Impact of Knowledge Economy on Indian Agriculture

7.1: Introduction

This chapter has been subdivided into two segmentations-(i) knowledge economy in Indian agriculture, agribusiness and research and to assess the role of information technology in agricultural production, marketing, extension and management and (ii) agriculture marketing information system that provides information on global trends in agriculture and competitive prices of commodities, legislation that will improve agricultural production and marketing.

Section-I: Knowledge Economy in Indian Agriculture

7.2: Objectives of the Study

The main objective of this section is to find out the role of IT in Indian agriculture, agribusiness and research, and also to assess the role of IT in agricultural production and marketing, and what is more to find out the role of IT in agricultural extension and management. We would also study the impact of internet on the farming community, and also to describe how farmers become successful in agriculture, agribusiness and marketing of their products using IT.

In everyday life we see that all the economic agents are not equally knowledgeable. If this is the case then a more informed party may exploit a less informed party. Such opportunistic behaviour due to knowledge gap leads to market failure and this feature, in effect, destroys many desirable properties of competitive markets. In a competitive market in which everyone has full information, consumers can buy whatever quality good they want at its marginal cost. In contrast, when firms have information that consumer do not, that is, when information is not equally available to all, there will be two sharp classes of economic agents—one the gainers (obviously the more informed) and the other the losers (less informed or ignorant). This does happen in Indian agriculture. In
agriculture the big or large farms are more informed and thus are capable of exploiting the other groups (especially the small and medium farmers)

7.3: Knowledge Economy and Agriculture

Information Technology has a tremendous role in Indian agriculture, agribusiness, agricultural research, education and it is improving the quality of life of the people living in rural areas especially the farmers and agricultural workers. The beauty of IT is that it helps an average Indian farmer to get relevant information regarding agro-inputs, crop production technologies, agro-processing, market support, agro-finance and management of agri-business. The information technology can furnish timely and proficient advice to the farmers to develop the productivity as well as the marketing of agri-products in a better way. The excellent scopes of Internet has broaden the opportunities for farmers for crop forecasting, input management, command area management, watershed management, land and water resources development, drinking water potential mapping precision management, natural disaster management, fishery management, hill area development and post harvest management and proper price of their produce. Due to the uncanny price fixation by the middleman and intermediaries the farmers do not get the proper price of their products. The crux of the problem is the selling of agricultural produces in an unregulated manner. Information technology can help the farmers to communicate with the company directly and get the best prices for their produces using web portals. We can have a look on a case study of ITC Ltd.

e-Choupal: An ITC Initiative-A Case Study

Farmers using e-choupal (source: ITC)
ITC’s Agri Business Division, one of India’s largest exporters of agricultural commodities, has started e-Choupal in different villages of India. The system of e-Choupal is to link directly with rural farmers via the Internet for procurement of agricultural and aquaculture products like soybeans, wheat, coffee, and prawns. The main objective of e-Choupal was to tackle the challenges posed by the unique features of Indian agriculture, characterized by fragmented farms, weak infrastructure and the involvement of numerous intermediaries. Traditionally, commodities were procured in mandis (major agricultural marketing centres in rural areas of India), where the middlemen used to make most of the profit. These middlemen used unscientific and sometimes outright unfair means to judge the quality of the product to set the price. The difference in price between good quality and inferior quality was little, and therefore there was no incentive for the farmers to invest and produce good quality output. With e-Choupal, the farmers have a choice and the exploitative power of the middleman is neutralised. ITC Limited has provided computers and Internet access in rural areas across several agricultural regions of the country, where the farmers can directly negotiate the sale of their produce with ITC Limited. This online access enables farmers to obtain information on mandi prices, and good farming practices, and to place orders for agricultural inputs like seeds and fertilizers. This helps farmers improve the quality of their products, and helps in obtaining a better price. Each ITC Limited kiosk having Internet access is run by a sanchalak—a trained farmer. The computer is housed in the sanchalak's house and is linked to the Internet via phone lines or by a VSAT connection. Each installation serves an average of 600 farmers in the surrounding ten villages within 5 km radius. The sanchalak bears some operating cost but in return earns a service fee for the e-transactions done through his e-Choupal.

Real-time information and customised knowledge provided by 'e-Choupal' enhance the ability of farmers to take decisions and align their farm output with market demand and secure quality & productivity. The aggregation of the demand for farm inputs from individual farmers gives them access to high quality inputs from established and reputed manufacturers at fair prices. As a direct marketing channel, virtually linked to the ‘mandi’ system for price discovery, 'e-Choupal' eliminates wasteful intermediation and multiple handling. Thereby it significantly reduces transaction costs. Launched in June 2000, 'e-Choupal', has already become the largest
Chapter-VII: Impact of Knowledge Economy on Indian Agriculture

initiative among all Internet-based interventions in rural India. 'e-Choupal' services today reach out to over 4 million farmers growing a range of crops - soybeans, coffee, wheat, rice, pulses, shrimp - in over 40,000 villages through 6500 kiosks across ten states (Madhya Pradesh, Haryana, Uttarakhand, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Kerela and Tamil Nadu).

Success story of a farmer

Ashutosh Dixit
ITC-e-Choupal Sanchalak
Icchapur Village, Uttar Pradesh

(Source: ITC Ltd)

Ashutosh Dixit’s evolution as an e-farmer has transformed the quality of his life. Like Ashutosh, 4 million e-farmers in 10 states across the country are raising a better crop and earning fair rewards. Thanks to ITC e-Choupal. This is just one of the many ways in which ITC expresses its belief that country must come before corporation.

The application of Information and Communication Technology (ICT) in agriculture is increasingly important.

E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (IT) in the rural domain, with a primary focus on
agriculture. E-Agriculture is a relatively new term and we fully expect its scope to change and evolve as our understanding of the area grows.

7.4: IT for Agricultural Production and Marketing

IT is playing an important and vital role in agricultural production and marketing. IT allows farmers to save time on order and delivery and getting feedback. In the existing competition, there is a need to rapidly attract new customers as well as retain existing customers. In order to take the real status of agricultural production and marketing, there is an urgent need to develop the following items:

1. Farmers’ crop database must be managed. The database includes the kinds of crops, the size of cultivated area, time of harvest and yield. Farmers or the extension personnel transmit those data via the Internet to database server. Further, information provides the farmer with an important instrument for decision making and taking action.

2. Crops information service system should be created. This system analyzes the crop data to create some statistical tables. Farmers can access these statistical data by browsing the homepage and make their production plan. Changes within the structure of agriculture will probably have an impact on the selection and types of acquisition of software and other integrated systems made by the farmers.

3. Production techniques and information inquiry system should be created. This system integrates the production techniques and information, which are developed by experimental agricultural institutes and agricultural improvement stations. Farmers can find out relevant production information through this inquiry service system.

4. Production equipment’s inquiry service system should be created. This system gathers information from the companies of seeds and crop production equipment to build the production equipment’s inquiry service system. At the same time, allow relevant companies to access this system and enter their own data. Therefore, farmers can order the needed items through this system. Information is critical to the social and economic activities that comprise the development process. Development economy has witnessed for revolutions in agricultural (i.e. Green, white,
yellow and blue revolution), bio-technological, industrial and information technology. Good communication system and information system reinforce commitments to sustainable productivity. The Government of India is giving more thrust on agriculture, food and information technology sectors towards achievement of economic reforms to achieve high growth rate in production in the years to come.

### 7.5: Knowledge Management System and the Scope in Agriculture

The world is in midst of a knowledge revolution complemented by opening up to entirely new vistas in communication technologies. Knowledge has indeed turned out as a single most important area we need to concern with. If we mean development, we must deal with the issue of knowledge. It is not an overstatement at all when our ex-president of India A.P.J. Abdul Kalam pointed out that in the 21st century a new society is emerging where knowledge is the primary production resource instead of capital and labour. A new society is emerging and that society’s primary source is knowledge. Today, agriculture has become an area where the role of IT has become huge important for knowledge sharing.

The main phases of the agriculture industry are: Crop cultivation, Water management, Fertilizer Application, Fertigation, Pest management, Harvesting, Post harvest handling, Transporting of agri products, Packaging, Food preservation, Food processing/value addition, Food quality management, Food safety, Food storage, and marketing of agro produce.

All stakeholders of agriculture, industry need information and knowledge about these phases to manage them efficiently. Any system applied for getting information and knowledge for making decisions in any industry should deliver accurate, complete, concise information in time or on time.

### 7.6: Agricultural Research and Information Technology

The major contribution of agricultural research in India has been reflected in various agricultural revolutions during the post independence period. The result of agricultural research boosted the food production and we could see the Green, White, Blue and Yellow revolutions in the fields of Cereal crops (wheat), Milk, Fisheries and the Oil Seeds witnessing the Golden Revolution of horticulture crop production.
However with the advent of new emerging agricultural technologies there was a change in focus from increased production to increased efficiency.

Today’s agricultural research is based on demand-driven, not supply-driven. Sustainability in agriculture and food security has become much more important now a days. So here are the implications of IT we can observe. For this purpose, the findings of laboratory research have become much more important where the requirement of software has become immensely important. Dissemination of a careful documentation methodology and proper communication media play a significant role in agriculture. In this sphere, the Information Technology can be fully utilized for proper transfer of technology to the farming community and also those living in remote areas of villages.

For research documentation, experiments, and analysis of results presentations IT can be the best tool to identify the thrust areas of research in the changing scenario under Indian and global context. The skill to distinguish between what is urgent and what is important will hold key to the success in deciding priorities. Such skill can be acquired by IT.

**• IT for research documentations: Textual and Non textual documents**

Textual documents – To present information in the form of Written text e.g. books, periodicals, catalogues, statistical compendia, trade publications, patents, etc. and

*Non textual documents* - e.g. maps, plans, graphs, diagrams, posters, paintings, photographs, slides, sound tapes, films, videotapes, artistic monuments and magnetic documents for computer processing IT can be the best mean in agricultural research management.

**• IT in Research Communication:** The benefits of Internet connectivity can be utilized for better collaboration amongst scientists for exchange of their views.

**7.7: IT in Agricultural Extension Management**

The present age is called as an “information age”. People want adequate and authentic information as early as possible. Farmers as human beings are also anxious
and become more intended with the advancement in science and technology to know what is happening in the field of agriculture. Farmers are enthusiastic to obtain knowledge, particularly in the field of modern agriculture to become psychologically strong and conducive with necessary capacities to adopt modern methods of agriculture. In India, it is very difficult to contact each and every farmer in limited time to communicate latest agricultural technology. To diminish this difficulty, various mass media have a tremendous role to convey information to the broad means of people, particularly to the huge illiterate segment of the farmers.

In India various media, radio, television, literature and newspapers are mostly utilized by the extension workers to transfer agricultural technology to the huge illiterate and literate segments of the rural. There is a great transformation in agricultural extension approach in dissemination of knowledge. The advancement made in information technology is so fast that every areas of livelihood have to be well organized to tie up such technology. It has been seen that generally the benefits of information technology have restricted primarily to the urban areas. This is only due to lack of understanding about the new Information Technology in rural areas. Now after the revolution of IT a new approach has come up which actually strengthening the communication and training centres like Agricultural Science Centres and Farmers Training Centres which have reinforced the overall agricultural scenario.

The Agricultural Extension System (AES) has five important prerequisites: Regular training and maintaining of extension workers and functionaries at various levels in the specific knowledge and skills, monitoring the AES and understanding the constraints, strong information, documentation and publication support, effective institutional network for synergetic support, develop national and international linkages. For this strong information, documentation and publication support are very pivotal. IT can play significant role in this.

• IT’s role for the linkage between Research and Extension: The network between different agencies like Agricultural Science Centres (Known as Krushi Vigyan Kendra), Farmers Training Centres, Agricultural Technology Management Agency and Information Shops needs to be developed for useful linkage and proper utilization of available resources. The human resources will have to be trained in
usage of IT Tools and all infrastructure facilities required for strengthening the Agricultural extension System and Services.

7.8: IT in Agro-Based Rural Development

It is assumed that 60 to 8 percent of household consumption belongs to agricultural produces so agriculture plays an important role in industrial development, it provides raw materials to industries like cotton textiles, jute, sugar, tobacco, edible and non edible oils, leather, plantation industries etc. The food processing industries are also dependent on agriculture. Lots of agro-based materials are exported in European and Gulf countries by India. In all such agro-based industries, role of IT needs to be improved. IT Tools are very useful in creating effective linkages in agro based industry activities. These linkages are concerning dissemination of useful information. Linkages of the producers can be with State Federations, National Federation and Board, Finance Corporation etc. Advertisement is best way to add value of products. This market again can be very well established with available database of product wise information on products with comprising data of competing nations of the world. IT can help in this direction.

Role of IT in agricultural production

The IT Approach for commercial crops, horticultural crops or floriculture have to focus on Integrated System may be for plant nutrition or plant protection. The well established Integrated Plant Nutrition Approach and Management and Integrated Pest Management (IPM) need to be strengthened with the help of IT Tools. The Post Production Technology (PPT) needs to be utilized properly. The end user, beneficiaries and all concerned especially with export of agricultural produces need to be trained to access the Internet facilities available as one of the most useful IT Tools of the computer era.

Role of Geographical Information System (GIS) in agriculture

The use of IT through GIS is very encouraging in India. The important areas like Crop forecasting (procurement policy, crop insurance, relief measure), Cropping System (input management: fertilizer, Crop Diversification, intensification, degradation measures, sustainability measures), Command Area Management
Watershed Management, Land and Water Resources Development, Drinking Water Potential Mapping Precision, Natural Disaster Management (flood, drought), Fishery (inland, Marine), Hill Area Agriculture Development Management, Post Harvest Management and Precision Farming can be reinforced with the help of Information technology in India.

**Scope of rural Internet**

Experiences of Rural Internet users of many developing and developed countries indicate that the Internet provides them with a very convenient method for quickly accessing a large volume of information without being hampered by geographic barriers in the form of new ideas, discussion, expert advice, continuing education resources, increased global understanding and cultural awareness, and information that helps to make them better and more informed citizens. In addition to this, social benefits including new opportunities to overcome geographic isolation, increased social interaction, opportunities to organize advocate for social change, equalization of urban/rural disparities and new links between urban and rural communities were also experienced. Agribusiness users emphasize the Internet's value in enabling them to expand their markets to global audiences and to establish national and global business networks and alliances that would otherwise be inaccessible. Residents as direct Internet users while in other areas the capacity of intermediary organizations (such as extension field officers, NGOs, rural schools, libraries, health clinics, government satellite offices) need to be built up, or assistance given in the establishment and promotion of community information centres linked to the Internet.
7.9: Establishment of Information Centers in Villages

It is stressed that Internet initiatives for rural and agricultural development must consider the fact that different regions, organizations and communities have different applications and technical needs. In some areas it is possible to have farmers and rural residents as direct Internet users while in other areas the capacity of intermediary organizations (such as extension field officers, NGOs, rural schools, libraries, health clinics, government satellite offices) need to be built up, or assistance given in the establishment and promotion of community information centres linked to the Internet.

Successful rural and agricultural Internet communication and information systems have some common elements. Some of the elements include preliminary participatory assessment of communication and information needs with intended users. Awareness building, sensitizing decision makers; commitment to participatory rural and agricultural development; user participation in design, implementation and
management of information and communication services and commitment to manage and sustain these services; provision for technical training, user support and outreach within the user community.

In our country services provided by the Government are inadequate both in terms of infrastructure, technology and in empowering people with information. To provide information to local rural people through satellite based communication technology according to their needs and demands, Information centre at village level can be established by involving local people in choosing the actual location of centre, providing rent free space and electricity and recruiting volunteers.

This concept was first implemented in Sweden. Information centres in isolated rural communities with Pentium personal computers, printers, a modem, a fax machine, Internet and electronic networks, access to databases, libraries and a consultant can make information accessible to a wider audience. Such centers not only facilitate single-point access to external information services e.g. government marketing and price information or to global information through the WWW, but also help in organization of virtual village-to-village meetings and tele-training events thus facilitating local sharing of information.

Each centre should contain data on agriculture, health-related information especially for the rural farmers, women and children. A directory of government schemes should be made available to rural families on local prices of agricultural input or produce, cultural/public events in the locality, local transport/traffic details including timing, grain prices, general and crop insurance schemes, hospitals and medical practitioners, as well as information about integrated pest management in various crops. These databases should be in local languages.

7.10: Application of IT based agricultural communication in India

The global communication revolution has been an important part of our country and now India is opening up to the world economy. As result, the situation has changed dramatically. Like other people, farmers also want latest, newest, most modern, most up-to-date, up-to-the-minute and most recent information of any corner of the world at there door. A few years back it was difficult to get such information
for Indian farmers, but now many spectacular, wonderful, amazing, fantastic, excellent and fabulous satellite based communication facilities are available in the hand of Indian farmers.

There are cases of application of information and communication technologies in extension that have made a difference in the delivery of extension services in rural India. Some of these include the Warana Wired village Project in Maharashtra; Milk collection in dairy co-operatives (National dairy Development Board); Information Villages Project (MS Swaminathan Research Foundation-International Development Research Centre); Information Technology application for Indian Rural Postal System (CMC Limited, Hyderabad); Knowledge Network for grassroots innovations (IIM, Ahmedabad); Application of Satellite Communication for Training Field Workers and Extension Workers in Rural Areas (ISRO); Computerisation of Mandal Revenue Offices (MROs) and computer aided administration of revenue department in Andhra Pradesh.

**Warna Wired Village Project: A Case Study**

Warna Nagar, a cluster of 70 villages in Maharashtra is a central eye of the "Wired Villages" project. In 1960, a visionary like Tahasaheb Kore propagated the idea of co-operatives in Warana Nagar, as a method of achieving socio-economic development. He showed how this could bring all the farmers together; to share information, increase productivity, and profits. Thus was born the "Warna Nagar Co-Operative Society". The society has a Chairman and a Board of Members and is free from political influence and society members are free to elect the board members. There are about eight sub co-operative bodies, working under this main society viz.; Warna Dairy Development Society, Warna Co-operative Bank, Warna Foods, Warna Women’s Co-operative society etc. Sugarcane is major crop of this area and most of the sugar production of the two districts Kolhapur and Sangli is processed at this Society. From each village 200 - 300 farmers are registered as society members.

The "Wired Village" project was initiated by Mr. Vinay Kore, the son of Mr. Tahasaheb Kore and the present Chairman of the Warna Co-operative Society two years ago and actual implementation began in April 1998. The Project has been jointly implemented by GOI through National Informatics Centre (NIC), Government
Chapter-VII: Impact of Knowledge Economy on Indian Agriculture

of Maharashtra and Warna Co-operative Society with the share of financial support being in the ratio of 50:40:10. The manpower and maintenance cost is borne by the Warna Co-operative Society itself. The project area is a cluster of 70 villages consisting of 46 villages from Kolhapur and 24 villages from Sangli districts of Maharashtra. This project has been initiated to serve the information needs on different crop cultivation practices of major crops, sugarcane cultivation practices, pest and disease control, marketing information, dairy and sugarcane processing information etc. to the farmers, right up to their village level.

NIC, Pune was involved in setting-up the hardware and software and NIC, Delhi established connectivity of WAN links such as VSAT and dial-up connections. The software required for the system such as web page designing, database designing and client based applications used by the farmers such as dairy; sugarcane information systems had been developed by the NIC, Pune.

Satellite Krushi Gosthi: A Case Study

Like all other State Agricultural Universities, Gujarat Agricultural University also performs triple functions of teaching, research and extension education. The research generates technologies, which can be utilized by farmers and rural people. The present system of the transfer of technology from Gujarat Agricultural University (GAU) to extension functionaries of the development of the State and in turn to the ultimate users consumes considerable time. Looking to this reality the GAU has prepared a major plan under the name of “GAU Satellite Krushi Gosthi” to apply modern tools like satellite linkage for agriculture sector. The GAU is the first in all SAUs, where such kind of facility has been installed. The GAU satellite Krushi Gosthi for transfer of technology can reduce the time lag to a considerable extent the system helps for large area coverage as well as noticeably reduces the distortion in message transfer. Such facility provides facility for two-way conversation. It helps farmers to get on the spot solutions of their questions and queries regarding the live programmes while watching it at the classroom end. This facility makes possible to keep a live contact between the scientists of the university and the farmers of the state.
Features of the System

A satellite based distance interactive education system normally consists three elements, first TV studio from where scientists deliver the talk through live programme, second a number of remote classrooms or Direct Reception Centres (DRSs), with the facility of TV set and STD telephone, from where farmers can watch the live programme on TV sets and third satellite linkage to transmit live programme given by scientists from the TV studio to farmers at DRSs.

The Gujarat SATCOM Network has full capability for one-way video and two way audio. RESCO has established SATCOM Network consisting of TV studio at the capital city of Gujarat. The video and audio from TV studio are digitally transmitted to the classroom ends (DRSs). The return audio at classroom (DRSs) is available through STD lines. This facility is used to keep a live contact of the scientists of the university delivering a talk from the studio with those farmers who are watching live programme at the classroom ends. At present more than hundred Direct Reception Stations (DRSs) to receive transmission are already established throughout the state with the collaboration of different departments of Government and NGOs. GAUSATKRU has vital linkage with them. This system helps farmers to receive information regarding inputs as well as markets. This latest satellite based communication facility is also useful to the students of the university to interact with the dignitaries or experts of agriculture field. To reduce time lag to a considerable extent, such type facility can also be installed in other State Agricultural Universities. Such facility needs to be strengthened at village level with the collaboration of NGOs, schools, co-operatives and Government organizations.

7.11: Government of Andhra Pradesh’s effort to apply IT in Agriculture

Satellite based Information and communication technologies are an important part of the Government of Andhra Pradesh’s efforts to improve the efficiency of its administrative offices. AP is the first state in India to design a statewide computerization programme that will be used in rural areas, at the administrative unit above the village-level panchayat. There are 1124 mandals in the state. The first software application is the issuance of certificates pertaining to land holdings, caste,
nativity and income across a common counter, without the current delay of 15 to 20-days. The AP State Wide Area Network (APSWAN), aims to link the state government’s Secretariat with 23 District Headquarters, serving as the backbone for "multi-services" (voice, video, and data) that would be used for improved co-ordination between state headquarters and district offices in managing various regulatory, developmental, and hazardous mitigation programmes of the state government. Mandals will be served by this two-way communication, and electronic commerce applications will be developed. The AP Value Added Network Services project hopes to deliver a variety of public services through a large network of information kiosks. The Computer-aided Administration of Registration Department (CARD), a project of A.P. aims to introduce a transparent system of property valuation, which is easily accessible to citizens.

**MANAGE’s efforts to Apply IT in Agriculture**

The National Institute of Agricultural Extension Management, MANAGE, Hyderabad, has taken-up a number of "Cyber Extension" initiatives, across the country. District level Web Sites are being hosted, Information Kiosks are being established at block/ Mandal and village levels and technical and other need based information is being collected, digitized and hosted on the Internet.

**7.12: Conclusion**

Information Technology is the buzz technology now-a-days. It is the technology that is helping to exchange the information in fast and easier way. Due to this technology the distance between or the difference between the nations is reduced and now world is becoming a global village. This technology provides an opportunity to the developing nations and under developed nations so that can build up their strategies and compete with the developed nations.

In any sector information is the key for its development. Agriculture is not exception to it. If the relevant and right information in right time is provided, it can help agriculture a lot. It helps to take timely action, prepare strategies for next season or year, speculate the market changes, and avoid unfavorable circumstances. So the development of agriculture may depend on how fast and relevant information is
provided to the end users. There are other traditional methods to provide the information to the end users. Mostly they are inoculated, untimed and also communication is one way only. It will take long time provide the information and get feedback from the end users.

So now it’s time to look at the new technologies and methodologies, which will benefit developing nation like India, which can help it to become the super power. There are many ways in which Information Technology can be used to exchange the information rather effective communication like information kiosks which provide not only the basic services like email, helps in education, health services, Agriculture and Irrigation, online trading, community services etc., expert systems which helps in determining marketing alternatives and optimal strategies for producers, integrated crop management systems for different crops, Farm-level Intelligent Decision Support system developed to assist in determining optimal machinery management practices for farm-level system. Many organizations and Institutes are utilizing the information technology to provide solutions to the problems faced by the agriculture sector in a cost effective manner with proper business models.

So like other area without of Information Technology agriculture is nothing now-a-days.

**Section-II Information and Knowledge in Agricultural Marketing**

**7.13: Introduction**

Information is significant to the social and economic activities that comprise the development process. Development economy has witnessed agricultural, industrial and information technology revolutions. Good communication system and information system reinforce commitments to sustainable productivity. Information system is a process that transforms data into information. When this information is further refined it acts as a basis for decision-making leading to the development of decision support system. Information and knowledge have the paramount importance to perform marketing functions systematically and continuously and making it available to market participants in a form relevant to their decision making. Information can enhance efficiency if it is used to aid decision making and
management of risk (King and Sonka, 1985). The purpose of such information is to continuously enhance market transparency through Creation of stimuli by indicating market opportunities and competition among suppliers and traders. Farm producers attempt to mitigate risk and uncertainty by utilizing accurate and reliable information (Jones et al. 1990).

Olukosi, Erhabor and Demiryurek identified the need for agricultural marketing information as a major tool for farmers to make economic decisions that would benefit them and thus enhance their market access. According to them, marketing has a connection to immediate income and is dependent on useful information and knowledge, which enables the farmer to make decisions on what to produce, where, when and the price to purchase inputs, as well as availability of transportation, and where and how to dispose of produce. In the initial stages of economic development agriculture marketing information may not available to stakeholders in all aspect. A need for an information service first appears with rising market production and a falling significance of subsistence production. Therefore its content and extent should be in relation to such development. Information plays a major role to marketing and distribution of commodity as well as in the overall farm enterprise in terms of income generation and sustainability. Farm producers often use information to minimize their risk exposure or increase their expected income (Bullock at al, 1982). Poor information dissemination process create sever limitation to the growth of the agricultural sector and a huge constraint in food and income chains of rural area.

Agricultural sector has variety of information user community. According to Kaniki, (1995) and Adimorah (1995) agricultural information user populations are basically farmers, traders, researchers, extension workers, agribusiness personnel, bankers industrialists, economist and policy makers. All those uses have different types of information needs. The farmers need information to know the procedure of increasing output, the use of fertilizers, useful pesticides, high yielding seeds, testing needs of soils access to credit facilities, marketing of their products, etc. Traders need information of demand, supply and price of commodity. The extension workers scope of needing information is confined to serving the farming community and making them empower with latest information on improving the farm productivity. However,
information on variety of needs such as of resistant seedlings, control of major pests, credit sources etc. as well, as providing information on farmers’ problems to the researchers. The agribusiness personnel are interested in product information that will increase farmers’ output, current information on various agricultural products that will improve agricultural productivity. The academician, researchers and Scientists need information to make them aware of knowledge in their concerned subjects to keep them abreast of the latest development in agriculture so as to improve the quality of research work. The industrialists require information on export commodities, up-to-date world markets rates and prices of commodities. The bankers on the other hand, are interested in lending rates as it affects agriculture, current world markets and prices of commodities, feasibility studies on various aspects of agricultural production and loans and credits (Aina, 2008). Policy makers and economists require information on global trends in agriculture and competitive prices of commodities, legislation that will improve agricultural production and marketing. With such a wide spectrum of the various information needs of agricultural stakeholders, it is very clear that information professionals need to develop a strategy of information provision so as to satisfy the information needs of those information users in agriculture.

### 7.14: Agriculture Marketing Information System

A marketing information system (MIS) consists of people, equipment and procedures to gather, sort, analyze, evaluate and distribute needed, timely and accurate information to marketing decision makers (Kotler and Aamstrong, 2002). Figure 5.1 shows a typical marketing information system and how components of the system are interrelated. MIS distributes information to the concerned stakeholders in the right form at right time to help them make better decisions.
The key components of marketing information system include information collection, analysis, and dissemination. Most of the marketing information systems have established linkages with other organizations and have subscribed relevant published documents like journal, newspapers, and website to collect information. Most of the marketing information systems have used multiple sources of information, a range of analysis, and various media to deliver useful information to the target clients. The large scale marketing information systems have developed sophisticated database and have heavily used information communication technology to collect, analyze and disseminate the information. In general, there is a growing trend of using information communication technology to strengthen the marketing information systems. Most information is transmitted through radio, cell phones, newspapers, email or websites.

The main purpose of agricultural marketing information system is to disseminate accurate and timely marketing information so as to support in marketing decision making and marketing efforts of farmers, traders, government, development organizations, academicians, and researchers. Agricultural market information system helps in ensuring that produce goes to markets where there is a demand for it. It shortens marketing channels and cuts down on transport costs. It helps to ensure that in each marketing transaction all participants share the risks and benefits. However, this does not happen if marketing information is distributed unequally. Many small
and medium scale farmers in India are bearing the loss in their transaction with greater part of the risk, while the traders end up with the greater part of the profits. Farmers must be able to seek out and compare the information available for different outlets if they are to sell to best advantage. Price information is less useful if there is only a single market outlet, or if farmers are price takers rather than price seekers. There is a very wide gap between the farm gate price, wholesale markets price and retail markets price. Marketing information can help narrow the gap. Marketing information system helps to attain efficient or competitive markets through reduction of information asymmetries among the participants, which leads to reduction in costs and maximize profit sharing to the participants. It helps to increasing market transparency. MIS improves market efficiency in terms of helping to establish the law of one price, where there is reduction in price dispersion. Improved market information helps in the reduction and managing price risks and allows market participants to make better production, marketing and consumption decisions that result in efficient allocation of productive resources. Market information helps farmers and traders to identify new market opportunities and reliable trade partners.

7.15: Marketing Information System of Indian Tobacco Company (E-Choupals)

Over seventy percent of India’s population lives in its 640,000 villages, for most of whom agriculture is the main source of livelihoods. The farmers are generally poor, and each of them generally owns just about a hectare of land. As they are situated in the remote places, they do not have updated information that impacts their agriculture practices and sales. They have very little bargaining power when they buy farm inputs or sell their products and the physical, social, and institutional infrastructure in rural India is generally weak (WB 2004).

Government interventions basically focus on dissemination of best farming practices and open auction system for better price discovery of farm produce. These supports mechanisms are helpful to improve production system and would be quite enough for a supply-driven business model. In the absence of any marketing information and support mechanism, the farmers have to sell their products to middlemen, who often offer them a complete package of solution- credit, inputs, and
market access. Thus, the middlemen, who can block the marketing information and create singles in their favor, enjoy a large chunk of profit from the trade of agricultural products (WB 2004). This situation in rural India was seen differently by Indian Tobacco Company (ITC). It was trying to diversify its business from the shrinking tobacco industry. It decided to establish a new business model by linking the rural communities with its marketing information and support system. Choupals, a meeting place in rural India, were targeted as the point of entry into the rural households for dealing in ITC products.

ITC targets the areas from where it has already been buying agriculture products for its MIS activities. The villages fairly accessible for market support and with population in between 1,000 to 5,000 are selected (Jain 2004). Farmers, who lacked marketing information about their products, were at disadvantaged situation and often reaped off by the middlemen. They needed not only the marketing information like price, demand, and quality, but also the alternative channel of marketing. Besides, the agricultural marketing system needed to address the problem of long marketing channels sapping the profit margins, fragmented and dispersed rural agriculture market, and weak infrastructure. To address this, e-Choupals system aggregates the supply and demand of the thousands of farmers; offers direct business links to ITC; provides marketing information about the products of farmers; and lets the farmers explore the competitive offers.

In the selected villages, ITC sets up internet kiosks and transforms them into e-Choupals. For those places, which face shortage of phone lines and electricity, ITC provides VSAT satellite links and solar batteries. Selected farmers are trained on use of the system. Educated, entrepreneur type of local farmer or trader is carefully chosen to be an e-Choupal manager (called sanchalak). The e-Choupal is connected to the websites which ITC cautiously creates in local languages for the farmers targeted. A website for each of the crops, such as soya, wheat, coffee and aquaculture (shrimp) is setup. ITC updates the information and makes sure that the content is relevant. As for the input supply information, at least three input suppliers are enlisted for each category of inputs, such as seed, chemicals, and nutrients. Sanchalaks help the farmers access the different agricultural crop-specific websites. For their services, they earn commissions for the transactions facilitated by them through the system to ITC or the
third party affiliated to the system. With this, the farmers can gain market knowledge about their products as well as they can browse websites to know farming techniques, price trend, weather forecast, etc. For this, they do not have to pay anything, and they are also free to sell their products to any place they choose. The system links the farmers to the agricultural universities, newspapers, meteorological departments, banks, and technical analysts for the information. If they wish they can sell their product online, farmers can also order agricultural inputs online with the help of the sanchalak. The system helps achieve virtual aggregation of product supplies from the farmers, reducing costs of procurement to ITC. On the other hand, the farmers can also gain by aggregating their demands for inputs. Farmers even consult an agronomist by e-mail when they find some diseases or problems in crops. They can also seek for other services like sale and hire of tractors and harvesters, soil testing, and insurance (Jain 2004, WB 2004). A panel of specialists answers specific queries of individual farmers through email, and service providers extend their services to the farmers. e-Choupal thus links the Indian farmer with consumers in local and national markets, by leveraging ITC’s proven competencies in marketing and distribution of agricultural commodities (WB 2004).

E-Choupal has empowered the farmers with information and helped improve their decision-making. Farmers do not have to pay for accessing the information, and they are free to decide whether to sell their produce to ITC or other buyers, or sell through the government auction center. Price is known in the villages before farmers incur any cost of transportation. As a result, farmers can choose the right place and time to sell, and they can avoid many overheads, such as multiple transportation, and handling. As it has created transparency in trading and market competition, farmers get benefits from more accurate weighing, faster processing time, and prompt payment. Farmers can earn higher incomes through increased prices, higher yields, better quality, and lower transaction costs. It is claimed that farmers selling directly to ITC through an e-Choupal realize at least 2.5 percent higher price for their crops than they would receive through the government auction system because of lower transaction costs. Farmers also benefit through lower prices for farm inputs. On the other hand, ITC benefits from decreased transportation and commission cost, which is reported to be 2.5 percent lower (WB 2004).
ITC also has more direct control over the quality of what it buys. The information provided directly to the farmers has resulted in improved planning and better relationships of ITC with the communities. ITC also earns by levying service charges to others participating companies, who find e-Choupal cost effective for distribution of their products to the villages. A number of companies market packaged consumer goods, personal care products, household appliances, and fuel through the e-Choupals. Sanchalaks also make money as they receive commissions from ITC and participating companies on all the purchase and sale transactions done through e-Choupals. As they have to compete with other marketing channels, entrepreneurial types of Sanchalaks try to meet the needs of farmers by customizing the offers.

In addition, villages have got free access to internet, which has opened up a window to the world. People also check local language news and entertainment sites. The possibility for e-Choupals is enormous, for example, government services can go online, micro-credit organizations can offer services in the small villages, and consumer goods firms can extend their networks into villages. As of March 31, 2004, it is reported that e-Choupal services reached to about 24,000 villages with 42,000 kiosks benefiting over 2 million rural farmers and expanding rapidly with seven kiosks added everyday (WB 2004). ITC intends to reach 10 million farmers in 100,000 villages by 2010. Recognizing its impacts, International Chamber of Commerce, United Nations Development Programme, and Prince of Wales's business forum jointly have honored ITC with Prince of Wales's business forum World Business Award.

The case shows that MIS system itself can be a core capability of a private enterprise when it supports to streamline the supply and distribution chain. Contrary to the common belief that the MIS system of private company is only tuned to their business strategic needs and profitability, the agri-enterprise MIS has shown that it is equally beneficial for the farmers. The perfect match between the need of the private company and those of the farmers has created win-win situation for both parties, and has increased the total economic gains in the agriculture business by reducing the inefficiency in the supply chain. However, this success owns much to the resourcefulness of the enterprise and their strategic choice to implement the MIS in a fashion contributing to the both parties and to the overall economy.
Furthermore, the market information system has increased its relevance to the farmers as it has incorporated the information, such as weather, best practices, input supplies, etc., which is relevant for the farmers. The strategic alliance among universities, other companies, and media houses to provide the content to the marketing system has made the system even more robust and cost effective in terms of information collection and management. Though initial invest is high, utilizing the information technologies appropriately, the system has been able to reduce the cost of market system operation per target farmer. And linking this system with e-commerce activities, the company has increased the credibility and usefulness of the system for the rural farmers. As the farmers and other actors are feeding data each time into the system, the capacity of system to generate even more useful analysis and information will certainly increase as the time progresses.

As the ITC’s business model powered by e-Choupals increased market transparency and empowered the people with knowledge and information, the case shows that the farmers started to improve their agricultural practices and marketing decision making, and ultimately increased their incomes. On the other hand, it threatened the more traditional types of trading occupations (WB 2004). Traders could not compete with the system or their incomes from the agriculture trade declined. However, as the traders were more entrepreneurs, in some places they took the new role of Sanchalaks. As the changed business environment is creating difficulty for them to unreasonably gain, they are changing.

The private sector investment, strategically alignment with the business model of ITC, and warm welcome from the communities indicate that this marketing information system is a sustainable model. Although its replication in other areas and sectors seems difficult and demands careful planning, this model however shows a good learning points for developing agricultural marketing information system and marketing interventions.

7.16: Role of Knowledge and Information in Marketing of Agricultural Commodities

Market information plays a vital role in marketing of agricultural produce. If the information on commodity prices prevailing in various markets is made available,
the farmers would be able to get better price to their produce by moving their produce to the market which pays higher price. Market information expands knowledge among traders and producers, which reduce transaction costs, enable farmers to purchase inputs, and enhance farmers’ ability to fine-tune production strategies to match the accelerating rates of change in consumer demand and marketing channels. Greater access to information seems to help farmers make better decisions around transportation and logistics, price and location, supply and demand, diversification of their product base, and access to inputs. Market information strengthens farmers’ position in their day-to-day trading and, over time, market intelligence enables them to focus on satisfying consumers’ and buyers’ demands and on developing relationships with stakeholders in the next stage of the value chain. The key development challenge lies in assembling and disseminating this information in a timely manner, not just to traders or farmers but also to consumers.

The purpose of such information is to continuously enhance market transparency through Creation of stimuli by indicating market opportunities and competition among suppliers and traders. This also reduces of seasonal and erratic price variation and associated market risk. Relevant, meaningful and reliable information enhance the performance of agriculture marketing. It facilitates marketing decisions, regulates the competitive market process and simplifies marketing mechanisms. Market information is a means of increasing the efficiency of marketing system and promoting improved price formation. It is crucial to the farmers and traders to make informed decisions about what to grow, when to harvest, to which market produce should be sent and whether or not to store it. Improved information should enable traders to move produce profitably from a surplus to a deficit market and to make decisions about the viability of carrying out storage where technically possible. Most of the farmers today still lack a good understanding and capacity to use market information in guiding their production and marketing decisions. All the Indian states depend on interstate trade for major agricultural and horticultural commodities. Hence dissemination of market information (demand, production and prices) plays a vital role in the functioning of the whole market, by harmonizing the competitive marketing process. By helping ensure that produce goes to markets where there is a demand for it, it shortens marketing channels and cuts down on transport
costs. It helps to ensure that each marketing transaction is a fair one, and that all participants share the risks and benefits.

In fact, marketing information plays a vital role in the functioning of the whole market, by regulating the competitive marketing process. By helping ensure that produce goes to markets where there is a demand for it, it shortens marketing channels and cuts down on transport costs. It helps ensure that each marketing transaction is a fair one, and that all participants share the risks and benefits. However, this does not happen if marketing information is distributed unequally.

**7.17: Agriculture Marketing Information Network Infrastructure**

Market information is needed by farmers in planning production and marketing, and is equally required by other market participants in arriving at optimal trading decisions. The existence and dissemination of complete and accurate marketing information is the key to achieving both operational and pricing efficiency in the marketing system. A central sector marketing research and information network scheme was launched by the Department of Agriculture and Cooperation in March, 2000. The scheme aims at progressively linking important agricultural produce markets spread all over the country with State Agricultural Marketing Boards and Directorates and the Directorate of Marketing and Inspection (DMI) for the effective exchange of market information. The Agricultural Marketing Information Network (AGMARKNET) is being implemented jointly by the Directorate of Marketing and Inspection (DMI) and National Informatics Centre (NIC), using National Information Network (NICNET) facilities available throughout the country. The objective of the scheme is to facilitate the collection and dissemination of information for better price realisation by the farmers. The information covers market, price, infrastructure, and promotion related issues for efficient marketing. The markets report daily prices and arrival data using a comprehensive national level database at the AGMARKNET portal (http://agmarknet.nic.in). Wholesale prices and arrival information in respect of more than 300 commodities and 2,000 varieties are being disseminated through the portal on a daily basis. More than 3,000 markets have been linked to the Central AGMARKNET portal and more than 1,900 markets reported data during the month of January 2010 (Govt. of India, 2010).
The information of weekly and monthly prices movement and arrivals are also being disseminated by the AGMARKNET portal. Several other market related informations like standards and grades, physical infrastructure for storage and warehousing, marketing laws, fees payable, commodity profiles etc are provided by this portal. The portal provides information about schemes of the DMI, weather information, e-directories of markets, CODEX standards etc. It provides weekly trend analysis for important markets in respect of major commodities. Besides spot prices, the portal also provides access to future prices. Further, it is constantly being enriched with various informations. Prices and arrival information are being disseminated in nine languages. The portal also serves as a single window and has linkages with various organisations concerned with agricultural marketing.

This AGMARKNET project networked 735 Agricultural Produces Wholesale Markets (APWMs), during 2000-02. Again, during the tenth five-year plan (2002–2007), 2000 additional markets are being networked. To start with, 810 AGMARKNET nodes have been established in the country during ninth plan period. This includes 735 agriculture produce wholesale markets, State Marketing Boards/Directorates (48) and DMI offices (27) spread all over the Country (Govt. of India, 2007). Under this scheme at present about 3011 AGMARKNET nodes (table-1) have been promoted in the country so far. Out of these, 92 percent have been promoted in the agricultural markets whereas remaining are used for monitoring and follow up. The availability of AGMARKNET nodes per thousand Sq. Km of area is not even one. However their availability per thousand tones of produce is six. Intensive efforts are required to expand the AGMARKNET nodes in the states of Assam, Bihar, Jharkhand, Manipur, West Bengal, Orissa, Punjab, Uttar Pradesh and Uttarakhand.

The AGMARKNET project has led to a nation-wide information network for speedy collection and diffusion of market information, computerization of market related information ensuring regularity and reliability of data and increasing the efficiency in agricultural markets. AGMARKNET project has also been designated as one of the Mission Mode Projects of the Department of Information Technology (DIT), Government of India, and has won recognition nationally and internationally, for effectively fulfilling the objective of speedy collection and dissemination of
agricultural marketing information for better market access and price realisation by the farming community. It is hoped that in due course of time it would be an on-line marketing information service useful to all the stakeholders on agricultural marketing system of the country. It has an immense potential to service all the market participants to face the new challenges emerging out of liberalisation and globalization of agricultural sector. State-wise AGMARK Nodes in India have been shown in table-7.1.

Table-7.1: State-wise AGMARK Nodes in India

<table>
<thead>
<tr>
<th>States</th>
<th>Agmark Nodes</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per 1000 Sq.km</td>
<td>Per 1000 MT</td>
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<tr>
<td>(August 2010)</td>
<td>(August 2010)</td>
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<tr>
<td>Andhra Pradesh</td>
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<td>Gujarat</td>
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<td>Haryana</td>
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<td>Sikkim</td>
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<tr>
<td>Uttarakhand</td>
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<td>5.84</td>
</tr>
<tr>
<td>West Bengal</td>
<td>56</td>
<td>0.63</td>
<td>1.34</td>
</tr>
<tr>
<td>All India</td>
<td>3011</td>
<td>0.92</td>
<td>6.40</td>
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</tbody>
</table>

Source: Compiled from the data obtained from Directorate of Marketing & Inspection, Ministry of Agriculture, Govt of India, Faridabad.
7.18: Finding a Suitable Channel for Agricultural Marketing: Role of Knowledge/ information

Efficient market information provides positive benefits to the farmers, traders and policy makers. Up-to-date market information enables farmers to negotiate with traders. Well analysed historical information helps farmers make decisions about new crops to grow and helps traders make decisions about the viability of inter seasonal storage. Market information can also be used by planners to help monitor food availability and to identify shortages. Market information enables farmers to make informed decisions about what to grow when to harvest, to which markets produce should be sent and whether or not to store products.

It has been observed that in the rural markets, the marketing activity is largely dominated by the private traders. Farmers are generally not aware of market information like supply, demand, prices prevailing in the market, market charges etc., which are crucial for proper decision making. There is no system of disseminate market information for the benefit of the producers and consumers. As such, the farmers who are in the villages have no chance to know the prevailing prices in the neighbouring markets at subdivision and district levels. They are never sure what price they will get until they reach the market. Prices fluctuate particularly in the peak season, when many farmers try to sell their production, under such circumstances the rural producers largely accept the price quoted by the traders. On the other side, due to various economic reasons like indebtedness, need for cash, insufficient storage, lack of adequate transportation and other infrastructure facilities farmers are also at a disadvantage in striking the bargain. As a result, they are forced to carry out distress sales.

Majority of the small farmers sell their produce to middlemen or in the nearest ‘mandis’ where the middlemen have a full control on deciding the price. The farmer does not have any interaction with the traders nor does he know the prices ruling at nearby markets. By making commodity prices and market information on real time basis available, the farming community can be provided with choices that they lack today. This will ensure better price realization and stimulate a drive towards better productivity. Farmers who grow cash crop can also be enormously benefited by
information and can forecast future prices of commodities. This will prevent the
tendency of farmers to jump into a decision on the basis of ruling price levels and
later on discover that the prices have crashed when they are ready to sell their produce
at the end of the season.

Credible and timely information plays a crucial role in agricultural marketing,
particularly for perishables. Due to lack of proper market information channel and
interference of middle man, the farmers have been exploited often and forced to sell
their produce at lower price in their nearby market. The harvested produce can be sold
at a premium price information of the nearest alternative markets is disseminated to
farmers on demand and daily basis. They can make better decision to harvest the
produce at right time and send their consignment to particular market where the
market price is higher for his/her produce.

In a study of jute marketing it has been observed farias, aratdars and balers are
the dominant intermediaries in the marketing of raw jute by which jute reaches to
ultimate consuming point at jute mills (Bhowmick, 2013). Though JCI (Jute
Corporation of India) and co-operative societies are also one of the functionaries in
the jute marketing process but no sample farmer sell their produce to JCI and co-
operative societies in the study area and maximum number of sample farmers have
not heard the name of any cooperative society and also no cooperative society really
purchases jute from the farmers.

From the study of 260 farmers it is observed that marketing of jute from the
producer to the consumer (Jute Mill) is done mainly through following four channels.

Channel I Farmer - Faria - Aratdar - Baler - Jute Mills
Channel II Farmer - Faria - Baler - Jute Mill
Channel III Farmer - Aratdar - Baler - Jute Mill
Channel IV Farmer - Baler - Jute Mill

The study revealed 71.72 percent of total farmers followed marketing channel-
I. Channel-I is the commonest channel followed by farmers. Then 15.77 percent
farmers followed marketing channel-II, 6.54 percent farmers followed marketing
channel-IV and remaining 5.77 percent farmers followed marketing channel-III. The
study also revealed that 67.78 percent of total produce of the sample farmers was sold through channel-I followed by channel-II (13.97 percent), channel-III (9.25 percent) and channel-IV (9.00 percent). It is clear that channel-I is most important channel through which major portion of raw jute is being marketed by maximum no of farmers. In channel-I farmers sold their produce in the village primary market where farias(middlemen) are the major intermediary. The reason is that most of the small and medium farmers have various constraints to access long distance secondary market. They cannot access information about price of the produce in the long distance secondary market. On the other side village market is easy to reachable where the farmers can access market information.

7.19: Conclusion

Agriculture is a prime sector for development in an agrarian economy. The rural livelihood primarily depends upon the agricultural development. Among other instruments of development of agriculture the provision of right information to the agricultural stakeholders has yet to be designed. Access to right information and its proper utilisation for the farming community is utmost important. There is a need to develop a system of information utilizing the modern information communication techniques so that the farmers are provided with the required market information at the village itself so as to make appropriate decisions with respect to production and marketing plans including post harvest management storage, processing and sale of agriculture commodities. Government should make the provision of information to increase efficiency and improve the performance of the agricultural economy. There is a greater need of assessing the information needs of the agricultural stakeholders so as to know their information requirements.
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