, agriculture related programs are not telecasted.
- **Importance of digital media:** Mobile app, website, WhatsApp messages, images, drones, eMandi, Digital Krushi Mission, internet etc. All digital channels are useful. Drones, disease and pest apps, Use of weather forecasting sites, micro irrigation and automation in water management. Social media's role is important.
- **An agriculture knowledge practice, innovation popularized due to government and agricultural university:** High yielding seeds and fertilizers, techniques in tilling, irrigation and nutrient management, pest control techniques etc. Floriculture, value addition FPOs, hybrid varieties are other examples. Seed variety replacement & seed replacement ratio. Integrated farming system, model goatery system, model nursery system.
- **Spread of innovation due to any media in contemporary times:** Rise in productivity, crop protection, improvement in condition of farm labourer, tissue culture, floriculture, drip-irrigation, Greenhouse Technology, Drip irrigation, farm ponds, fruit tree plantations, accurate and authentic information due to artificial intelligence, machine learning and data analysis. Agrowon is a classic example.

**Findings:** Overall there's a strong consensus across all respondent groups that digital and social media are crucial for agricultural extension along with print news. This is true for both ICT led mass media catering news to the public as well as ICT lead media technology used by extension agencies, government departments, corporate entities. A recurring finding based on the interviews of Government Outreach/Extension Officers/Staff and Experts/Academics/Researchers is the *lack of human resources and funds within government extension systems and agricultural universities*. This directly impacts their ability to reach farmers effectively. Several respondents highlight the need for *improved infrastructure*, including basic facilities at Krishi Vigyan Kendras (KVKs) for *farmer training, separate offices and vehicles for extension departments, and accessible testing labs*. Farmers also mention the need for *better roads to farms and permanent irrigation facilities*.

**Assumption No. 2 was:** *Diverse-Heterophilic individuals/communities are successfully adopting varieties of agricultural innovations due to changing relationship (interactivity, real time response, User Generated Content) between 'mass audiences' and 'mass media'.*

**Findings:** Government officials and KVK staff express a personal need for more technical and digital training and further emphasize the need for exposure and training in AI, robotics, and IoT. There is no direct evidence of heterophilic individuals have better tendency towards adoption of innovation, how findings of the interviews reveal the following choices. To the question how individual farmer will respond to the innovation coming to knowledge, farmers responded:

- a) 25% of the respondents shared that they will contact the innovator on a phone to congratulate him.
- b) 35% of the respondents shared that they will travel and visit the innovator's home to see how it works
- c) 33 % of the respondents shared that they will learn about the know-how of innovation from innovator to replicate at my end.

## CONCLUSION

In summary, the responses highlight a critical need for improved, well-funded, and technologically advanced agricultural extension services that effectively bridge the gap between research and farmers. While traditional media still plays a role, digital and social media are rapidly becoming the primary channels for information dissemination and peer learning, driving innovation and a shift towards more sustainable and mechanized farming practices. Stakeholders of this topic identified various lacunae in government and systemic aspects of extension and outreach. Farmers especially are the most vulnerable and central to the field constantly evaluate the information coming to them from all directions i.e. corporates, universities, governments, media and peers. This research gives important insights about qualitative aspects of how different agricultural innovations spread with peers, both homophilic and heterophilic, are adopting the innovations. Experts from agricultural university and outreach department interpret and comment on the contemporary challenges of development sector at large and agriculture in particular. Farmers through their answers to the in-depth interview, express expectations in the policy change. In a way this is a very solid indicator of expression of farmers instigating bottom up policy formulation while shaping public discourse.

## DISCUSSION ABOUT KEY FINDINGS

**Assumption No. 1** was *Mass media (e.g. newspapers) 'enabled (mediated) agricultural extension' activities are more significant in diffusing innovation than knowledge disseminated through other institutional outreach efforts.*

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