REVIEW PAPER

Technology Transfer and Skill Development towards Improved Livelihood in Rural India

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ABSTRACT

India looses about 2000 farmers every day and more than two crores farmers left agriculture over the past two decades. This scenario will have very serious implications on the future of Indian agriculture and food security. Youth in India comprise more than 50 per cent of the population both rural and urban and hence, play important role in agriculture development. Migration of farmers and youth, h, leaving agriculture to urban areas for seeking job happens in a alarming magnitude. Bringing profitability in agriculture through appropriate livelihood options is one among the better propositions to attract and retain farmers and youth in agriculture. Keeping skill development as a major strategy of the re-oriented agricultural extension system, is a best strategy for engaging the farmers, youth and farm women in profitable livelihood ventures and thereby enhancing the rural standard of living. This paper discusses about the on-going and new initiatives to attract youth in to agriculture. This paper also discusses about the status and barriers of promoting entrepreneurship in Indian agriculture and policy interventions needed to promote entrepreneurship in agriculture.

Key words: *Skill development; Entrepreneurship; Livelihood; Rural India;*

In recent years, in India, land-based livelihoods of small and marginal farmers are increasingly becoming unsustainable, since their land has not been able to support the family's food requirements and fodder for their cattle. Varying socio-economic and environmental trends including declining crop prices, swelling labour forces migration and urbanization increased the demand for alternative employment and off-farm livelihood opportunities. As a result, rural households are forced to look at alternative means for supplementing their livelihoods. As a result, natural resource-based micro-enterprises have emerged as alternative livelihood opportunities in rural areas. However, due to lack of skill development, employment ceased to keep pace with the demand (*Anantha et al, 2010*).

As a result, India is losing more than 2,000 farmers every single day and that since 1991, the overall number of farmers has dropped by 15 million (*Sainath, 2013*). Over the past few years, rural youth have been shying away from agriculture and globally there is an increasing interest in finding ways of engaging youth in agriculture (*IFAD, 2012; Paisley, 2013*). This has several implications for the future of Indian agriculture and India's food security.

In Indian farming, young farmers can play an important role in ensuring food security, if they are encouraged to involve in farming and the challenges they face are addressed. India today faces a massive skills deficit compared to the tremendous demand generated within all sectors of the economy – industry, construction, infrastructure on the one hand; and agriculture and allied sectors on the other. In order to address emergent needs and challenges in rural areas, there is need for an approach based on skills development as an important strategy (*Sohani, 2013*).

Amidst such scenario, attracting and retaining youth in agriculture is critical for Indian Agriculture. Most of the new agricultural innovations require a skilled

agricultural work force. For instance, promotion of high value agriculture, precision farming, organic cultivation, Hi-Tech horticulture, micro-propagation, Integrated Pest Disease & Nutrients Management, Post Harvest Management, development of backward and forward linkages etc, require well-trained young farmers with enthusiasm and passion for farming and ability to take risks. Organised groups of young farmers will be useful for introducing new production technologies and organizing effective input and output markets.

This paper discusses the issues and initiatives pertaining to A. Skill Development, Youth and Transfer of Technology and B. Status, issues and strategies for promoting entrepreneurship in agriculture in rural areas.

A. *Skill development, youth and technology transfer:* Youth is often understood to be the period of transition from childhood to adulthood, encompassing processes of sexual maturation and growing social and economic autonomy from parents and carers (*Bennell, 2007*). The Government of India (GOI) officially defines youth as persons between the ages of 13 and 35 years and it varies depending on the programme. For instance, the National Youth Policy of India considers age group from 10 to 34 yrs as youth. The youth could be the ideal catalyst to change the poor image of persons involved in agriculture, if they apply their greater possibility to adapt new ideas, concept and technology. Agricultural extension services can effectively encourage and support youth participation in agriculture.

Most of the agricultural extension programmes, which we implemented since independence in India traditionally, targeted the head of families for training and technology transfer. Young farmers often have greater capacity for innovation, imagination, initiative and entrepreneurship than older adults and these characteristics should be effectively harnessed by extension services to provide better livelihood opportunities for youth in agriculture. The investment on youth in agriculture is still minimal, as there are only a few youth focused programs and thus, few clear examples of impact (*Chander, 2013*).

Nevertheless, the ICAR and Departments of Agriculture in many states are recognizing the farmers including the young and innovative ones for the innovative and diversified farming ventures taken up by them. Many young farmers are taking up high risk high returns agri-ventures like protected agriculture, precision farming, organic agriculture, floriculture, medicinal and aromatic plants cultivation etc, which are mostly avoided by the aging farmers. These new agri-ventures need to be actively supported by the government agencies and financial institutions with skill training, financing and marketing support. The on-going and new initiatives towards attracting rural youth towards agriculture and developing relevant skills are discussed hereunder:

I *On-going Initiatives* **:**

Krishi Vigyan Kendra (KVKs) : Imparting need based vocational training to farmers, farm women and rural youth to improve their knowledge and skill and change their attitude, is the main mandate of the KVKs. KVKs numbering 641, exist practically in every district of India. KVKs organize trainings on various vocations viz., crop production and management, post-harvest technology and value addition, nursery management, livestock, fisheries, income generation activities, capacity building and group dynamics etc. However, KVKs need more resources to organize more number of skill trainings programmes and enhanced capacity to encourage and promote micro-enterprises in agriculture through youth and farm women (*Chander, 2013*).

Nehru Yuva Kendra Sangathan (NYKS) : Established in 1987-88 as an autonomous organization under the Ministry of Youth Affairs and Sports, it has been channelizing the power of youth (13-35 yrs) on the principles of voluntarism, self-help and community participation. Youth Clubs formed by such Kendras, are village level voluntary action groups of youth targeted towards nation building activities, working for community development and youth empowerment. However, only a few NYKS are involved in agricultural development. Much more could be achieved, if NYKS could focus on skilling rural youth in agricultural activities (*Chander, 2013*).

Farmers' clubs of National Bank for Agriculture and Rural Development (NABARD) : NABARD's policy support for Farmers' Club Programme emphasizes on linking technologies with farmers' club members, while facilitating market access through capacity building of members of Farmers' Clubs including leadership training; linkage with technology/markets; Self Help Groups (SHGs)/Joint Liability Groups (JLGs) formation and forming Federations of Farmers' Clubs/Producers' Groups/Companies. The broad objective of setting up Farmers' Clubs is to achieve prosperity for the farmers

with overall agricultural development in its area of operation by facilitating credit counselling, technology counselling and market counselling. The NABARD provides a financial assistance of Rs. 10,000 to each club per annum for three years. Most of these farmers' clubs have a good representation of rural youth (*Chander, 2013*).

II *New Initiatives* :

ARYA (Attracting and Retaining Youth in Agriculture): The Indian Council of Agricultural Research (ICAR) has constituted a seven-member expert committee, to suggest ways of attracting youth to agriculture. This would involve a series of activities, including exploring opportunities in secondary agricultural operations such as value addition of crops and hiring, and servicing of mechanized farm implements. This is going to be an important strategy of the ICAR focused on rural youth mobilization for agricultural transformation during 12th plan. This programme is going to be implemented by KVKs.

National Rural Livelihood Mission (NRLM) : NRLM aims at creation of opportunities for both wage employment and skill development for the rural youth, who lack skills in many areas of agricultural production and processing. National Skill Development Mission and the National Skill Qualification Framework are, thus, aggressively pushing the agenda of skill development to build the capacity of rural youth so that they are meaningfully employed in rural areas itself. Thus, need-based experiential skill learning supported by public sector banks/organizations in rural areas is the key to strengthen the Rural Self Employment Training Institutes (RSETIs) being set up in all districts under NRLM to assist such youth (*Likhi, 2013*).

Agricultural Skill Council of India (ASCI) : Considering the need for skilling the work force in agricultural sector, the Agricultural Skills Council of India (ASCI) has been recently proposed by National Skill Development Corporation (NSDC), which could be one ideal institution to train rural youth. The ASCI proposes to train, certify and accredit 56.5 million workforce comprising of farmers, wage workers, entrepreneurs and extension workers, over 10 years through its training partners (*Chander, 2013*).

ASEAN-India Farmers Exchange: The Ministers of the ASEAN (The Association of South East Nations) concerned over the small number of young farmers' involvement in the agriculture sector, agreed on the Agricultural Extension in South Asia (AESA) importance of promoting innovation and entrepreneurship among young farmers to achieve more sustainable agriculture development in the region. This initiative is expected to create greater awareness among the young and innovative farmers on the promising career in the agriculture sector. The first Exchange Visit was conducted in Malaysia in conjunction with the 2012 ASEAN Farmers' Week and the Malaysian Agriculture, Horticulture and Agro-tourism (MAHA) International in November 2012, followed by the second Exchange Visit conducted in India during December 19-30, 2012, wherein, farmers' delegation from nine ASEAN member states participated.

B. *Promoting entrepreneurship in agriculture for improved livelihood option in rural areas* : Indian economy is basically an agrarian economy (*Saxena, 2012*) and the majority less literate and unskilled population living in rural areas does not fit into the employment market created by service sector. Employing 55% of labour force, agriculture sector is a major employment provider (*Chand, 2014*). However, the seasonal nature of Indian agriculture leads to seasonal and cyclical unemployment. This situation can be altered by generating employment opportunities through nurturing entrepreneurship in agriculture (*Rehman et al., 2012*).

Present Status of Fostering Entrepreneurship in Agriculture in India: The micro, small and medium enterprises have surfaced as vibrant and dynamic component of Indian economy by significantly contributing to Gross Domestic Product (GDP), industrial production and exports and employment generation (*Manimala, 2002*). While employment in agriculture sector has been declining and large industries experience jobless growth, the main responsibility for job creation rests with unorganized sector including small and medium enterprises and the service sector (*Jahanshahi et al., 2011*).

The opportunities created by global knowledge economy have made India a 'fertile ground' for entrepreneurship. India's economy can potentially gain from the country's characteristic features such as strong technology base, unparalleled diversity, vibrant capital markets, growing

private equity and venture capital markets, sizeable market of a large number of customers and free competition in private sector (*NKC, 2008*).

Agricultural sector remains as an important source of raw material for industrial and manufacturing sectors. The Department of Agriculture and Cooperation (DAC), Ministry of Agriculture (MoA) is responsible for formulation and implementation of national policies aimed at achieving rapid agricultural growth. Ministry of Food Processing Industry (MoFOI) is responsible for developing a strong and vibrant food processing sector through appropriate policies (*BKRO, 2013*).

Agriculture is a State subject and it is the responsibility of the State Governments to ensure growth and development of the sector (BKRO, 2013). Several significant initiatives have been taken by the Government in order to promote entrepreneurship in agriculture through Small Farmer Agri-business Consortium (SFAC), National Horticulture Board (NHB), National Dairy Development Board (NDDB), National Fisheries Development Board (NFDB) etc. SFAC promotes community entrepreneurship in agriculture through producer organizations, especially 'Producer Companies'.

The National Mission on Food Processing (NMFP) of MoFPI also implements schemes for promoting entrepreneurship in food processing and value addition arenas. National Institute of Food Technology Entrepreneurship and Management (NIFTEM) of MoFPI mandated to do need-based research, education, capacity building activities to the stakeholders. The Ministry of Micro, Small and Medium Enterprises (MoMSME) operates various schemes for entrepreneurship promotion. Research institutes of this ministry such as National Institute for Entrepreneurship and Small Business Development (NIESBD), National Institute for Entrepreneurship (NIE) and Mahatma Gandhi Institute for Rural Industrialization (MGIRI) organize research, education and outreach programmes to foster entrepreneurship (*http://msme.gov.in/Web/Portal/New-Default.aspx*).

Agriculture and Processed Food Products Export Development Authority (APEDA) supports the entrepreneurs in marketing and exporting their products (*http://www.apeda.gov.in/apedawebsite/index.asp*). National Cooperatives Development Corporation (NCDC) promotes cooperatives of farmers as enterprising organizations (*http://www.ncdc.in/*).

Establishment of National Science and Technology Entrepreneurship Development Board (NSTEDB), National Manufacturing Competitiveness Council (NMCC), Small Enterprises Financial Centres (SEFC), National Commission for Enterprises in the Unorganized Sector (NCEUS), Technology Bureau of Small Enterprises (TBSC) etc. were some of the measures implemented by Indian government to promote technology-led entrepreneurship in general (*http://www.dst.gov.in/*).

Confederation of Indian Industries (CII), Federation of Indian Chambers of Commerce and Industries (FICCI), The Associated Chambers of Commerce and Industry (ASSOCHAM), All India Food Processors Association (AIFPA), Progress Harmony Development (PHD) Chambers etc. aim to build the capacity and handhold the micro, small and medium entrepreneurs. NABARD and its system implement government sponsored schemes that promotes entrepreneurship in agriculture (*https://www.nabard.org/english/home.aspx*).

The Indian Council of Agricultural Research (ICAR) of MoA aims at promoting technology-led entrepreneurship in agriculture. It established Institute Technology Management Units (ITMU) in all its research institutes. To coordinate the efforts of these institutes in commercializing technologies to aspiring entrepreneurs and incubate and facilitate entrepreneurial start-ups, ICAR established Zonal Technology Management Units (ZTMU) and Business Planning and Development (BPD) Units one each in five zones of the country. Realizing the importance of fostering technology-led entrepreneurship in enhancing agriculture and rural livelihood opportunities, ICAR established many such BPD units (22). With similar mandates, ICAR has also established 'AgriInnovate India Limited', a company registered under Company's Act, 1956. The Farm Science Centres (Krishi Vigyan Kendras (KVK), the outreach arms of ICAR located throughout the country (more than 630) cater to the capacity building needs of entrepreneurs (*www.icar.org.in*).

Agricultural education in India has been catered by Agricultural University (AU)/ State Agricultural University (SAU) system, which comprises of more than

60 AU/ SAU. Many of these AU/ SAU provide non-formal vocational education to the aspiring entrepreneurs through need-based short courses, diploma and post-graduate diploma programmes. Indian Institutes of Management (IIM), Indian Institutes of Technology (IIT) and Institute of Rural Management (IRMA) and many private and non-government sector-owned institutions also address the research, education, capacity building, incubation and outreach needs of entrepreneurs towards agri-based enterprises (*Venkattakumar et al, 2014*).

Barriers to Fostering Entrepreneurship in Indian Agriculture: Major difficulties faced by rural entrepreneurs in India are financial-related issues such as low purchasing power of rural consumer, lack of finance to start business, dilemma of pricing of goods and services, lack of supportive tax policy, lack of guarantees for raising up of loans and difficulty in raising capital through equity and dependence on small money lenders for loans etc. Organizations such as Industrial Finance Corporation of India (IFCI), Industrial Development Bank of India (IDBI), Industrial Credit and Investment Corporation of India (ICICI), Small Scale Industry Development Bank of India (SIDBI) at the national level and State Financial Corporation and State Industrial Development Corporation (SIDC) at the state level try to support rural entrepreneurs through various schemes for establishing new ventures and their expansion (*Saxena, 2012*). But these schemes are unable to meet the expectations of rural entrepreneurs. Raising funds through equity is difficult for rural entrepreneurs because of lack of financial knowledge and low financial corpus. The policies of Reserve Bank of India (RBI) towards priority sector lending failed to achieve its objectives.

Micro-finance movements in India work well. But for a new member, joining an existing self-help group (SHG)(micro-finance unit) is often a costly affair in order to maintain mandatory parity among the members. Rural entrepreneurs face severe competition from larger organizations and urban entrepreneurs in terms of quality standards (*Saxena, 2012*). The rural entrepreneurs are heavily dependent on middlemen for marketing of their products who pocket large amount of profit. Storage facilities and poor means of transport are the other problems. Information technology is not very common in rural areas but entrepreneurs ought to rely on internal linkages that facilitate flow of goods, services, information and ideas.

Rural entrepreneurs find it extremely difficult in complying with various legal formalities in obtaining licenses due to illiteracy and ignorance. Poor access to training facilities and extension services also creates a hurdle. Most of the entrepreneurs of rural areas are unable to find workers with adequate skills. Rural entrepreneurs are also generally less innovative in their thinking. The socio-economic environment such as family, peer group and community is not always conducive to rural entrepreneurs. Though there are many players to promote entrepreneurship in agriculture, it may be concluded that their efforts are isolated, small in scale and there is no coordination among the various players and convergence in their programmes (*Saxena, 2012*).

Potential Interventions (*Venkattakumar et al, 2014)*

Institutional Interventions

- Many of the State Agricultural Universities (SAU) have the 'extension educator' model to transfer the university technologies to farming community. Similarly, Farm Science Centres (KVK) recruit subject matter specialists (SMS). This is the high time to transform these extension educators of SAU and SMS of KVK as 'Innovation Counsellors', who can link the entrepreneurs of rural areas to innovation, infrastructure and various resources. The 'network' of such innovation counsellors may be utilized for building the capacity of community leaders too.
- The lack of collaboration between public, private and non-governmental sectors in fostering entrepreneurship need to be addressed. SAU may amend policies that encourage public-private partnership in research, intellectual property (IP) management, technology commercialization and finally innovation-led entrepreneurship in rural areas.
- The SAU may plan business incubation and start-up support to entrepreneurs; encourage students and aspiring individuals to practice their business concepts and mentoring entrepreneurs towards business management. Small Farmers Agribusiness Consortium (SFAC) may formulate a special scheme for meeting financial requirements.

- SAU as well as National Institutes and Deemed-to-be universities of Indian Council of Agricultural Research (ICAR) may adopt a model to foster competency enhancement of entrepreneurs. Libraries of these organizations may develop online guides, resources, databases, information packages and courses etc. Awareness campaigns, webinars, teleconferences etc. may be organized for the local entrepreneurs.

Capacity Building/ Educational Interventions

- The role of community in engaging entrepreneurs and the potential rural youth is very vital and will have a long-term impact on enhancing rural livelihoods and overall socio-economic development. It may be possible only through sensitizing community leaders and local policy makers. The SAU has a major role to play in collaboration with KVK, private and non-governmental institutions and provide pragmatic capacity building in this regard.
- Fostering entrepreneurship in agriculture needs intensive capacity building efforts at all levels. Hence, capacity building organizations such as National Academy of Agricultural Research Management (NAARM) which serves the scientists of ICAR and faculty of SAU and MANAGE which serve the officials of development agencies, private and non-governmental sector ought to design customized programmes and build platforms for training, knowledge sharing and policy dialogues.
- SAU and KVK systems need to build the capacity of entrepreneurs to effectively use the internet and social media for accessing information and knowledge, marketing, advertising, partnering, exporting and networking.

Policy interventions:

- Rural, district and state level libraries may be strengthened as 'Business Resource Centres' targeting aspiring entrepreneurs. Special funds may be announced for strengthening library infrastructure, resources, internet connectivity etc.
- ICAR may plan to do need-based research, capacity building, education and outreach activities to cater to the diverse needs of entrepreneurs depend upon agriculture. This activity may be undertaken through the collaborative efforts of Institute Technology Management Unit (ITMU), Zonal Technology Management Unit (ZTMU)-Business Planning and Development (BPD) units of ICAR and SAU, so that there will be connectivity among the ICAR-SAU system in entrepreneurship promotion agenda.
- Entrepreneurial promotional initiatives of ICAR-SAU system need to have continuous liaison with the developmental agencies of Ministry of Agriculture (MoA), Ministry of Food Processing Industries (MoFPI), Ministry of Micro Small and Medium Enterprises (MoMSME), National Bank for Agriculture and Rural Development (NABARD), Agriculture and Processed Food Products Export Development Authority (APEDA) and other financial organizations, business associations and institutes like National Institute for Entrepreneurship and Small Business Development (NIESBD), National Institute of Entrepreneurship (NIE), Mahatma Gandhi Institute for Rural Industrialization (MGIRI), National Institute for Food Technology and Entrepreneurship Management (NIFTEM), Indian Institute of Management (IIM), Institute of Rural Management (IRMA), National Institute of Rural Development (NIRD), National Institute for Agricultural Extension Management (MANAGE) etc. To augment this, a coordination committee may be established at ICAR.
- SAU ought to develop need-based and customized courses through online (webinar, teleconferencing systems and online resources) and distant education modules effectively coupled with contact programmes to cater to the needs of entrepreneurs.
- Unemployed agricultural and general graduates may be recruited by Ministry of Agriculture (MoA), Ministry of Food Processing Industries (MoFPI), Ministry of Micro Small and Medium Enterprises (MoMSME) as 'Innovation counsellors' at block level towards the aspiring youth development/ engagement activities and promoting start-up entrepreneurs towards successfully establishing, managing and expanding their enterprises.

CONCLUSION

To revitalize Indian agriculture, there is a need to bring-in profitability through better livelihood options and promoting entrepreneurship in agriculture. This will not

only attract back the farmers towards agriculture but also the next generation youth. There are initiatives to attract farmers and youth in agriculture. The Government of India also contemplates new initiatives to address the needs of farmers and rural youth with respect to profitability in agriculture. Promoting entrepreneurship in agriculture will be the major strategy to address the needs of farmers and youth. The institutional, educational and policy interventions to be designed and implemented to promote entrepreneurship and overcome the barriers to promote entrepreneurship in agriculture are suggested in this paper.

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