

Extension strategies for doubling farmers' income

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This work reflects upon eight broad approaches extension system, and needs to follow to help farmers in doubling the income viz. Information Communication Technology-based and enabled extension services, revamped mass media services, mobilization and organization of farmers, market led extension and market linkages models, pluralistic approach with synergy, cognitive behavioural change of farmers. Studies showed that mass media (audio/audio-visual, and print media) showed high impact on commercial farming by acting as information source. Mobilizing and organizing the farmers in the form of farmers-based organization, Self-Help Groups, Cooperatives, Rural Youth Clubs etc. will-help in achieving economy of scale, reducing transaction cost and marketing cost along with reducing supply chain. Extension approaches and programmes need to be oriented towards market, so that farmers are better linked to the market and market information which also need development of innovative models for linking farmers to market. More synergy and convergence among pluralistic extension actors like public, private, non-governmental organizations, farmers-based organisation etc. need to be achieved for effective extension service delivery.

Key words: Extension, Farmer, Income, Strategy

THE cognitive behavioural changes need to be brought about among farmers for information seeking, problem solving behaviour and reorienting their attitude and beliefs. Agricultural Technology Management Agency and Krishi Vigyan Kendras need to be strengthened to bring more convergence for effective extension service at grassroot level along with technology backstopping by institutions of Indian Council of Agricultural Research and State Agricultural Universities.

The Government of India has set target to double the farmers income by 2022. Extension can play major role in achieving this target. There is need of reorientation and restructuring of extension approaches for inclusive service delivery. One must keep in mind that no single approach can act as panacea for the extension problem, but we need proper blending of various

approaches as per need of the farmers and demand of the situation with more emphasis on evolving technologies. Learning from the past experiences we have realized that for doubling the farmers income, extension approaches should have the features like demand driven, bottom up, participatory, pluralistic, farmer led, market led, Information and Communication Technology-based and synergistic.

While contemplating and formulating new extension approaches one should keep in mind that public extension system in India have some limitations. The ratio of farmers to extension worker in country is 1,000:1; a extension worker has to serve more than one village, even sometimes 10 to 15 villages in absence of fresh recruitment. Therefore rather than repeating old rhetoric of criticizing extension system, we need to find out approaches supplementing and

complementing or even sometimes replacing the public extension system as happening in high value crops. Country has experimented different extension models and has got lot of practical experience with it. Challenges before extension system are large number of small-and marginal-farmers (83%), depleting natural resources, large yield gap and information gap etc. However, there are many opportunities in the form of ICT revolution in country, enabling policy environment, market reforms, emerging farmers' organizations and readiness of farmers to adopt new innovative technologies.

ICT-based and ICT-enabled extension services

In India, 60 % Indian farmers do not have access to information about agriculture. India has 77% mobile phone penetration and rural subscriber base till June 2016 was

371 million. Nearly 2.5 lakh village *Panchayats* were covered under the National Optical Fibre Network upto December 2016. Various ICT tools viz. Mobile extension, cyber extension, Interactive video, kiosk, *e-chaupal* etc. can) helpful for farmers who need knowledge more than anything in agriculture.

Mobile extension (M-extension): Information can be disseminated through mobile by various ways viz. mobile app, mobile advisory using text and voice messages, videos, and internet. NARES can develop crop/technology specific app to cater the information and consultancy needs of the farmers. The Government has started mobile-based advisory to the farmers through app like *Kisan suvidha*, *m-kisan* etc. These efforts can be supplemented by Krishi Vigyan Kendras and State Agricultural Universities (SAUs) by including region specific content in the regional language which will be more attractive and comprehensive to the farmers. Farmers-based Organizations and NGO can also develop the farmers' location specific and need based content for mobile advisory services and deliver to the client/members in collaboration with the scientists from NARES.

Social networking sites like Facebook, Linkdin, Skype, Twitter, You Tube, WhatsApp etc. are becoming popular in rural India, and can be effectively used for the dissemination of information to the farmers. Many farmers are already using such platforms for creating groups related to particular crops viz. grape growers in Maharashtra, where they are connected to the other fellow farmers, scientists from National Research Centre on Grapes, personnel from private companies and persons from Grapes Growers Association by forming WhatsApp groups. Here they interact and share their experiences and seek solutions to their problems. Thus use of ICT can serve dual function to the farmers by disseminating knowledge and linking them to other stakeholders.

Cyber extension/Kiosks: National Farmers Commission had envisioned the concept of every village having village knowledge centre/kiosk for

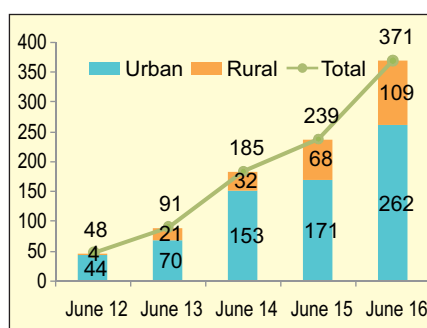


Fig. 1 Number of mobile subscribers

Source: IAMAI

providing necessary information regarding inputs, markets, innovative technologies and cultivation practices to the farmers at village level. With availability of internet facility to the village *panchayat* through NOFN, village kiosks/knowledge centres needs to be established at every village which can be used as platform for accessing different types of expert systems by the farmers depending upon their needs. Moreover, small and marginal-farmers from villages can also access the agricultural information through various agri-portals of the government to know about various programmes and policies of the government; market information of various crops and inputs. With introduction of e-NAM (National electronic agricultural market) these types of knowledge centres at each village will serve the purpose of information need as well as marketing of the farmers produce. Same platforms can also be used for e-learning by the farmers.

Informative videos: Videos containing information about agricultural practices, new technology, method demonstration, result demonstration etc. can be made and uploaded on web sites, social sites so that large number of farmer can have access to it. It was observed that where National Demonstration project was activated and videos were shown farmers were more innovative and adopted new technologies when compared with other villages. More initiatives like Digital Green need to be scaled up by agricultural universities and ICAR institutes for creating video/ documentaries of the new technologies, success stories, recommendations etc. so that it can

reach large number of farmers, available to the farmers as per their convenience and in cost effective ways.

Marketing mix-input supply with ICT: More and more private players can start the ICT services for advisory services, input services and marketing services to the farmers on the line of Tata Rallies, Air Tel etc. (Mobile-based advisory and mobile app). Farmers cooperatives and farmers based organizations can use ICT for transfer of timely information to the members at low cost in the line of services provided by the IFFCO and above mentioned private players.

The innovative and successful models of ICT used for agricultural extension purpose are Warna Wired village in Maharashtra, *Gyandoot*, *e-chaupal* etc. However, there is need to replicate such models in other parts of the country considering local situations in mind. While developing the content, it should be in the regional language which can be easily understood to the farmers. Marketing Information System and Management Information System needs to be developed for farmers-based organizations for their efficient functioning.

Revamped mass media services

Television: Since 1967, Television has been used as audio-visual toll for dissemination of information based on agriculture. Now, Government of India added *DD Kissan* channel exclusively for the farmers of India. Such initiatives can also be initiated at regional level, so that the content is relevant, in vernacular language and easily understood by the farmers. Agricultural universities and ICAR universities can use this platform for showcasing their technologies, demonstrating the improved practice, or for creating awareness about some important issues like IPM, e-NAM etc.

Radio: The community radio can be very effective mass medium as audio tool for spreading agricultural related message to particular community. It gives marginalized communities an opportunity to express their views and many voluntary organizations, civic groups,

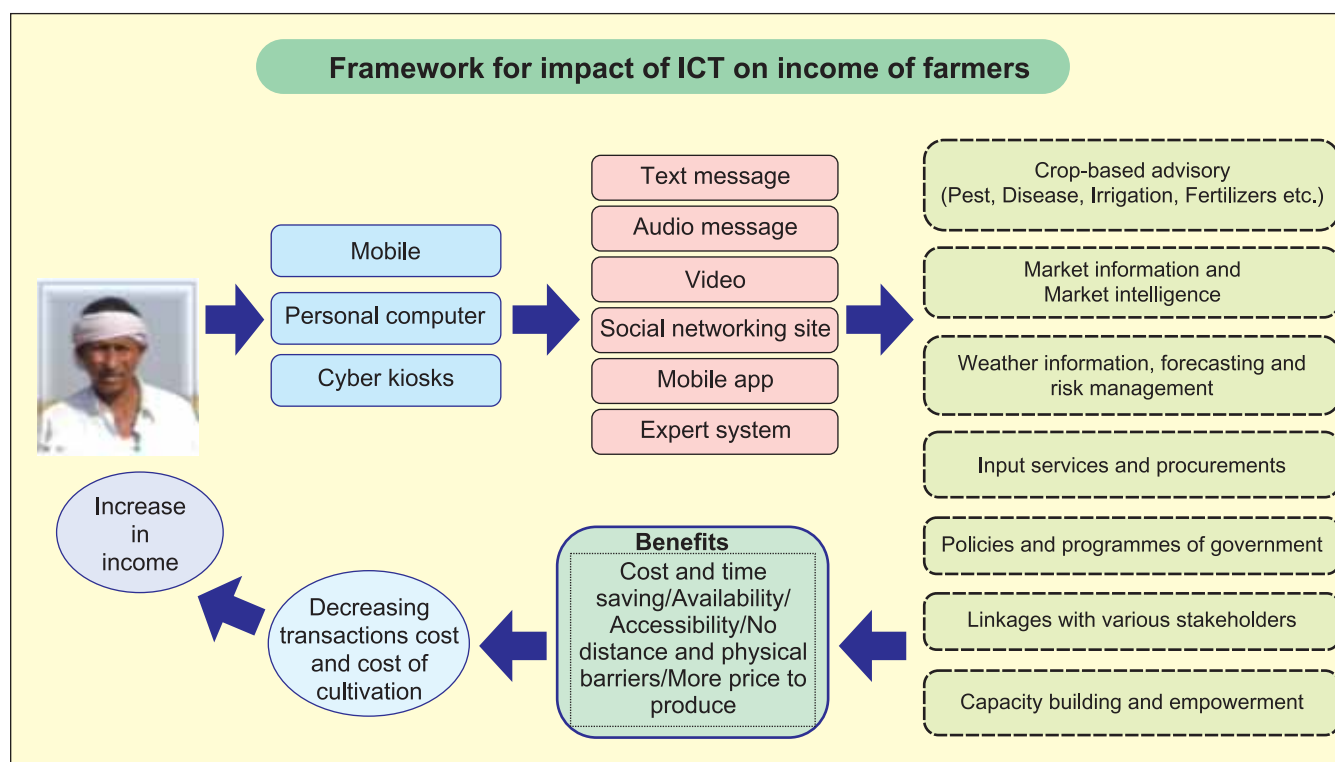


Fig. 2. Framework for Impact of ICT on Income of farmers

NGO's, Women's groups/ organizations, etc. are now entering into broadcasting to share, express, empower, give voice, to many communities to benefit them with the broadcast. Many NGOs like Deccan Development Society are helping many marginalized members of society especially women to raise their voices and share success stories. National Farmers' Commission also recommended that Government need to review policy towards Community Radio, since a combination of the internet/ cell phone and community radio can help in giving timely information to farmers even in the remotest parts of the country.

Print medium: In print medium, newspapers, magazines, research journals come that are dedicated to agriculture and read by thousands of farmers for fulfilling their information needs, like, 'Agro one' in Maharashtra. Such initiatives can be scaled-up at national level and in other parts of the country. Agriculture universities in various states can publish their research findings and technologies in local and simple language which can cater to the region specific needs of the farmers. Farmers' organizations which are set up for particular

commodity or purpose can also use print medium for transfer of advisory, information to the members which is commodity specific and based on needs of the farmers and at the same time are relevant and farmer friendly.

Mass media should use 'mix' of traditional and modern media-local with national and international content so as to enrich the content and make them more attractive and useful for farmers.

Mobilization and organization of farmers

With more than 83% of small-and marginal-farmers and feminization of agriculture, there is need to mobilize and organize this vast segment. They can be organized through Farmers-based organization such as, Farmers Cooperatives, Self-Help Groups and Rural Youth Clubs.

Farmers- based organization: By joining farmer-based organization, small-scale farmers can have easy access to market information, credit and input for their production, processing, and marketing activities. Farmers' organizations to a larger extent focus on production or crops relevant for the market rather than for production for own consumption and therefore are good tools to

improve small-and marginal-farmers' welfare. National Farmers Commission also had recommended that Commodity based Farmers Organization should be promoted to combine the advantages of decentralization production and centralized service, post-harvest management, value addition and marketing.

Farmer-based organization like Mahagrapes in Maharashtra are also involved providing extension services to farmers and helping small-and marginal-farmers to connect to international market. To ensure the sustainability of Farmer-based organization Government should introduce some regulations and guidelines for its functioning and operation. To improve the technical competency of the personnel involved, trainings in financial and organizational management at block or district level or even by KVK experts can be provided to them.

Co-operatives: Co-operation helps in mobilizing and organizing vulnerable and unorganized people engaged in various economic and social activities at the village level. Many cooperative in Maharashtra are involved in input supply to the members at concessional rate. Based

on cooperative principal, they can also provide extension services to the members with collective cost sharing, for low cost extension services to the farmers. AMUL and IFFCO are providing quality extension services to its members. Over 1.5 lakh primary agricultural credit societies across the length and breadth of the country can be reinvigorated with extension and market focus.

Self-help groups/Farmers interest groups: Farm-women in village lack or have limited access to extension, capital, information and market despite their major contribution to agricultural activities. Capacity building of Self-help Group Farmers Interest Group will help in financial inclusion of both women and youth in village, giving them more money to invest in micro-enterprises and in agriculture thereby improving income and standard of living. Such organizations can provide technical and marketing skills to the members along with disseminating information about women related concerns like nutrition, health, family planning etc. More than 80 lakh Self-help groups and many Farmers' Interest groups are working at the grassroot level and can be used as platform for learning and marketing with ICT support (*Sanchar Shakti*).

Rural youth clubs: With 356 million 10-to 24-year-old, India has the world's largest youth population. Rural youth can be organized through Rural Youth Clubs, which can be effectively used for promoting entrepreneurship and agri-business among the rural youth. Rural Youth Club are useful over the long-term in building effective producer organizations, as well as in introducing new production technologies and marketing systems for high-value commodities. Considering importance of social capital in rural development activities, rural youth organizations are effective way to increase social capital into the communities. These are also constructively used for diverting the social energy of youth into the agricultural and extension activities. It can guide youth for using their leisure time into productive activities. Rural Youth

Club can also play important role in programme Skill-Training of Rural Youth under the National Mission on Agriculture Extension and Technology and 'Skill India' programme of the government. All these grass root (village level) institutions can be used as nucleus of convergence with KVKs, ATMA, NGOs and private extension companies.

Market led extension and market linkages models

There is growing recognition that markets, not technology, have become the primary driver for agricultural development in many countries; innovations in agriculture can come from many sources and most of these sources are market driven.

Market led extension: Hitherto, most of the extension programmes focused on technologies and information about production aspects only. Studies showed that farmers know how to produce but lack the skill for marketing of the produce. The focus needs to change from production to beyond production. In this context, market led extension which is the market ward orientation of agriculture through agricultural extension assumes very significant role. It aims at conversion of agricultural sector into profit oriented business by application of ICT in agriculture marketing and strengthening research-extension-farmer linkage between various departments at various levels.

Market linkages models: Small-and marginal-farmers lack resources and bargaining power which can overcome by using innovative extension strategies like producers companies, Self-help group/farmer interest group, Cooperative societies etc. Through these approaches small-and marginal-farmers can be mobilized and organized to give them better bargaining power and market price to their produce ensuring sustainability of their livelihood. At ATMA level, we need to explore various market linkages for the established farmer interest group for better marketing of their produce and for more price realization. Private

industries working in the district, can also explore the possibility of contract farming by tie up with farmer interest group/self-help group/farmer-based organizations working in the district. Scientists observed that such types of contract gives more income to the farmers. KVK and ATMA may act as facilitator for this purpose. Farmers needs to encourage for the collective marketing so that cost of marketing (transactions cost, transport cost etc.) would be shared among them giving them more margin as compared marketing by individual farmers.

Pluralistic approach with synergy

Public: Rationalization of the public extension system delivery system needs to be done. Rather than competing with private sector/ other organizations providing extension services or duplicating their efforts, public extension system should focus on the areas, regions, crops where other type of organizations are not willing to provide services. Extension in high value crops can be done by private players, farmers' organization, or farmers-based extension services and they are quite sustainable. Therefore, government can withdraw some of its resources from such crop and focus on services with public good component of extension and for upliftment of small-and marginal-farmers.

There is need to shift the focus from empowered farmers producing high value crops to the small-and marginal-farmers cultivating subsistence crops and not properly connected to the market. Once empowered, these farmers producing high value crops are able to pay for the extension services, which can be supplied by the private sectors. By reorienting themselves, public extension services should gear up for new roles like entrepreneurship development in the village, capacity building of the various stakeholder including farmers, mobilizing and linking farmers to the market, promoting diversification through high value crops and promoting more and more use of ICT in agriculture.

Private: Private players who are involved in the input supply to the farmers can also provide extension

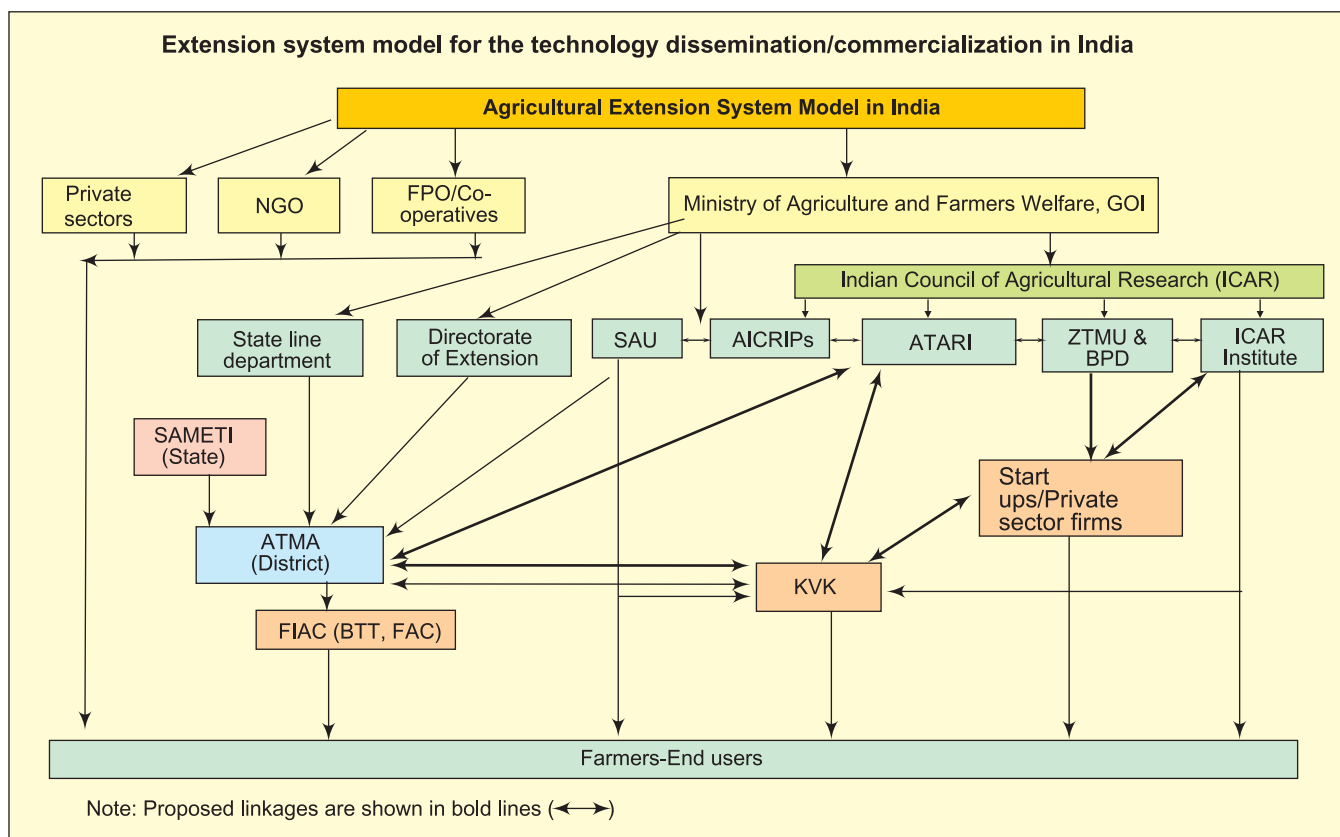


Fig. 3. Extension system model for the technology dissemination/commercialization in India

and advisory services to the clients. Tata Rallies in Maharashtra is providing extension support in consultancy to the farmers in addition to the input supply. They are even using mix marketing strategies to improve upon their service delivery and number of clients viz. Mobile-based app to farmers for weather and disease forecasting. Farmers are paying to the consultants as crop involved is high value crop (grapes). Though private sector are involved in the extension services in high value crops considering their profit motto, they can also utilize their share of Corporate Social Responsibility for providing extension services to the small-and marginal-farmers involved in subsistent farming for their upliftment.

Public-private partnership and synergy: It is not that private sector and public extension service providers are competitors or work in isolation, but there should be partnership and synergy among them whenever possible. While public organizations have significant research result outputs and the ability to absorb

uncertainties of payoffs, the private sector has an edge in factoring clients technology designing and diffusion processes. ATMA model has envisioned this concept of public-private partnership (PPP), where partnership with the private sector is being developed in the area of production, marketing, processing and even is operating cyber kiosks in villages in Maharashtra. Such types of initiatives need to be outscaled and upscaled in other parts of the country.

Non-governmental organization: It was said that NGOs have employees who are socially committed to helping rural people, therefore they can play a significant role in building social capital within rural communities. Though these employee many times lack the technical competency required for working at the field level, this can be overcome by increasing linkages and collaboration with the SAU or ICAR institutes working in the area. As part of Corporate Social Responsibility many companies are operating their own NGOs, and Corporate Social Responsibility fund is being utilized for agriculture related activities and

mostly in extension. More and more such initiative can be started so that Corporate Social Responsibility can be utilized for the betterment of agricultural extension services in the country.

Farmers-to-farmers extension: It was observed that farmers innovative, experiment continuously and are great source knowledge and wisdom. Therefore there is need to document the innovations of the farmers and spread to other farmers or scaling-up for the welfare of farming community. Farmers who are interested in producing a particular high-value crop or product can be taken to other area/ district where some innovative farmers are already producing the crop or product. Such type of farmer-to-farmer extension is effective in getting groups of farm leaders interested in and informing them about the potential benefits of a new enterprise. This approach builds off the knowledge and expertise of innovative farmers and then uses different farmer-to-farmer extension approaches. Such types of approaches have significant impact on the farmers attitude and learning as they

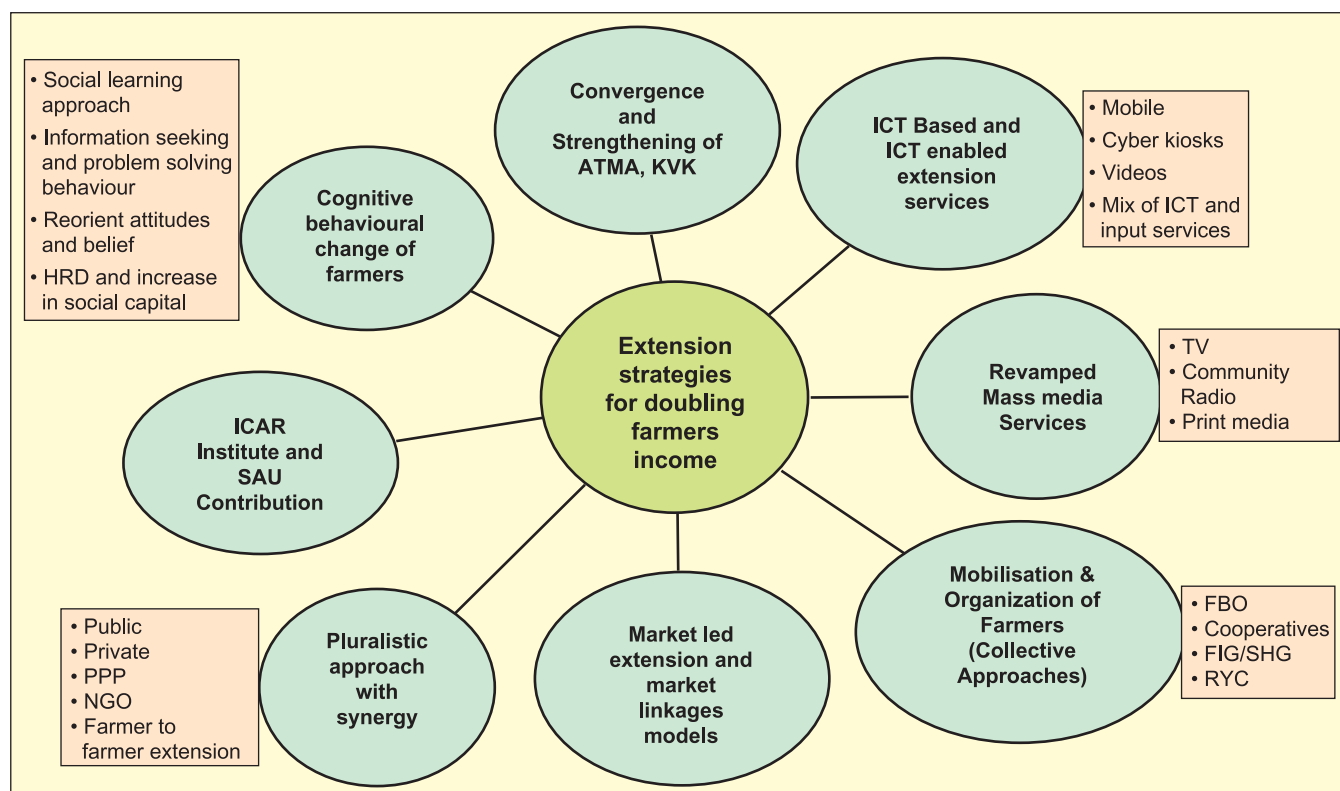


Fig. 4. Framework for Extension Strategies for doubling farmer's income

engage in cognitive learning process. Moreover, NSSO situation assessment survey (2005) showed most popular source of information to the farmers was 'other progressive farmers' (16.7% farmers) and it is reported that fellow farmers as most preferred source of information by the farmers. In this context farmers to farmers extension can be more credible, persuasive and effective strategy of extension that needs to be popularized by KVK, ATMA, SAU and ICAR institutes.

Cognitive behavioural change of farmers

Over long-term for helping poor farmers successively, a cognitive approach to learning will be required which will increase the capabilities of small-scale farmers and their groups to find or create.

Social learning approach: Agricultural production is embedded in the social and cultural contexts of people, therefore it is important to understand the social process behind innovation, adoption of new technology by the farmers. Every time extension agent can not convince farmers for adoption of new technologies. Social learning

approach provides opportunity to farmers to tap their capacities to innovate in spontaneous response to situation specific challenges in their farming systems. It was observed that both extension services and social learning are strong determinants of technology adoption and diffusion, while the effectiveness of each type of informational channel is enhanced by the presence of the other. Therefore extension system should see farmers as learner rather than as recipient of the technology, work with them in participative way and should create a social network which will facilitate the exchange of knowledge among farmers to farmers, researchers to farmers. This social learning approach will form basis for developing working and engaged relationship between farmers and FBO/ RYC/ SHG/FIG/NGO or other organization working at the grass root level.

Information seeking behaviour: National Farmers' Commission had envisioned the dream of Information Society- 'people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge'. To fulfil

this dream of information society, farmers can not be passive information receivers but should be active information seekers/ searchers. Grape growers in Maharashtra exhibit such behaviour. Whenever they find any problem on their crop, they either dial to or visit the NRC on Grapes or consultant from the private company. This active information seeking behaviour helps farmers in getting timely information with less cost for saving their high value crop. This type of information seeking behavior needs to be promoted in other areas so that farmers get benefits from the nearby available State Agricultural Universities and ICAR institutes.

Education and problem solving behaviour: The extension needs to move beyond Transfer of Technology to embrace such roles as problem solving, education, and human development. At village level this can be done by conducting Farmers' Field Schools. These schools will help farmers in gaining knowledge and capacity for diagnosing their problems, identifying solutions and developing plans for action with or without support of the outsiders. In India Farmers' field school have

helped in success of Integrated Pest Management movement in the country. ATMA and KVK can play important role in conducting Farmers' Field Schools at the villages. Through participatory research and technology development also problem solving behavior can be inculcate among the farmers. Farmers' FIRST programme of the ICAR where farmers needs to be proactive at all stages of technology development, with proper implementation is expected to create problem solving behavior among the farmers.

Reorient attitudes and belief: Since independence the failure of many extension programmes is attributed to the lack of participation of the farmers or community. Therefore, ensuring farmers participation is essential for effective extension programmes and policies. In fact, this is an underlying principal of extension education which often gets neglected leading to ineffective programmes. For this purpose there is need of understanding and addressing the prevailing beliefs and values. The reorienting farmers' attitude towards new technologies and developmental programmes is essential for changing adoption of new technologies and modern practices in the field. Attitude is not static and can be changed through effective and persuasive communication, which can be done by KVK, ATMA, SAU, ICAR institutes or through mass media by using credible information sources and persuasive messages.

Human resource development and increase in social capital: Provision of training by KVK and awareness programmes of ATMA needs to be strengthened for better human resource development. Formation of FBO, SHG, and RYC helps in increasing social capital of the farmers. Various NGO, ATMA, NABARD etc. can play great role in establishing such organizations and thereby promoting social capital

among the farmers.

Contribution of ICAR institutes and SAUs

To improve the extension system, linkages between agricultural universities/ICAR institutes and farm communities needs to be restructured and strengthened to utilize the potential especially of transformative technologies in the huge basket of innovative technologies in agricultural and allied sectors.

State Agricultural Universities: The state agricultural universities need to undertake a serious study of existing and emerging cropping patterns in their regions, and develop region specific literature and plans for the farmers. Along with the rural agriculture works experience, industrial exposure will help in developing spirit of entrepreneurship among the agricultural graduates. For this all universities should adopt the motto 'Every student an entrepreneur' as suggested by the National Commission on Farmers. Introduction of programmes like 'Students Ready' and 'Experiential Learning Lab' by Education Division of ICAR are good endeavor in this direction. Agricultural universities can help graduates establish business for themselves viz. agri-clinics, soil- and water-testing facilities etc. by establishing start up culture.

Universities can revamp their curricula to include business management, applied course for the students. At the same time they can provide the training to the KVK staff for employment oriented activities like agro-processing, value addition etc. Agricultural universities can establish village-based farm schools on innovative farmers' field for learning new innovations and technologies by other men and women of the village. Massive Open Online Courses also needs to be introduced to spread the knowledge of modern practices and methods.

ICAR institutes: These institutes need to ensure that technology development is strictly followed by

the technology transfer to farmers' field and proper follow up. For this institutes need to include transfer component as integral part of research project proposal. Some institutes operationalized the concept of Research Project Proposal-IV (RPP-IV) which is necessary step in this direction. Through *Mera Gaon, Mera Gaurav* our government, institutes can transfer their technology to the farmers to get feedback regarding applicability and suitability of the technology to the farmers' local condition. Through this scheme they can create general awareness among the farmers about government schemes like soil-health card, crop insurance etc.

SUMMARY

As governments objectives are shifting from food security of nation to the livelihood securities of the rural people, extension strategies need to be reoriented and shifted from technology transfer to organizing farmers, human resource development to make them successful producers and sellers; self-dependent in problem solving and decision making. The above described list of approaches is not exhaustive, with advent of technological change and changing demand of the farmers many new approaches need to be brought up, some need to be modified and even some approaches needs to be discarded. The approaches should be dynamic and change with the changes in farmers' socio-economic, environmental situation, changing agricultural and extension system. This paradigm shift is essential for re-invigorating extension system and doubling the income of the farmer.

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HANDBOOKS OF THE ICAR

- *Handbook of Agriculture* • *Handbook of Horticulture* • *Handbook of Animal Science*
- *Handbook Fisheries and Agriculture* • *Handbook of Agriculture Extension (in-press)*