Promoting EDP in Fisheries: Extension Strategies and Way Forward

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Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2012). As per estimate, during the period 2014–2016 more than one in nine people in the world suffered from hunger, while 13 percent of populations of all developing regions were undernourished (FAO, IFAD and WFP, 2015). The fish is considered as crucial to improve food security and supplement human nutrition in the fight against hunger, as articulated in the 2030 Agenda. Due to easy affordability, abundant availability and low risk, consumption of fish supplemented with daily diet provides a vital source of protein and a variety of essential fatty acids and micronutrients, such as iron, zinc, vitamin A and others. In addition to providing nutrients, fish also contributes to the food and nutritional security of poor households in developing countries through livelihood diversification and income generation (Thompson and Amoroso, 2014; Béné *et al*., 2015). As per FAO statistics (2016) about 59.6 million people were directly employed in fisheries and aquaculture at global level in 2016 and more than 200 million engaged along the value chain in various upstream and downstream activities from tide to table, thus sustaining the livelihoods of around 660-880 million people dependent on the sector. Upstream and downstream activities in fishing harbours, landing sites, processing facilities, maritime and logistical services, insurance and other financial services provide significant employment and economic benefits to countries and local coastal communities. Employment opportunities in ocean-based sectors have a great importance along the coastal areas of many countries, especially in developing countries where they often represent the only opportunity for livelihoods, earning an income and improving the quality of life for the family.

Fisheries for entrepreneurship development

In the context of current challenges in food production, nutritional security, social transitions and growing climate uncertainties, fish and aquatic animals play important role to maintain the *status quo*. Fish and fishery products are perceived as the most traded food commodities in the world accounting for 11 % of total global export of agricultural products and 1% of world merchandise trade, in value terms *(FAO, 2018)* and contributing to about 16.6 % of the most

affordable and easily available form of animal protein. About 38% of the global fish production enters international trade in various forms and shapes, generating export earnings of USD 164 billion, whereas in India as of 2019-20, the export of marine fish and fisheries products has registered an impressive figure of 1.29 million tons and valued at Rs.46,662.85 crores (USD 6.68 billion), occupying 4th rank in global exports of fishery products.

Global fish production has attained a target of 179 million tonnes in 2018 with an average annual growth of around 6 % in aquaculture and is expected to be increased to the extent of 186 million tonnes by the end of 2030. On the contrary, the trend of Indian fisheries has achieved a big leap in fish production during last seven decades witnessing a quantum leap in production i.e. from 0.75 million tonnes (1950-51) to 14.2 million tonnes (2019-20). Today, it shares about 7.7 % of the total global fish production and has established its dominance in global fisheries scenario as the 3rd largest in total fish production and 2nd in aquaculture production with an average annual growth rate of 14.8%. Out of total global production, around 87 % (156 million tonnes) accounted for human consumption covering more than 3.1 billion people in world (FAO, 2016). Mostly the developing countries account for over 60% of global fish catch, about 50% of global fishery exports in value terms and more than 60% in quantity.

In the livelihood sector, at global level about 59.6 million people are directly employed in fisheries and aquaculture at global level and more than 200 million engaged along the value chain in various upstream and downstream activities from production to distribution (FAO, 2016). In India, it provides livelihood security to more than 25 million (2018-19) of fishers and fish farmers at the primary level and almost twice along the fisheries value chain. Besides, about 84 percent of the globally engaged population in fisheries and aquaculture sector are in Asia, followed by Africa (almost 10 percent), and Latin America and the Caribbean countries (4 percent).

Thus, it is pertinent to mention that the fisheries sector ensures nutritional security for the small farm holders, stimulates the growth of many subsidiary industries, generates export earnings boosting the economic development of a country, promotes entrepreneurship and start-ups for new venture and generates adequate employment opportunities for the millions of youth mass in a nation. It is observed that over the years, due to the technology driven rapid development in aquaculture, fishing and fish processing practices, this sector unfolds umpteen opportunities for the start-ups to make investment in fishery enterprises covering both capture and culture fisheries, in the field of aquaculture, ornamental fisheries, gears fabrication, aquarium management,

breeding, developing fish products and by-products, fish waste management, fish nutraceutical development, seafood trade and many related activities. As a result of which, Indian fishery sector has now opened new vistas for starting any profitable business venture. In this context, there is an urgent need for formulating efficient extension strategies for converting the resource specific commercial technologies in fisheries into viable business ventures.

What is entrepreneurship?

Entrepreneurship means undertaking a new business venture to make it commercially viable, profitable and economically sustainable. It comprises of activities as gathering of information, communication with chain partners, market orientation, strategic decision making, learning *etc*. Entrepreneurship deals more with strategic issues than management which focuses more on operational and tactical decisions. Entrepreneurship involves a lot of 'special' skills like communication ability and risk management, and competencies like leadership, imitativeness, innovativeness, risk-taking ability, creativity, self-reflection *etc*.

Entrepreneur VS Entrepreneurship

Entrepreneurs are those who manage an enterprise as a viable business. *The word 'entrepreneur' is derived from the French word 'entreprendre' which means 'to undertake'. Schumpeter has portrayed Entrepreneur as an innovator. He considered entrepreneurship as the catalyst that disrupts the stationary circular flow of the economy and thereby initiates and sustains the process of development (Block et al, 2017).*The entrepreneur is characterised by innovative behaviour and employs strategic management practices in the business(Cartland, 1984).Entrepreneurship has traditionally been defined as the process of designing, launching and running a new business, which typically begins as a small business, such as a startup company, offering a product, process or service for sale or hire (Yetisan*et al*, 2015). Entrepreneurship comprises of any purposeful activity that initiate, maintain or develop a profit-oriented business in interaction with the internal situation of the business or with the economic, political and social circumstances surrounding the business (Harvard School).

Entrepreneur according to E.E. HAGEN is an economic man, who tries to maximize his profits by innovations. The process of creating something different with value by devoting the necessary time and effort, assuming the accompanying financial, psychic and social risk and

receiving the resultant rewards of monetary and personal satisfaction is called entrepreneurship (Fry, 1996). Thus, the entrepreneur is the key agent in transition processes of development.

There is always confusion over the concepts of Entrepreneurship and self-employment and both are often used as synonyms. Many self-employed individuals are indeed entrepreneurs, but not all of them. In most of the cases self-employments are micro level initiatives in informal sector, where growth is not focused. Entrepreneurship is broader concept compared to self-employment and focus on growth and development. Entrepreneurship, as opposed to self-employment, is also defined by the spirit of the entrepreneurs (GFRAS,2016). Entrepreneurs are usually creative, take opportunities and accept risks, and can quickly change business strategies to adapt to changing environments. They are often innovators (Kahan, 2012).

Entrepreneurship Development

Entrepreneurship development deals with the study and analysis of entrepreneurial behaviour, to support the establishment and growth of the enterprise. Entrepreneurship development (ED) comprises the activities related to enhancing entrepreneurial attitude, skills and knowledge through various capacity building programmes. It intends to create an environment of confidence which can boost the morale of entrepreneurs so that more and more venture will be established. This will add to the employment generation and economic development of the region. Such initiatives have the potential to absorb the skilled youth of the nation so that unemployment issues can be sorted out. Entrepreneurship development can help in sustainable utilization of resources which was hitherto unexploited. New entrepreneurships can cater to the varying needs of general populace, which could not be served by Government services alone. Entrepreneurship is promoted to help alleviate the unemployment problem, to overcome the problem of stagnation and to increase the competitiveness and growth of business and industries. Mishra (2005) regarded entrepreneurship development as an approach of developing human resources. It is concerned with the growth and development of people towards high level of competency, creativity and fulfillment. An entrepreneurship development programme aims to increase the competency of aspiring entrepreneurs to recognize and design unique entrepreneurial strategies based on the assessment of local situation and market condition. The programme should encourage the entrepreneur to expand or diversify the production in response to the emerging scenarios. A spirited entrepreneur can discover a market for the product, which is other remaining hidden. In a truly entrepreneurial approach, innovative capacity matters more than the size of the

market. Diversification can be accomplished by introducing a novelty or new product feature, stressing quality or value added, anticipating a new market or even creating a market. Entrepreneurship development has different phases viz. stimulatory phase, support phase and sustaining phase.

Stimulatory Phase

This is the beginning stage which comprises all activities that can stimulate the prospective entrepreneur/s to take up the initiative. The process begins with awareness generation, identification of opportunities, sensitizing potential entrepreneurs, conceptualization and development of suitable enterprises tuning to the specific context etc. It is meant to handhold and facilitate the persons vouching for entrepreneurship, but lacking the initial momentum. The aim is to create an atmosphere for the making of entrepreneurs and enterprises. Assessing the entrepreneurial intention, development of entrepreneurial motivation and channelizing it into the action domain are the major activities in this phase, along with imparting required skill sets. This prepares the background from where people start looking for entrepreneurial pursuits. All these taken together stimulate entrepreneurship in a society.

Support Phase

This is the continuation of stimulation phase to facilitate the motivated entrepreneurs to channelize their ideas to action domain. Major activities include facilitated access to resources, infrastructural development, technology backstopping, market linkage, legal assistance and other services. The focus is to remove all the hurdles in the way of prospective entrepreneurs and help them to carry out the activities successfully.

Sustaining Phase

Sustainability of the enterprises is an important concern. Many enterprises fail to sustain after the withdrawal of initial support/ incubation period. Changing socio economic and political context may pose new challenges to the enterprise. New regulations and market condition will further add to the worries of the entrepreneur. Many of the entrepreneurs, especially the small-scale entrepreneurs may not be able to cope up with the changing scenario and new set of problems as they are not prepared to face those issues. Lack of adequate finance, inputs and new product requirement may trouble them. Support for sustaining the entrepreneurs is needed in

such cases in terms of arranging for finance, legal support, product diversification, modernization expansion etc.

Entrepreneurship development has to start with assessment of resources, need and market potential. Focus should be on product/services of high growth potential with the aim to initiate and grow dynamic enterprises. Equally important is to identify the risk involved and to develop strategies to overcome the difficulties. Creation of a facilitating environment is important at policy level including change in the mind sets of individuals, government servants and policy makers towards entrepreneurs. Many studies have shown that 'intention' antecedent of entrepreneurship development. So, it is important to identify the factors affecting the 'intention' so as to strengthen the supporting dimensions and to lessen the hindering dimensions. It was reported that personal attributes like optimism, innovativeness, risk taking ability etc. are positively affecting the entrepreneurial intention. Entrepreneurship development programme need to have a screening process for identification of the beneficiaries with strong entrepreneurial intention so that sustenance of enterprises will be more. Pervasiveness of entrepreneurs largely depends on the strong intention of the prospective entrepreneurs.

Role of extension for addressing the concerns in small scale fishprenureship

Small-scale fisheries are normally characterized by low capital input activities, low capital investments and lack of equipment, labour-intensive operations followed by traditional fishers. They also usually operate as semi-subsistence, family-based enterprises, where a share of the production is kept for self-consumption (Garcia *et al*., 2008). Traditional fishers dominate the marine sector and they are socially deprived, educationally weak with very high occupational rigidity. There is inequity in the distribution of yield and effort in marine fishing. They are unorganized with least social security benefits. The informal social security system in the form of sharing of earnings for the community and social organizations prevailing in the traditional fishing is absent in the mechanized fishing. There are also huge regional variations in productivity.

Technologies are the main drivers of growth. Hence, systematic technological interventions backed by adequate policy and institutional support are vital for making the more enterprising. Following extension strategies have been suggested for an accelerated fishpreneurship development with focus on sustainable development of small fishers.

- Commodity-centered approach

- System approach
- Prioritize technology on the basis of needs and problems at micro and macro levels
- Innovate and strengthen institutions and policies
- Upgrade the skills of the fishers
- Enhance investment and reorient policies to facilitate percolation of benefits to all sections of the society.
- Follow ecological principles
- Emphasize on domestic market demand and consumers' preferences
- Monitoring the technology demonstrations programs and assess the impacts.
- Strengthen database and share it for a better planning and policy making in the sector.

Extension strategies for sustainable entrepreneurship development

Unlike agriculture, fisheries stand on the very complex interaction between biological, climatic and geographical factors in addition to human activities. The information under such a complicated system is unpredictable, unstable, subjective, site specific and reliant on empirical decision given the inherent variability of biological phenomena. In spite of nation's priorities and developmental strategies for reducing poverty, hunger and ensuring quality of life to its people, we are still lagging behind in human development index as expected. People particularly the dominant population of small-scale fishers are still far from the reach of good education, nutrient nourished diet, better health care facilities and modern age amenities. Hence, there is an urgent need to reform the fisheries sector in holistic, scientific and systems approach to meet the current challenges due to climate change and global competitiveness so as to achieve sustainable production and growth through rural agripreneurship. The following innovative and advanced extension techniques validated through different research systems can be adopted to promote entrepreneurship in fisheries in a sustainable manner.

a. **Asset Based Community Development (ABCD) approach**

Conventionally, poor people consider themselves as the impoverished population with certain needs for development that can only be resolved by various supporting agencies. But Asset Based Community Development (ABCD) approach intends for the development of community based on

the principle of identifying and mobilizing individual and community 'assets', rather than focusing on problems and needs. It is an extension approach in which a community's micro-assets are linked with its macro environment. It believes that communities can initiate and sustain the process of growth and development themselves by recognizing and harnessing the existing, but often unrecognized assets, and thereby promoting local economic potential to drive its development process (Rans & Green, 2005). The approach is optimistic in nature, because the focus is on *'what is possessed by the community, rather than the problems of the community."* The focal point in this approach is asset and not the need of the community. Assets of individuals, associations and institutions are identified after an extensive survey and assets are then matched with the need of the people to empower communities to control their futures and create tangible resources such as services, funds and infrastructures etc. *(Foot and Hopkins, 2010.* In fishery, ABCD approach gives greater emphasis on reducing the use of external inputs and on a high degree of social mobilization in which the assets of the poor (*social, physical, financial as well as human*) can be utilized to bring sustainable livelihoods in fisheries through number of different fishery related activities.

Five Key Assets in ABCD

As per ABCD approach there are 5 categories of asset inventories such as individuals, associations, institutions, physical assets and connections

1. **Individuals**: Every individual has got certain assets, gifts and qualities; such individual is at the center of ABCD approach.
2. **Associations**: Groups of people working with a common interest are critical to community mobilization.
3. **Institutions**: The assets of institutions help the community capture valuable resources and establish a sense of civic responsibility.
4. **Physical Assets**: Physical assets such as land, buildings, space, and funds are other assets that can be used.
5. **Connections:** These are the exchange between people sharing their assets by various methods.

b. Rural Advisory Services (RAS)

Rural Advisory Services **(RAS)** refer to all the different activities that provide the information and services needed and demanded by farmers and other actors in rural settings, to assist them in improving their livelihoods by developing their technical, organizational and management skills

and practices (GFRAS, 2011; FAO, 2010). RAS must be designed to provide the information related to farm, organization, business management etc. recognizing the diversified actors involved in extension and fields advisory works (public, private, civil society); knowing the need of fishers, fish farmers' producer organizations (FFPOs), fishermen cooperatives and rural communities beyond technology related information and explaining them the role of facilitation and brokerage in rural development and value chains. In the case of aquaculture, large-, medium- and small-scale fishers need different types of RAS support. The large aquaculture farms are mostly self-reliant and need only regulatory support, while medium-sized farms need mobilization and facilitation support in addition to regulatory support. Small aquaculture farms need more education and input provision alongside facilitation (Kumaran, 2014). Timely sharing of research recommendations can address the problem of technology information for the fishers. In this direction, innovative extension strategies are being formulated keeping the fishers' needs and capacities in mind to pass on appropriate technologies by combining Internet, telecommunications, video, and print technologies that may bridge the information gap and empower fishers to make better production and marketing decisions (McLaren et al. 2009).

In fishery sector, RAS helps in

- Providing management and business development support appropriate to the scale, resources and capacities of each fisherman.
- Better understanding markets (prices, products, seasonality, standards, value addition etc.) related to fish and fish products.
- Linking fishers to other stakeholders involved in provision of varied support and services.
- Creating platforms to facilitate interaction and sharing among the various stakeholders including FFPOs to ensure coordinated support to fishers.
- Exploiting information communication technologies (ICTs) to provide fishers with a range of information related to weather, prices, extension programmes and generic information regarding fisheries.
- Facilitating the formation of FFPOs and also collaborate with FFPOs to strengthen the demand and supply side of RAS.
- Promoting institutional and policy change to enable and support small-scale fishery.

RAS encourages the formation/ organisation of groups by involving individual fishers, who have little influence over the social, economic and political processes affecting them, but as a group/ organizations and networks they can deal with their specific challenges. This can act as a platform

to articulate concerns, exchange knowledge, influence policies and engage in collective action so that their livelihood remains sustainable and profitable. Effective formation of Rural Resource Centres (RRCs), Fishermen Cooperative Society, Fish Farmers' Producers Organisations (FFPOs) can be instrumental by galvanizing collective action in order to ensure better access to markets and to support innovation by their members in related activities (Sundaram, 2014).

c. Model Village System of Extension (MVSE) approach

MVSE is an integrated and holistic extension approach where *community participation* is prioritized for suitable technological interventions in the fisheries to bring all-round development in fisheries sector in terms of *socio-economic upliftment, technological empowerment, self-governance* thereby enhancing the futuristic knowledge base and skills through *participatory framework.* MVSE emphasizes on involvement of all stakeholders in the process to converge their activities with a stake in the food value chain *linking producer to consumer.* Nevertheless, MVSE is an action research taken up in fishers' farm based on the principle of leveraging the activities, investments and resources from outside agencies/ externally aided projects resulting higher productivity, ensuring food security and sustainable improvement in overall quality of life by promoting leadership, self-dependency of the community in food chain. Economically viable, ecologically compatible and socially acceptable suitable technologies are successfully intervened in a cluster approach through participatory mode by integrating the multi-disciplinary research. The cluster of villages is adopted as model village, the success of which is later replicated to other villages. The village is developed as a commodity village branding for a particular commodity in the market.

MVSE approach works on the following principles:

- Promotes self -governance among the fishers
- Skill improvement and leadership development among the fishing community.
- Establishing linkage through pluralistic convergence of multiple stakeholders associated in the sector.
- Encouraging the market opportunities through commodity based village development (CBVD).

d. Farmers Field School (FFS) approach

The FFS extension approach is an alternative to the top down extension approach which was evolved as a method to solve complex field level issues in fisheries sectors. FFS aims to build fishers'

capacity to analyze their production systems, identify problems, test possible solutions, and eventually encourage the participant member to adopt the practices most suitable to their farming systems (FAO, 2003 c). This is a learning-by-doing approach which emphasizes group observation, discussion, dissection, modification, and promotes field-based experimentation, analysis for collective decision making followed by actions. The FFS approach is an innovative, participatory and interactive learning approach that emphasizes problem solving and discovery-based learning. FFS also provides an opportunity to fishers to practice and evaluate sustainable resource use technologies, and adoption of new technologies by comparing with their conventional technologies developed in congruent with their own tradition, culture and resource use pattern. The goal of FFS approach is such that, after observing and comparing the results of field level experiments, fishers will eventually "own" and adopt improved practices by themselves sidelining the conventional ones without any external compulsion. Field day is being organized at the end of the season to give visibility to the entire activities to convince the non-adopters. Exchange visits with other FFS is also encouraged to learn by association and comparison A group of 20-25 fishers can form a Farm School under the guidance of a FFS facilitator. Extension workers, NGO workers, fishermen co-op members or previously trained fishers can become Farmer Field School (FFS) facilitators. The facilitators are trained by master trainers, who have expertise in the particular subject matter. FFS is a time bound activity usually covering one production cycle or a year.

It is also significant to note that irrespective of the merits of the technology, the acceptance to technologies is influenced by the extension methods. Farmer Field School (FFS) model has been accepted as a good extension technique because of its exclusively participatory nature. FFS was also found to be effective in avoiding barriers like socio- economic constraints, infrastructure problem and incompatibility of technology for the adoption of sustainable fishery practices.

The basic component of FFS is setting up of a Participatory Comparative Experiment (PCE), commonly referred to as Participatory Technology Development (PTD), whereby the fishers put the FFS concept into practice under close monitoring and supervision by the FFS members. A PCE can be developed in the field of agriculture, livestock, fishery, forestry, agro-forestry, livelihood system and others.

Principles of Farmer Field School (FFS)are as follows: -

- Field is the learning place.

- Emphasizes hands on and discovery-based learning.
- Farmers become experts.
- Integrated and learner defined curriculum.
- Doing is better than learning/ seeing.
- Experiences are the start of all learning.
- Link to actual field situations and should be relevant to local needs and problems.
- Participatory monitoring and evaluation.
- Fishermen are decision makers.

e. Market Led Extension (MLE) approach

In order to make farming more enterprising, extension professionals need to be pro-active beyond the regular objective of maximizing the productivity of the fishers by transferring improved technologies rather fishers should be sensitized on various aspects of farming like culture, harvest, quality, processing and value addition, consumer's preference and market intelligence. This will help the fishing community to realize high returns for the produce, minimize the production costs, and improve the product value and marketability that may lead to realize the concept of doubling farmers' income (DFI). With the globalization of agriculture, emphasis on productivity and profitability to the farm enterprises has been increased and, therefore the demand- driven agriculture (and allied sectors) has led to the paradigm shift from production-led extension to market- led extension. There are many challenges in the agricultural marketing system, which can be resolved through the efforts of market- led extension models.

In this approach, fishers are viewed as 'Fish-entrepreneurs' who expects high returns 'Rupee to Rupee' from his produce by adopting a diverse basket of package of practices suitable to local situations/ farming systems with optimum cost benefit ratio (C:B ratio) ensuring maximum share of profit by exploring the market demand. Goal of market led extension is to facilitate fishers to get better price. Market led extension focuses on harnessing the ICT tools to access market intelligence including likely price trends, demand position, current prices, market practices, communication network, etc. besides production technologies.

For farmers, as the extension system is more credible source of farm technologies, the extension personnel ought to be knowledge- and skill-oriented in relation to production and

marketing of agro-enterprises. Thus, revamping the extension system will have a catalytic role for ushering in farmer-led and market-led extension; which can subsequently alleviate poverty and ensure livelihood security. In the light of this, the challenge remains to motivate the extension personnel to learn the new knowledge and skills of marketing before assigning them marketing extension jobs to establish their credibility and facilitate significant profits for the fishing community. SWOT analysis of the market, Organization of Farmers' Interest Groups (FIGs), capacity development, establishing linkage and synergy, harnessing ICTs, digital marketing etc are the competencies required by the extension personnel in order to effectively implement market led extension.

f. Digital Extension approach

Extension reforms brought a transformation in fishery extension system through introduction of Information and Communication Technologies (ICTs). The ICT-enabled extension system referred to as Digital Extension has the potential for enabling the empowerment of fishing communities by improving their access to information and sharing knowledge with innovative e-agriculture initiatives (Saravanan, 2010a).

With the phenomenal growth in information and communication technology, use of ICT application in agriculture and allied sectors will bring remarkable change in the attitude and knowledge level of user. Basic requirement is to provide most appropriate information in such a capsule that can be easily understood and used by them. This approach will strengthen the extension system for better dissemination of technology. Hence, along with ICT-based advisory services, input supply and technology testing need to be integrated for greater impact and content aggregation from different sources require to be sorted in granular format and customized in local language for rapid adoption of technologies (Balaji et al., 2007 & Glendenning and Ficarelli, 2011).

The effectiveness of this innovative extension approach depends on capacity building, people's participation along with government initiative to provide strong infrastructure to be worked with the cutting-edge technologies. The farmer friendly technology dissemination process needs to be handled with careful planning by the incorporation of information communication technology. The use of ICT application can enhance opportunities to touch the remote farmers to live in close proximity of the scientific input. The computer based web portals namely aAQUA, KISSAN Kerala, TNAU AGRITECH Portal, AGRISNET, DACNET, e-Krishi, ASHA, India Development

Gateway *(InDG) portal, Rice Knowledge Management Portal (RKMP), Agropedia, KIRAN, AGMARKNET, ITC-e-Choupal, Indiancommodities.com, Mahindra Kisan Mitra, IFFCO Agri-Portal, Agrowatch Portal, iKissan, etc. along with some mobile based Apps like mKRISHI® Fisheries, riceXpert, Pusa Krishi, Krishikosh, m4agriNEI, CIFTFISHPRO, CIFT Lab Test, CIFTraining)* etc. launched in India are some of the successful digital intervention for technology dissemination.

The use of internet, mobile and video- conferencing assists the IT enabled farmers to utilize the facilities for their favors for which the most suitable permanent infrastructure is the basic requirement. Strong linkages need to be established between direct ICT interventions and it should be part of the national level program on holistic agricultural development.

g. Disruptive Extension:

Recently, a new extension technique christened as 'disruptive extension' comes into limelight which is considered as an innovative extension approach that creates a new paradigm of extension that eventually disrupts an existing approach followed by extension professionals in the field of agriculture and allied sectors with a pre-conceived idea about the field level problems. It is an entrepreneurial oriented sustainable extension system that can be able to transform every link in the food chain, from farm to fork, pond to plate and deck to door. It is a combination of different innovative extension techniques like ABCD, CRE (cost-recovery extension), MVSE, CBVD etc. blended with suitable conventional approaches, the fulcrum of which lies between resource exploitation on one side and resource conservation on another side that influence the livelihood security and technology sustainability for small scale farm holders. It deals with the following principles:

- Importance of good governance in agriculture (and allied fields) that considers the resource rights of the farmers.
- Emphasis on growing interest among the stakeholders by explicit analysis of field level issues for technology adoption.
- Potential to resolve the social conflicts for equal access to community resources through Memorandum of Understanding (MOU).
- Based on cost recovery mechanism.
- Ensure commitment to optimum resource management and maximum economic benefit to improve food security.
- Provision of community based social insurance.
- Maintaining the sustenance of the technology supports through custom hiring approach.

- Focus on pluralistic convergence of different partners to build a network of linkage with various entities around the farm households.
- Encouraging the farmers-scientist interaction for technology development, assessment and application through Farmers' FIRST approach.

When, global agriculture embraces diverse actors in its endeavour to feed about 10 billion people in the planet by the end of 2050, innovation in extension strategies and evolving advanced extension techniques are the key to address the growing challenges for fisheries entrepreneurship development, which need to be validated, integrated and scaled up and further recommended for large scale implementation by the policy makers. Finally, the concept of sustainability in fisheries articulates to Dr. APJ Kalam's concept of PURA to recommend a *rural entrepreneur-led hybrid model* of fisheries development to solicit sustainable cooperation among the suppliers (i.e., stakeholders to fishery resources), labour (including fishers) and capital (including professionals) that can bring the empowerment among the fisher community and put them at the centre stage of control alongside other stakeholders for fishpreneurship development.
