

RESEARCH FRAMEWORK AND HYPOTHESIS

3.1 Identification of Research Gap and Need of Current Study

Several issues are concerned with the recent agriculture situation in India, right from the natural resource degradation, technological advancement, production optimization, to marketing of produce etc. According to Schultz (1964), many farmers stayed poor not because they are “backward” but because their government provides them with little technical and economic support. These productive technologies are available but the farmers are reluctant to use them due to lack of information regarding effective technological implementation. The traditional agriculture extension has poorly responded in dissemination of agricultural information which results in an information deficit situation in India. The need has been aroused to transform the traditional extension system to pluralistic extension system, involving all the stakeholders in the agriculture value chain such as public sector, private sector, public-private partnership, self help groups (farmers groups) etc.

With the advancement of recent development in ICT sector in India, it has embarked as an important vehicle in providing information and knowledge to the agrarian community by expanding the geographical, cultural and social outreach. But the lack of relevant, accurate and timely delivery of information is the important factor affecting the farmers in an information and knowledge deficit situation. Several organizations which are involved in the enlistment of agrarian community are facing difficulties such as lack of two-way communication, specific and localized information, linkages among research institutions and extension workers as well as farmers (Chapman & Slaymaker, 2002). Farmers, therefore, are unable to exploit the wealth of agricultural knowledge that exists.

National Sample Survey Organization (NSSO) has documented that at all-India level which indicates that only 40% of farmer households accessed one or more sources of information on modern technology for farming (NSSO, 2005). The NSSO (2005) survey

found that out of the sixteen different sources about 16.7% of the farmers got their information on daily basis from other progressive farmers in their vicinity. Farmers consider input dealers (13.1%), radio (13.0%) and television (9.3%) as important sources of information. Recent studies show that the farmer's information needs vary according to their agricultural problems and socioeconomic circumstances (Villamil, Silvis & Bollero, 2008). Thus, by understanding the agriculture related information needs of farmers, different programs can be customized according to the needs of different groups. A limited number of published studies on farmer information needs and preferences have been done in India and other developing countries.

In Africa, Aina (2006) and Okwu & Dauda (2011) analyzed that various sources of information, several agricultural information needs and socioeconomic dimensions were the factors influencing the adoption of agricultural information behaviour of farmers. Similar studies have been conducted in developing countries to evaluate the role of various information sources in agriculture such as by Lwoga (2010) in Tanzania and Asaba et al. (2010) in Kenya and Uganda. In India, where more than half of the population is dependent on agriculture and allied activities, very few studies explored the factors that influence farmers' agriculture related information and its sources. But the usage as well as the coverage of these sources remains limited and their effects vary across states and farmer groups.

Mittal, Gandhi & Tripathi (2010) studied in Tamilnadu districts that most of the farmers had regular access to agricultural information by using a variety of traditional sources (television, radio, newspapers, other farmers, government agricultural extension services, traders, input dealers, seed companies and relatives). The market prices, weather information, information on diseases and plant protection, and seed information were identified as the preferred information needs by small farmers. Halakatti et al. (2010), in the Haveri district of Karnataka, found that farmers preferred television, radio and print media as immediate sources of information. Meitei and Devi (2009), in rural Manipur, found that farmers adopted information related to seed varieties, pesticides and fertilizers and the preferred medium was radio followed by television and newspapers.

Singh (1990) surveyed 120 farmers in Meghalaya and Sikkim and found that information needs were required in cultural practices of crops, plant protection and growing new varieties. Bhagat et al. (2004) interviewed 200 farmers in Jammu and Kashmir; and found that the progressive farmers were the most preferred source of information followed by

the extension staff of state department, television and radio. Riesenber (1999) in his study discovered nine sources of information transfer among which demonstrations, field trips and training were most preferred.

NSSO (2005) survey acknowledged that the farmers needed information on improved seed varieties, fertilizer application, plant protection, farm machinery, harvesting and marketing activities. On summing up the above literature, a range of diversified information needs can be categorized; choice of inputs (crop varieties, seeds, water, power, fertilizers and pesticides), market transactions, farm operations (tillage, sowing, water management, fertilizer management, pest management, harvest), post-harvest operations and transactions (storage, transport, marketing, processing, etc.) and some others got significance (Rao, 2007).

The information needed for effective decision making by the farming communities ranged from production planning, cultivation practices to post harvest stage and marketing. Production stage included crop rotation practices, crop production planning, multi cropping and soil testing. After production planning farmers needed field level operations to optimize the production of crops by adopting improved production technologies such as high yielding varieties (HYVs), integrated pest management (IPM), improved irrigation, fertilizer and credit. Post harvest operations required activities related to sorting and grading, storage, transportation and inventory to reduce post harvest losses and get the reasonable price of the product (Ali & Kumar, 2010).

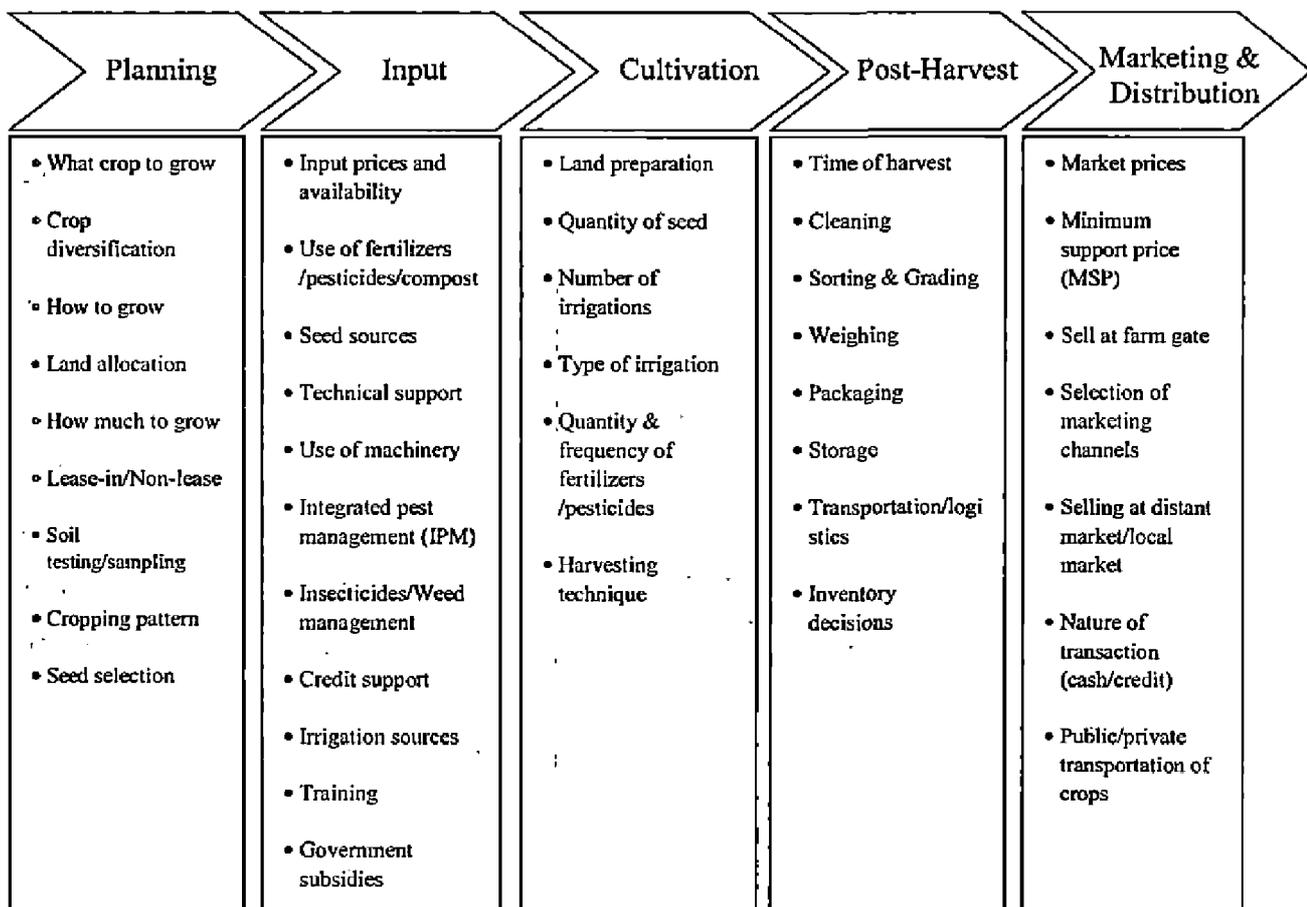
The six stage model was proposed consisting of twenty eight different agricultural activities encompassing crop planning or deciding, seeding and planting, growing, harvesting, packaging and selling (De Silva & Ratnadiwakara 2008, Mittal et al., 2010). Our study finds this gap and finally it is extended to five stages of the agricultural supply chain comprising planning decisions, input, cultivation, post harvest and marketing and distribution decisions.

Our study concludes on a range of activities affecting farmers decisions according to agricultural supply chain based on the related literature review. Planning decisions include the activities regarding crop choice, how to grow, soil behavior, cropping patterns (single or multiple crop choice) and selection of seeds (Castellazzi et al., 2008, Ali & Kumar, 2010). Input decisions comprise of timely plantation and price information of inputs (fertilizers, pest and weed management, government subsidies etc.) (Byerlee &

Hesse de Planco, 1986). Land preparation, use of machinery and irrigation facilities are some of the emphasized decisions regarding cultivation practices (Rolling & Pretty, 1997). On the basis of above literature review, forty one information needs have been identified in the context of farmer's decision making processes (in agriculture supply chain).

The underutilization and inadequate consumption of agriculture produce directs the farmers to make seriously concerned about the post harvest losses that occur in storage, packaging, transportation etc. (Ali & Kumar, 2010). At marketing and distribution stage, farmers must decide whether, when and where to sell the commodity for better price realization (Shilpi & Deininger, 2007). The agriculture supply chain will include the following variables (in Figure 3.1) at each stage of supply chain analysis employed in our study.

Figure 3.1: Stages and Variables for Agriculture Supply Chain Analysis



Source: Author

Thus, by integrating and implementing modern ICTs in diversified manner we can reduce the information and knowledge gap across the agriculture supply chain. Several ICT

projects have been launched to fulfill the unmet demands of innovative information delivery mechanism to the agrarian community for making right decisions related to their day to day activities, thereby improving overall performance of the complete agriculture supply chain (Ali & Kumar 2010, Kumar & Ali 2007).

Several factors affect the farmer's pattern of using diversified sources of information. An analysis of the NSSO (2005) survey showed that small and marginal farmers accessed less information as compared to medium and large-scale farmers (Adhiguru et al., 2009). Ali (2011) reported in his empirical study of vegetable growers of Uttar Pradesh that small land holders are more likely to use mass media than large land holders. However mass media are less important at the adoption stage because of their one way flow of information, which can be improved by transforming it into two way interactive medium (Adhiguru et al., 2009).

A number of ICT-based initiatives cater information regarding agriculture supply chain and extension services. With the emergence of modern ICTs such as mobile telephony, innovative community radio and television programs, video shows, information kiosks, web portals, rural telecenters, farmer call centers, video-conferences etc., ICT based agricultural extension brings incredible opportunities and has the potential to empower the farming communities.

A number of government, private and NGO based models (around 200) are involved in facilitating information as well as transactions to the farmers. These models correspond to heterogeneous behavior of service provision embedded with different technologies. A complete list of various distinct modern ICT-based programs operating in India is presented in Chapter 6. To make extension service delivery more effective and beneficial in its reach to target farmers, it is important to assess the potential of ICT models, where some are concerned with information provision only (lifeline, MSSRF and Boodikote); whereas Bellandur, AP online, Gyandoot typically operate in e-governance services. ITC e choupal and Warana models belong to transactional mode of service delivery (Dossani et al., 2005). A number of models also work as input supplier such as Hariyali kisan bazaar, Mahindra krishi vihar and Tata kisan sansar by Tata chemicals limited etc.

Thus, there is a need to better understand the impact of information and knowledge on agricultural decision making processes by analyzing the role of information delivery models in enhancing the decision making capabilities of farmers across the whole

agricultural supply chain (Ali & Kumar, 2010; Mittal, et al., 2010; Meitei & Devi, 2009). None of the study compared all the three types of ICT models (transactional, informational and e-governance) and a non-ICT model.

In our study we selected four models namely 'Lifeline', 'e-choupal', 'Common Service Center (CSC)' and 'Tata Kisan Sansar (TKS)' based on the services offered as well as their mode of working. We later discuss institutional structure, functioning and operations of these models thoroughly in chapter 6.

The study is specifically concerned with the following objectives.

- 1) To analyze the role of ICT in various agribusiness sub sectors.
- 2) To identify the source of information for effective decision making in various sub sector of agribusiness.
- 3) To evaluate the role of ICT in information delivery at all stages of agribusiness processes.
- 4) To analyze the existing IT driven agribusiness information delivery models and its contribution in strengthening agribusiness activities.
- 5) To identify the factors affecting ICT adoption for agricultural decision making.

3.2 Formulation of Research Hypotheses:

Several studies have analyzed the factors that affect information adoption by agrarian communities (Agwu et al., 2008; Feder et al., 1985; Ali, 2012). The researchers (Caswell et al., 2001; Yahaya, 2002; Isgin, Bilgic, Forster & Batte, 2008; Boz & Ozcatalbas, 2010; Tucker & Napier, 2002; Rogers, 2003; Rahelizatovo & Gillespie, 2004) investigated the relationship between farm size and adoption of technological farming information. Some (Nazarea-Sandoval, 1995; Ali, 2011) identified the social and cultural system of a society as a factor of ICT adoption and possession of mobile technology was also discussed by many (Qiang, Kuek, Dymond & Esselaar, 2011; Xiaolan & Akter, 2011). This study also empirically analyzes the factors affecting adoption of information using ICTs for better agricultural decision making among farmers. Three sets of hypotheses have been formulated by reviewing the related literature. This has been depicted in Figure 3.2.

H1: The socio demographic profile of farmers such as age, education, social category, farm income, secondary source of income are likely to have an influence on ICT based information use in agricultural supply chain decisions.

H2: Farm characteristics such as landholding size, leasing of land, and number of crops grown are likely to influence ICT based information use in agricultural supply chain decisions.

H3: A farmer's business characteristics are likely to influence information use in agricultural supply chain decisions. It is assumed that the farmers who receive membership of cooperatives, are aware of government subsidies, availed demonstration facilities and are owner of modern technological assets like mobile are more likely to adopt ICT based information.

Figure 3.2: Framework for Analyzing ICT adoption

