Impact of an Innovative Market Information System for Pulses in Northern Karnataka

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Abstract

Access to information can be truly empowering and aid decision-making, especially in agriculture. Recently, the government and private agencies initiated few programs for adoption of Market Information Systems (MIS) in the areas of agricultural marketing and agribusiness development in the country. In this context, an attempt was made in this paper to analyze the results of one such innovative project for disseminating market-related information to the pulses growing farmers in the Hyderabad-Karnataka region by taking into consideration the before and after situations. The results revealed that majority of farmers possessed communication assets like television and cell phones, but did not have knowledge about area under crop sown, awareness of quality specification of N-spot exchange, and prices of dals prevailing in the neighboring markets, even though the formal agencies were distributing information on the same. The results after the project's implementation proved that majority of the farmers were fully aware of the following: prices of pulses in the market, quality of seeds for sale, fertilizers, manures & micronutrients, and plant protection chemical application while production, and so forth. Majority of the respondent farmers started using the disseminated information to decide which pulses were to be grown and how much area was to be allocated in the process of production decisions; and in case of marketing, when to sell, where to sell, whom to sell, and what quantity was to be sold. The study suggested strengthening the existing formal sources of agricultural extension, including post harvest and marketing management techniques in transfer of technology programmes, and disseminating information using modern information communication technologies.

Keywords: MIS in agriculture, pulses marketing, awareness on MIS, sources of market information, information communication technologies

Paper Submission Date : January 13, 2014 ; Paper sent back for Revision : May 19, 2014 ; Paper Acceptance Date : June 4 , 2014

In the marketing mix, price is the only element that generates a turnover for the organization, the remaining 3Ps (place, product, and promotion) are the variable costs. Throughout most of the history, prices were set by negotiation between buyers and sellers, and that remains the dominant model in many economies. However, like many other things, emergence and growth of e-commerce technology has reshaped the pricing landscape (Singh & Paliwal, 2010). An information system in an organization is like the nervous system in the human body; it is the link that connects the organization's components together and provides better operation and survival in a competitive environment. Access to information can be truly empowering and aids decision-making, especially in agriculture (rural areas) because millions of small holders and illiterates have been exploited by consolidated brokers, traders, and commission agents in this country, and numerous efforts have been made to redress this issue.

Market Information Systems (MIS) have been developing over the past 15 years. The government institutions initiated few programs for adoption of MIS in agriculture, especially in the areas of agricultural marketing and

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agribusiness development in the country. They now engage private operators such as professional organizations and companies to include information on aspects other than pricing alone and foster the emergence of inter-country MIS networks.

The Indian marketing system underwent a significant change after the economic reforms. Infrastructure development is the critical factor for determining the success of any marketing system. Both domestic and global players are trying to capture the Indian market. Hence, market information is an essential tool in agricultural value chains and in sound agricultural marketing policies for ensuring fair returns to farmers. Therefore, MIS becomes necessary on the part of regulatory agencies to ensure remunerative prices to farmers for sale of their produce, and to boost up their efforts for increasing income-generation opportunities and sustainable agricultural production. A number of measures have been taken-up by the government to safeguard the interests of the farmers through regulation of markets, grading of agricultural produce, cooperative marketing, and so forth. Still, the benefits are not percolating down to farmers, as they are unable to plan their strategies for sale of their produce at remunerative prices in the absence of correct and timely available market information and advice about arrivals, prices, market trends, and so forth. Markets with scientific measures of regulation and good participation of the stakeholders will be able to meet the challenges of supply and demand distortions.

Information about market performance, weather forecasts, and supply & demand depends upon the level of satisfaction of market users, which influences market arrivals. Arrivals supported by infrastructure and able administration will help farmer sellers to get remunerative prices. Thus, marketing information helps farmers to identify the right market, right price, and the right time to sell their produce. Information related to crop area, production, and selling behaviour of farmers will help the policy makers to develop the markets in the right direction of development. Imperfections in data have caused major losses to the small and marginal farmers who get exploited, but in contrast, better gains were found (in pulses) on which future data was available (Sukhadeve & Biyani, 2012). Markets dealing with identical commodities getting integrated with the help of information will facilitate uniform agricultural growth. Quality of market information available in time at reasonable costs will enhance the number of participants in trading activity, which in turn, stabilizes the prices. Thus, market information has a direct role even in the distribution of the produce and balancing the price levels.

Understanding the importance of information in agriculture and the prevailing system of dissemination of information by formal agencies in the Hyderabad-Karnataka region (H-K Region), a new project on MIS (as indicated in the Figure 1) was implemented by the University of Agricultural Sciences, Raichur (UASR) for pulses producing farmers during 2011. To analyze the impact of this new project, an attempt was made by us to consider the situations before and after the implementation of the said project. Gulbarga district was identified for the study as it is one of the largest pulses growing area in the state. Dissemination of information related to current (live) prices of pulses in different markets (such as Gulbarga Agricultural Produce Marketing Committee (APMC), Marketing Board, National Spot (N-Spot) Exchange, and Krishi Vigyan Kendras (KVKs)), its trend over the years, and expected prices in future were made available to selected farmers to help them take decisions on production, marketing, and processing of the produce. The study was undertaken to help the researchers, academicians, and administrators to formulate sound agricultural marketing policies for pulses in general, and for the dissemination of MIS in particular. In turn, the study would also help agricultural scientists to develop suitable varieties for the farmers and to suggest appropriate policy measures relating to their operations, governance, and financial sustainability. Keeping these facts in mind, the following objectives were set for the study:

(1) To understand the socioeconomic characteristics and possession of audio-visual communication assets by the farmers.

(2) To determine the awareness on MIS before and after the implementation of the project.

(3) To identify the sources and usage of market information at different levels.

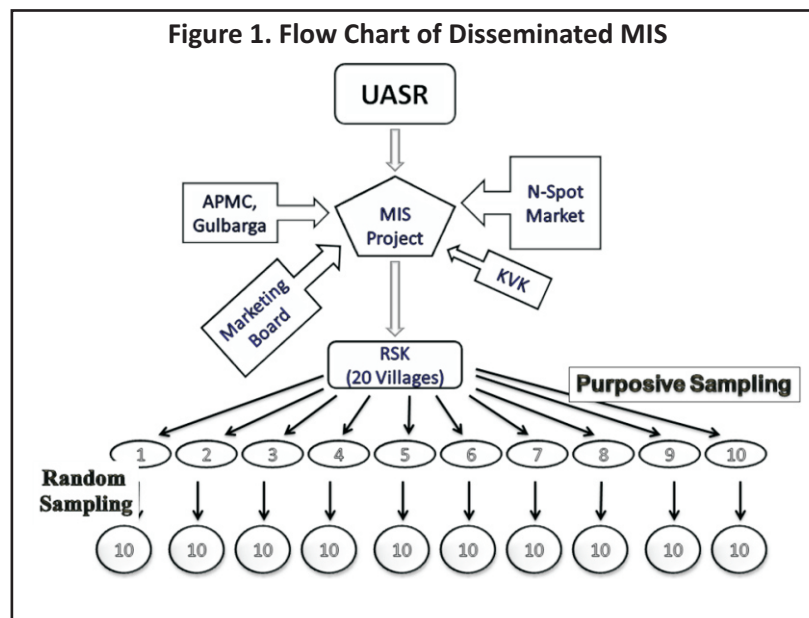**(4)** To estimate the extent of utilization of MIS by the farmers.

Figure 1. Flow Chart of Disseminated MIS

Table 1. Sample Villages and Respondents of Pattan RSK of Gulbarga District, Karnataka

SN.	Name of the Village	Sample Farmers	Information Disseminated
1	Pattan	10	1. Quality of seeds, fertilizer, PPC, manures, and their price.
2	Hatgunda	10	2. Prices of pulses
3	Bheemalli	10	3. Quality and grade specification of pulses
4	Taj Sultanpur	10	4. N-Spot grade specification
5	Savalagi	10	5. Prices of dals in the reference market
6	Sindagi	10	6. Prices of pulses and dals in other markets
7	Babalad	10	
8	Melakund	10	
9	Machnal	10	
10	Shrinivas Saradagi	10	
	Total	**100**	

Methodology

Karnataka is one of the important pulses growing states in the country, and the H-K Region is known for cultivation of pulses, and the region alone contributes 80% of the state's pulses production, and hence, it is called as the 'pulses bowl of Karnataka'. As the project was initiated by the University for disseminating market related information (as shown in the Figure 1) to pulses growing farmers in the H-K region, we decided to analyze the impact of the project in the pre and post period of the project implementation during 2011 and 2012.

To represent before and after situations, a base line survey was conducted, and the observations/results were compared with the post study period. To study the existing agricultural marketing information system and its dissemination, Gulbarga APMC market was selected purposively as the district alone accounts for 67-70% of the total pulses production in Karnataka in general and red gram in particular. To study the sources of agriculture market information and their utilization among farmers, Raitha Samparka Kendra (RSK) constituting 20 villages was selected. The Pattan Raitha Samparaka Kendra was purposively selected because it is well connected to Gulbarga APMC, KVK, and Agriculture College. Furthermore, 10 villages within the coverage of Pattan Raitha

Table 2. Socioeconomic Characteristics of the Sample Farmers

SN.	Particulars	Small (52)		Medium (40)		Large (8)		Overall (100)	% to Total
		No.	%	No.	%	No.	%	No.	
A.	**Socioeconomic information**								
1.	Average Age (Yrs)	39.50	--	35.60	--	43.00	--	39.37	--
2.	Education								
a.	Illiterate	25	48.08	10	25.00	01	12.50	36	36.00
b.	Primary	16	30.77	19	47.50	03	37.50	38	38.00
c.	Higher	07	13.46	05	12.50	01	12.50	13	13.00
d.	Collegiate	04	7.69	06	15.00	03	37.50	13	13.00
	Total	**52**	**100.00**	**40**	**100.00**	**08**	**100.00**	**100**	**100.00**
3.	Average family size	5.70	--	4.30	--	6.20	--	5.50	
4.	Land holdings(Ha)								
a.	Irrigated	0.31	4.13	0.85	27.33	1.14	68.53	7.50	37.43
b.	Rainfed	0.85	6.78	3.43	35.33	5.26	57.89	12.54	62.57
	Total	**1.16**	**9.80**	**4.28**	**36.15**	**6.40**	**54.05**	**3.95**	**100.00**
B.	**Possession of AV and communication system assets**								
a.	Radio	12	12.00	15	15.00	02	2.00	29	29.00
b.	Television	43	43.00	48	48.00	08	8.00	99	99.00
c.	Mobile Phone	51	51.00	40	40.00	08	8.00	99	99.00
d.	Newspapers	--	--	--	--	08	8.00	58	58.00
e.	Krishi Magazines	--	--	--	--	04	4.00	04	4.00

Samparka Kendra were selected for the study, and from each selected village, 10 farmers were chosen randomly, constituting a total sample size of 100 farmers. The details of the selected village information were collected and were used for drawing meaningful conclusions. The important commodities selected for dissemination of MIS information were red gram, green gram, back gram, and Bengal gram in addition to prices of important inputs used in cultivation of pulses. To find out the nature, extent, sources, utilization, and expectations of the market information system by the farmers, multiple cross-tabular analysis was used for working-out simple averages and percentages. The Table 1 presents the names of the villages, size of sample farmers, and the information disseminated by RSK in the study area.

Analysis and Results

⮂ **Socioeconomic Characteristics and Possession of Audio-Visual Communication Assets:** The socioeconomic characteristics of the sample farmers and audio-visual (AV) communication assets possessed by them are presented in the Table 2. The average age of the farmers was about 39 years with a family of 5.5 members. By and large, 36% of the farmers were illiterate, and about 38% of them had been to primary school. Farmers educated upto higher school and collegiate accounted for 13% each. Among illiterates, 48% of the farmers were of small category, followed by medium (25%), and large (12%) categories. Majority (63%) of the farmers had land holdings under rainfed conditions, while the remaining (37%) had land under irrigated situations since pulses are grown in both rainfed and irrigated situations. As usual, a large category of farmers held more area under irrigation.

The possession of communication assets owned by the respondents indicated that almost all (99%) respondents owned televisions and cell phones, whereas 29% of the respondents owned radios in an overall category of farmers. Interestingly, none of the small and medium farmers subscribed to either newspapers or any agriculture-

Table 3. Farmers' Awareness About Market Information Before and After Implementation of the MIS Project

SN.	Particulars	Small(52)		Medium(40)		Large(08)		Overall	% to Total
		No.	%	No.	%	No.	%	No.	
A.	**Before Implementation of the Project**								
1.	Quality of seeds and their price	21	21.00	23	23.00	06	6.00	50	50.00
2.	Quality of fertilizer and its price	24	24.00	28	28.00	06	6.00	58	58.00
3.	Price of manures & micro nutrients	23	23.00	27	27.00	05	5.00	55	55.00
4.	Quality of PPC and its price	29	29.00	21	21.00	06	4.00	54	54.00
5.	Prices of pulses in the reference market	23	23.00	26	26.00	05	5.00	54	54.00
6.	Area of the crop sown	--	--	07	7.00	07	7.00	14	14.00
7.	Quality and grades required	11	12.00	13	13.00	03	3.00	27	27.00
8.	Awareness of FAQ quality								
	Specifications of N-Spot	--	--	--	--	02	2.00	02	2.00
9.	Prices of Dal in the reference market	05	5.00	04	4.00	02	2.00	11	11.00
10.	Prices of Dal in other markets	--		--	--	--	--	--	--
B.	**After Implementation of the Project**								
1.	Quality of seeds and their price	41	41.00	43	43.00	06	6.00	90	90.00
2.	Quality of fertilizer and its price	41	41.00	39	39.00	06	6.00	86	86.00
3.	Price of manures & micro nutrients	37	37.00	35	35.00	06	6.00	78	78.00
4.	Quality of PPC and its price	35	35.00	34	34.00	08	8.00	77	77.00
5.	Prices of pulses in the reference market	52	52.00	40	40.00	08	8.00	100	100.0
6.	Area of the crop sown	28	28.00	19	19.00	08	8.00	55	55.00
7.	Quality and grades required	39	39.00	28	28.00	06	6.00	73	73.00
8.	Awareness of FAQ quality specifications of N-Spot	41	41.00	30	30.00	06	6.00	77	77.00
9.	Prices of dal in the reference market	37	37.00	34	34.00	08	8.00	79	79.00
10.	Prices of dal in other markets	17	17.00	23	23.00	08	8.00	48	48.00

related magazines, but about 58% of the large farmers subscribed newspapers, and out of this percentage of respondents, 4% were also reading agricultural magazines. However, no farmers in the category of small and medium farmers subscribed to either newspapers or any other agricultural magazines.

⮞ **Awareness of MIS Before and After Implementation of the Project:** The Table 3 presents data regarding the awareness of the sample farmers on different components of market information before and after implementation of the project on MIS for pulses in Northern Karnataka. Before implementation of the project, more than half (50-58%) of the total respondents revealed that awareness on inputs like quality and price of seeds, fertilizers, manures and micro nutrients, and plant protection chemicals (PPCs) were moderate. However, awareness about area under crops (14%), quality of graded produce required for marketing (29%), prices of dal in the reference market (11%) as well as in the neighboring markets was found to be poor.

After implementation of the project, the results revealed that majority (more than 80%) of the farmers were fully aware about the following : the prices of pulses in the reference market (100%), quality of seeds (91.67%), fertilizers (88.33%), manures and micronutrients (81.67%), and PPCs (80.83%). On the other hand, a significant improvement was found in the awareness levels regarding the quality of produce required for marketing in APMC and N-spot market when compared to the results before (2 % of the respondents) and after (more than 70% of the respondents) initiation of the project. Majority of the farmers were not aware of the market information pertaining to preparation of the produce for the market by cleaning, drying, sorting, and packing. As a result, the market

extension activities need to be strengthened to create awareness among the farmers on post harvest handling of the crops. In the existing agricultural extension education, only production technologies up to harvesting are covered, ignoring post harvest management and other marketing aspects. Therefore, post harvest and marketing management techniques need to be covered in transfer of technology (TOT) programmes of various public and private agriculture related institutions like State Department of Agriculture, State Agricultural Universities (SAUs), Krishi Vikas Kendras (KVKs), and so forth. In addition, production and post harvest management techniques may also be disseminated along with market information using information communication technologies (ICTs).

The category wise comparison of farmers before implementation of the project indicates that the respondent farmers did not have much knowledge about area of the crop sown (27%), awareness of FAQ quality specification of N-spot (2%), and prices of dals prevailing in neighboring markets. It is interesting to note that small farmers were not at all aware of area under crop, quality of product/ grade required for online trading of tur by N-Spot exchange, or even of scientific post harvest handling of the produce. In case of large farmers, the extent of awareness regarding the said components was found to be higher than what was possessed by the medium farmers.

Before implementation of the project, respondents were not fully aware of prices and quality of inputs used in the production of pulses. Majority of the respondents opined that spurious and low quality of inputs were available in the market and they were paying a higher price for the same. This resulted in decline in yield and income of the farmers. Therefore, it is necessary to strengthen the existing formal sources of market information and communication technologies to provide relevant and scientific information to the farmers and other stakeholders so as to enable them to make the right decisions in their production and marketing of pulses. In this regard, networking of market information at hobli level in the state through existing RSKs with one subject matter specialist of SAUs for 8-10 villages, and formation of Village Knowledge Centers (VKCs) needs to be developed.

⊃ **Sources and Usage of Market Information at Different Levels:** The sources of market information at different administrative levels such as the household, village, and market levels were compared and are elicited in the Table 4.

➔ **At the Household level:** At the household level, mobile phones (46.67%), televisions (35.83%), and radios (35.83%) were the important sources of market information for small category of farmers, whereas mobiles (41.67%) and televisions (40.00%) alone played an important role in the case of medium category of farmers. However, the large category of respondents were not dependent on village-level information due to their direct accessibility with the market intermediaries at the market level. Finally, the overall category of respondents revealed that mobile SMS by different market agencies like Karnataka State Agricultural Marketing Board (KSAMB), KVKs, SAUs, input dealers, N-spot agencies, and commission agents-cum-wholesaler/processors were their main sources of market information. This clearly indicates that farmers were getting market information at the village level for making their decisions about where, when, and to whom to sell, what are the grades of commodities to be sold, and so forth.

➔ **At the Village Level:** With reference to the overall respondents' opinion, the main sources of information at the village level were village traders (84.17%), friends (75%), followed by Raitha Samparka Kendra-(RSK) (45.83%), and neighbours (40%). It is important to note that the role of institutional agencies like co-operative credit society (1.67%), gram panchayat (4.17%), and agriculture assistants were very meager as they did not provide any market-related information, but their main role was to disseminate the required information about new technology and other agriculture related aspects to the farmers. However, Raitha Samparka Kendras (RSK) are part of the sources of market information to the farmers at the village level and need to be strengthened by employing exclusive persons for MIS.

➔ **At the Market Level:** N-Spot officials (95.83%), commission agents (62.50%), and input dealers (39.17) were

Table 4. Sources of Market Information for the Farmers at Different Levels

Sl No.	Particulars	Small(52)		Medium(40)		Large (08)		Overall	% to Total
		No.	%	No.	%	No.	%	No.	
A.	**At the household level**								
1	Radio	43	35.83	26	21.67	02	1.67	71	59.17
2	Television	43	35.83	38	40.00	08	6.67	99	82.50
3	Newspapers	21	17.50	27	22.50	06	5.00	54	45.00
4	Mobile	46	46.67	40	41.67	08	6.67	114	95.00
5	Magazines	--		09	7.50	01	0.83	10	8.33
B.	**At the village level**								
1	Gram Panchayat	--		05	4.17	--	--	05	4.17
2	Co-op credit society	02	1.67	--		--	--	02	1.67
3	Raith Samparka Kendra	23	19.17	29	24.17	03	2.50	55	45.83
4	Friends	47	47.50	28	23.33	05	4.17	90	75.00
5	Neighbours	19	15.83	25	20.83	04	3.33	48	40.00
6	Village traders	47	47.50	38	35.00	02	1.67	101	84.17
C.	**At the market level**								
1	N-spot officials	48	48.33	39	40.83	08	6.67	115	95.83
2	Commission agents	36	30.00	34	28.33	05	4.17	75	62.50
3	KSAMB Officials	19	15.83	13	10.83	02	1.67	34	28.33
4	Announcement by APMC	21	17.50	27	22.50	06	5.00	54	45.00
5	Display boards in APMC	10	8.33	17	14.17	--	--	27	22.50
6	Input dealers	29	24.17	18	15.00	--	--	47	39.17

the main sources of market information as per the opinion of the overall categories of farmers. Interestingly, the formal agencies like market intelligence cell and regulated markets at the market level did not form the major sources of market information for the farmers. Similar observations were made by Bo and Yibio (2003) in China, Rana and Wenny (2003) in Indonesia, Gunatilke (2003) in Sri Lanka, and Shreshtha (2003) in Nepal. This calls for the development of a system of market information utilizing the modern information communication techniques like linking all RSKs with the market intelligence cell, so that the farmers can be provided with the required information so as to make appropriate decisions at the village level only. These results are also supported by the results obtained by Kumar (2011) at the multinational level (India, Indonesia, and Uganda). Kumar's study reported that for market information, farmers relied very little on the Internet, but turned to multiple other sources, including farmer organizations, other farmers, newspapers, radio, TV, and short messaging services (SMS) & voice services. Technical advice was the most popular agricultural information service provided via phone-in hotlines, followed by SMS-based technical and weather advice, with SMS-based market price services coming third in Uganda.

The information on prices of pulses was collected from APMC officials and was distributed daily during the sowing and harvesting seasons. The APMC officials were disseminating market information on a daily basis to the district information officer, All India Radio (AIR), newspapers, television, the Internet, and the district statistical officer ; whereas information was transmitted to Karnataka State Agriculture Marketing Board (KSAMB) on a weekly, monthly, and annual basis. As per the base line survey, which was conducted before implementation of the project to evaluate the knowledge regarding MIS, the respondents revealed that though formal agencies were distributing information on arrival, prices, and quality of pulses through different means, they had very poor knowledge about arrivals, prices, quality of the produce, and quality specification of N-spot, and so forth.

Table 5. Frequency of Usage of MIS by the Respondents During the Harvesting Season

Sl No.	Particulars	Before Project Implementation (No.)				After Project Implementation (No.)			
		Daily	Weekly	Sometimes	Don't know	Daily	Weekly	Sometimes	Don't know
1	**Quantity arrival in**								
a.	Reference market	--	18	31	71	76	32	10	02
b.	Neighboring markets	--	13	15	92	74	27	13	06
2.	**Prices of pulses in**								
a.	Reference market	23	22	15	60	97	21	02	--
b.	Neighboring markets	15	17	14	74	81	23	14	02
c.	N-Spot Gulbarga	--	--	--	120	86	26	05	03
3.	**Information about quality of**								
a.	Produce arrived in reference market	16	17	15	72	77	27	11	05
b.	Price range in reference market	--	21	21	78	88	22	06	04
4.	**Quality/Grades required in**								
a.	Reference(Gulbarga) market	21	10	08	72	99	14	06	01
b.	N-Spot Gulbarga	--	--	--	120	84	23	09	04

However, after implementation of the project (results of the survey presented in the Table 5), it was revealed that the respondents were quite receptive and had full knowledge regarding the selected components as indicated in the Table 5.

⊃ **Extent of Utilization of Market Information:** The Table 6 presents the extent of utilization of information on arrivals, prices, and quality of the produce before and after the implementation of the project in the study area. The utilization of information was very poor during the pre implementation of the project, especially among the small farmers, who did not utilize or were not bothered about the information while making decisions of any kind. However, after implementation of the project, almost all respondents started using information to decide which pulses had to be grown (97%), and how much area was to be allocated (86%) in the process of the production decisions. In case of marketing, when to sell (92%) was the most important decision taken by the respondents for selling their produce, followed by where to sell (89%), whom to sell (83%), and what quantity was to be traded (77%). It was observed that only few farmers used market information for making post harvest handling decisions. However, majority (94 %) of the respondents used MIS information for taking decisions regarding bagging and transportation, followed by grading (86%), and drying & cleaning (75%). Whereas, farmers showed disinterest in the use of facilities available for pledge loan, processing, and storage, indicating difficulties in storage of produce and getting pledge loan from APMC and other institutions.

Research Implications

In this era of liberalization, the developments in modern information communication technologies (ICTs) have been playing a crucial role in the field of agriculture. Most of the communication assets like cell phones, TV, newspapers, and many other agricultural magazines, and so forth have become more popular and accessible nowadays. In this context, the study helped us in deriving some of the research implications, which are as follows :

(1) Poor awareness of farmers on available market information before implementation of the project clearly highlights the need to create awareness regarding market led extension among farmers.

(2) Farmers' dependence on informal sources such as fellow farmers, friends, and relatives for market information

Table 6. Utilization of MIS by Respondents Before and After Implementation of the Project

Sl No.	Nature/Type of Decision	Extent of Information Utilized by the Respondents (*N*= 100)			
		Before Implementation of Project		After Implementation of Project	
1	**Production decisions**				
a.	Pulses to be grown	41	41.00	97	97.00
b.	Area under crop	11	11.00	86	86.00
2	**Selling decisions**				
a.	Where to sell	23	23.00	89	89.00
b.	When to sell	35	35.00	92	92.00
c.	Whom to sell	--	--	83	83.00
d.	Quantity to sell	22	22.00	77	77.00
3	**Post harvest handling decisions**				
a.	Maturity of grains	13	13.00	64	64.00
b.	Drying & Cleaning	19	19.00	75	75.00
c.	Grading	04	4.00	86	86.00
d.	Bagging & Transportation	17	17.00	94	94.00
e.	Storage	--	--	67	67.00
f.	Availing pledge loan	--	--	33	33.00
g.	Processing	--	--	41	41.00

indicates the inability of formal sources in disseminating the required information to farmers, which calls for revitalizing the market intelligence system in public institutions like State Department of Agricultural Marketing, KSAMBs, State Agricultural Universities, and so forth using modern communication technologies.

(3) Post harvest and marketing management techniques need to be covered in transfer of technology (TOT) programmes of various public and private institutions related to agriculture, and the information can be disseminated along with market information systems. In this regard, networking of all the information at the hobli/block level in the state through the existing RSKs, with one subject matter specialist of State Agricultural Universities (SAUs) for 8-10 villages, and formation of Village Knowledge Centers (VKCs) needs to be undertaken.

Conclusion

Market information has a direct role in even distribution of the produce and balancing the price levels. Dissemination of information related to prevailing prices of pulses, arrivals, and its quality will definitely help farmers to decide about their operations, production, and marketing strategies. The study revealed that majority (99%) of the farmers possessed communication assets like television and cell phones, but more than half of the large farmers also subscribed to newspapers and agricultural magazines but did not have knowledge about area of crop sown, awareness of FAQ quality specification of N-spot exchange, and prices of dals prevailing in the neighboring markets.

After the implementation of the MIS project, majority (>80%) of the farmers were fully aware of pulses prices in the market, quality of seeds for sale, fertilizers, manures & micronutrients, and PPC application while production, and so forth. A significant improvement was observed in awareness regarding the quality of produce required for marketing in APMC and N-Spot markets when compared to the results before (2 % of the respondents) and after (more than 70% of the respondents) initiation of the project. The main sources of information at different

users levels were mobile SMS by different market agencies, input dealers and commission agents-cum-wholesalers/processors, village traders, friends and neighbors, RSK and N-Spot officials. Interestingly, the formal institutional agencies like market intelligence cell, regulated markets, co-operative credit societies, gram panchayats, and agriculture assistants did not form the major sources of market related information. Though the formal agencies were distributing information on arrivals, prices, and quality of pulses through different means, farmers had very poor knowledge about arrivals, prices, quality of the produce, and quality specifications of N-spot, and so forth. However, results after implementation of the project revealed that respondents were quite receptive and had full knowledge regarding the selected components. Majority of the respondents started using Zinformation while making operation, production, post-harvest, and marketing decisions. In fact, about 94% of the respondents used MIS information for decisions regarding bagging and transportation, followed by grading (86%), drying and cleaning (75%), but showed disinterest in the use of facilities available for pledge loan, processing, and storage, indicating difficulties in storage of produce and getting pledge loan from APMC and other institutions.

Limitations of the Study and Scope for Further Research

The project was implemented by the University as an experimental basis for a limited period of time (1 year), in a limited area (Gulbarga alone), and for a limited crop (pulses).The sample size was also small to generalize the results . In addition, the reliability of the primary data is limited to the opinions expressed by the farmers.

There are several technological innovations that are taking place in the field of agricultural marketing information systems at both the national and state level by public and private organizations. The present study throws light on various issues related to awareness, reliability, and dissemination of market information on pulses crops as these crops are the major crops in the study area. Therefore, future research studies can be conducted on other aspects such as the role of other innovations and their impact on various stakeholders of agriculture who are at different stages of the value chain. A cost-benefit and comparative analysis can also be undertaken to draw policy implications on the efficiency and effectiveness of these innovations for the farming community. In addition, similar studies can also be taken up for different categories of crops based on the specialization of the crops in those areas.

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